Lesson Plan by Anna Clark, Tiffany Maple, Dawa Sherpa, and Becky Welker

UNIT THEME: Indiana

Lesson: What shaped Indiana
Length: two 50 minute class periods

Age or Grade Intended 4th grade

Academic Standard(s):
Science - 4.3.5 Describe how waves, wind, water, and glacial ice shape and reshape Earth’s land surface by the erosion* of rock and soil in some areas and depositing them in other areas.

Social Studies - 4.3.6 Explain how glacial periods shaped Indiana’s landscape and environment.

Performance Objectives: The students will create a model showing the effects of the glacial period in Indiana based on a rubric.

Advanced Preparation by Teacher:
Materials:
paint tray (the kind used for a paint roller), pieces of sod (enough for each group), potting soil, heavy clay like soil, Rainmaker (paper cup with about ten tiny holes poked in the bottom), Water

Procedure:
Introduction/Motivation:
Take students on a walk outside the school building and ask them to note where the soil is worn away or seems to have collected (Naturalistic; Bodily Kinesthetic). Before going on the walk you may want the children to explain what they will look for or what are the signs that soil has worn away or built up? (Suggested answers may include: erosion - puddles, hollowed out areas, areas that dip or are lower that the surrounding area; deposition - mounds of dirt, collection of soil or other materials in a certain spot, etc.)

Upon returning to the classroom make a list of the sites where soil was worn away or collected (Logical/Mathematical).

Examples:
bottom of slide under swing, end of splash guard by rain spout at entrance to door, path leading to the playground at the bottom of hill/slope,

Questions:
Do you notice anything different about these areas? (They are just dirt; no grass is growing here.)
What do you think caused these changes? (Students walking over them; water running through it.) (Analysis)

Step-by-Step Plan:
Construct a model to investigate how these changes may have occurred. Provide materials so the students can construct their own model of a landscape. It should include a piece of sod, fine potting soil, and a heavy clay like soil. Have them use a paint roller tray as the base of the landscape. Do not put any landscape materials in the bottom well; it should remain empty. Once students have constructed their models have them diagram and label their models and make a prediction as to what will happen if it "rains" on their landscape (Logical/Mathematical). One student pours a cup of water all at once into the rainmaker. Hold the rainmaker about 4 inches above the upper end of the landscape and slowly move it back and forth so the water "rains" down on the model landscape. Observe what happens to the landscape. When it is finished raining have the students observe the final effects of the rain on their landscape. Have students go back to their predictions and record what actually happened (Linguistic).

Tell me what some of your prediction were before it rained on your landscape. (Record on board.)
What actually happened to your landscape when it rained on it? (record so you can make comparisons.)
How is your landscape different after the rain than before it rained on it?
What happened to the soil? Where did it go? Why did this happen? (Analysis)
As students share their ideas and understandings, record key phrases on the board. Some phases that may be valuable to your later discussion may include:
dirt and soil washed away
the soil collected at the bottom of the slope
the water hollowed out the soil
the rain carried the soil down the hill
when the water washed away the soil it formed a hole

Relate their observations to the processes scientists observe over an extended period of time, focusing primarily on the effects on Indiana during the glacial period. Use student models to identify and label erosion and deposition. Have students work to create definitions for these terms. When you are sure students have a real understanding of the terms, formulate a final definition and post on board or chart in the classroom for future reference. Demonstrate the process of transportation and lead students to understand that it is the movement of soil particles from one place to another. Refer to the list generated during the engagement and have students make connections; they should use the new terms to discuss and explain what they saw. Help them to understand that they just used water to simulate erosion, transportation, and deposition, but it can also be caused by wind, waves, glacial ice, people, animals, etc.

What would Indiana have been like if the glacier period had not been in Indiana? There will a class discussion on what life might have been like today for people like the farmers of Indiana had this historical event not occurred.

Closure:
1. Using the same paint roller tray as the base for their landscape, have the groups of students plan a method to decrease or eliminate erosion (Interpersonal). Students should
draw a diagram of the model planned and label the materials used in their landscape (Spatial). They should write a short explanation explaining why they think this will work to curb erosion (Linguistic; Evaluation). (Tell students that you will provide the same materials that they used today and they are responsible for supplying the rest of the materials to build their new landscape tomorrow.) (Synthesis)

2. Have students use a variety of resources and references to research various landmarks that are the result of these processes (e.g. Grand Canyon, Mississippi River Banks, etc.). You can then lead a class discussion on the topic: Erosion and Deposition - Help or Hindrance? (Application)

3. The students will create a model of what the landscape of Indiana would have been like if the glaciers had not come down so far.

**Assessment:**

( Evaluation)

1. Have photographs representing each process and have students identify and explain why they identified it as such.
2. Have students take a walk in their own neighborhood tonight to find examples of each process (Bodily Kinesthetic). They should draw and write one sentence telling what they observed (Spatial). (Comprehension)
3. Have students write their own definition and list an example for each process in their science journals (Linguistic; Comprehension).

**Adaptations/Enrichment:** Students will have help available in the classroom while creating their models. As a way to enrich the activity students will have the option to go into more details on specific aspects.

**Self-Reflection:** What could we have done better? What went well? What did not go well? What changes would you make?

(adapted from
http://cte.jhu.edu/techacademy/fellows/ullrich/webquest/ScienceLesson.html)