



SCHOOL OF EDUCATION

**Utah Valley State College
Teacher Education Program
Landform Discovery Lesson Plan #3**

Name: Erica Fordiani **Date:** November 2008 **Time:** 1 ½ hours

Grade Level: 4 **Subject:** Social Studies **Cooperating Teacher:** Kristin Wright

- I. Utah State Core Curriculum Standard(s)
 - a. **Understand:** Standard 1—Students will understand the relationship between the physical geography in Utah and human life.

- II. Lesson Objective(s)/Goal(s)
 - a. **Know:** Objective 1—Classify major physical geographic attributes of Utah. Objective 2—Analyze how physical geography affects human life in Utah. Objective 3—Analyze how human actions modify the physical environment.
 - b. **Do:** 1.a. Identify Utah’s landforms using a variety of geographic tools. 1.b. Examine the forces at work in creating the physical topography of Utah (e.g. erosion, seismic activity). 2.e. Examine the interactions between physical geography and public health and safety (e.g. flooding). 3.a. Describe how and why humans have changed the physical environment of Utah to meet their needs (e.g. cities).

- III. Preparation (teacher materials, student materials, etc.)
 - a. Teacher: CD player, CD with song “Utah, This is the Place,” transparency pictures of a mountain, plateau, and basin, moist sand in large shallow plastic bin, equal amounts of dirt in two large shallow plastic bins, small amount of weeds, grass, bark chips, leaves, a watering can, a plastic cup, two large pieces of paper that have the below mentioned questions on them. Place two paper sentences (see below) up in the room on large pieces of paper.
 - b. Student: lyrics to song, pencil and paper
 - c. Vocabulary Use: landform, canyon, mountain, basin, plateau, valley, sand dune, erosion, butte, fault, magma, uplift, vegetation

- IV. Technology Use:
 - a. CD player, overhead projector

- V. Instructional Procedures:
 - a. Sing Utah song.
 - b. Pre-Assessment—Write landforms on the board and ask students to tell everything they know about the word. Write what they tell you under the word.

- c. Tell students that we are going to learn about some of Utah’s landforms and how they were formed by doing a few activities first. Remember that a landform is a natural feature on earth’s surface like a mountain or lake.

- d. Background Information for Teacher:

Plateaus are broad flat-topped mountains with steep sides. They form due to a number of tectonic forces. This activity will discuss four different ways plateaus form.

As upwelling magma pushes its way toward the surface but does not break through, it can push up large flat areas. This magma plume can be created from a melting sub ducted plate. Scientists believe that this is one process that helped to form the Colorado Plateau.

As a plateau region elevates, stresses cause breaks in the crust known as faults. A fault often separates smaller plateaus from one another on the Colorado Plateau. As a result of faulting, some of the uplifted regions are pushed higher than the surrounding area.

Erosion helps to define one plateau from another. Rivers follow the path of least resistance, where rocks are weakest. Rocks near faults tend to be weak and broken. Flowing water easily cuts into broken rock along a fault and over time forms a broad river valley. Separation by the new valley allows us to easily differentiate between plateaus.

A large concentration of plateaus is found within the Colorado Plateau (uplifted 10-15 million years ago). It is an uplifted region broken into many smaller plateaus. It comprises portions of four states: Utah, Arizona, New Mexico and Colorado. All of the Colorado River drainage basin is located on the Plateau, and thus its name.

Smaller structures resembling plateaus are known as mesas and buttes. Mesas are like plateaus, only smaller. Buttes are even smaller than mesas. On the side bar there is a list of National Parks found on the Colorado Plateau. Each National Park protects a unique feature created by the Plateau uplift. The following activity allows students to create plateaus in a few different ways.

- e. **Show** a picture transparency of each landform (mountain, plateau, basin,) below before demonstrating.
- f. Explore the Problem—**Plateaus** (seismic activity)
 - i. Ask, “Have you ever seen a flat-topped mountain? How are they created?” In this activity, students see how broad uplifted areas breakup, forming plateaus such as those on the Colorado Plateau.
 - ii. Sand plateaus (represents upwelling forces)
 - 1. Use a large flat plastic storage bin.
 - 2. Place a student's hand flat on the bottom of the bin.
 - 3. Pour sand over student's hand, forming a layer 2 inches thick. Make sure sand is 5 inches around the student's hand.
 - 4. Compact the sand so that it is flat.
 - 5. Have the student lift his/her hand upwards a little. (This is represents magma upwelling in the mantle). Repeat the process multiple times with more than one hand in the sand.
 - 6. Discuss how water is like a river and will erode where the faults are because the rocks are weakest.
 - 7. Show what a mesa and butte are.
 - iii. Discussion:

1. Explain to students that their action in uplifting the sand cake is taking the place of magma rising to the surface of Earth. The irregular uplifting caused by the students resulted in small breaks in the sand. In nature these would be called faults. Ask students how erosion may separate the broken sand cake into plateaus. How can the Colorado Plateau be more than one plateau? Why is the entire region uplifted? What can happen to land that is uplifted? Why?
- g. Activity—**Basin** (seismic activity)
- i. Demonstrate in the sand a bowl shaped area with hills or mountain around it. Show the transparency of a basin and describe it's characteristics to the students.
- h. Formative assessment—Observe that students are engaging in the activities and are voicing their opinions when asked specific questions outlined in the lesson.
- i. Activity—**Mountains** (water erosion, formed by seismic activity)
- i. Use sand bin to demonstrate mountain formation.
 1. Flatten sand and draw a line between the shorter sides of bin. "This is a fault line. The earth has a crust just like an apple has a skin. The crust is split into sections that sometimes move. When they do we have earth quakes and land changes."
 2. Put your hands in the sand about eight inches away on either side of the fault line and push the sand together until it forms a mountain. Point out the characteristics of a mountain and how valleys were created on either side.
 - ii. Ask, "Remember how there was a fire on our mountain here in Payson during the summer ('08)? Much of the trees, bushes and grass were burned off. Can that affect us?" Have them think about the answer to this question as we do the activity below.
 - iii. Activity—**Erosion**—Use one of the bins with dirt and push the dirt to one side where the dirt gradually sloped down like a hill and tell the students it represents the side of a mountain. Add weeds, bark chips, leaves, and grass. Place toy people at the bottom if available. (Playmobil tents and people work very well!) "This represents a mountain side that has vegetation like trees and bushes."
 1. Fill the watering can with water and have student pour water into plastic cup that has small holes poked into the bottom. This will simulate rain. Tell students that you are going to have it rain three full cups on our mountain. This was our mountain before the fire.
 2. Use the next bin with unused dirt and shape into a side of mountain.
 3. "This represents our mountain now. All of the vegetation was burned off because of a man made power line." Have it rain three cups full and ask why the water slides off and piles up at the bottom of the bin. Are there homes at the bottom of our mountain? This is called a mud slide. We need vegetation to grow back quickly to keep this from happening.

4. Discuss with students how vegetation like trees and bushes hold the soil in place. When they are gone, either through a fire or someone cutting them down, there is a chance for a land or mud slide because the dirt has nothing keeping it in place.
5. Point out the **two papers with the questions**: How can Utah's physical geography affect human life in Utah? How do human actions modify or change the physical environment? Ask students to offer suggestions.
6. Point out that Humans have changed the physical environment of Utah to meet their needs. One example is the power line that fell over and started the fire. Humans need towns and cities to live in with power available.
7. Post Assessment—Ask students to take out a piece of paper on which they will list one way in which a plateau, basin and mountain were formed. They will also write one paragraph answers that include one correct example each (remind them they may use the erosion activity example) to each of the questions: How can Utah's physical geography affect human life in Utah? How do human actions modify or change the physical environment?

Accommodation(s) for Diverse Learner(s)

- j. Group hands-on activity and class discussion to develop concept of landforms found in Utah.

VI. Evaluation of Student Progress

- a. Pre-assessment—Write landforms on the board and ask students to tell everything they know about the word. Write what they tell you under the word.
- b. Formative assessment—Observe that students are engaging in the activities and are voicing their opinions when asked specific questions outlined in the lesson.
- c. Post assessment—Students will list one way in which a plateau, basin and mountain were formed. They will also write one paragraph answers that include one correct example to each of the questions: How can Utah's physical geography affect human life in Utah? How do human actions modify or change the physical environment?

Source for plateau activity idea: <://www.nps.gov/brca/forteachers/landformact5.htm>.