

Greening the Environment - Lesson Plan

July 13 – 24, 2009

Title: Soil Study of the Deep River Outdoor Educational Center

Purpose: To allow students to study the properties of soil in a living environment. These properties will then be extrapolated to the type and extent of external factors that affect the soil properties.

Overview: Students will study specific locations within the Deep River Outdoor Educational Center for various components such as pH, % moisture, and temperature. The results between locations can then be compared.

Student Outcomes:

C.1.2 Determine the properties and quantities of matter such as mass, volume, temperature and pH.

C.1.27 Describe chemical changes and reactions using descriptions of the reactants and products.

C.1.29 Describe dynamic equilibrium

C.1.32 Describe the possible subatomic particles within an atom or ion.

C.1.41 Describe the role of light, heat, and electrical energies in physical, chemical and nuclear changes.

Time: From start to finish, 4 hours of time.

Level: 10th grade (15-18 students)

Materials and Tools:

Handheld Vernier Lab Quest Unit
pH sensor probe
temperature sensor probe
GPS location probe
% moisture probe
distilled water
filter paper
funnel
(3) soil collection bags
(2) stirring rods
(4) 250mL beakers
drying oven or microwave
laboratory balance

Pre-Lab Activities:

Before traveling to Deep River, discussion about chemical reactions, factors affecting reaction rates, pH, how to use the Lab Quest equipment, proper techniques for specific testing, review of a proper lab report, and layout of Deep River will be conducted.

Learning Activities (Procedure)

1. After discussion in the classroom, students will be divided into groups of 2-3 students. Among the groups, they will decide the area of Deep River they will test. They will be asked to survey 3 sites within that area.
2. After travel to Deep River, they will be separated into their groups and be assigned the specific testing equipment they will need.
3. The groups will move to their respective sites and collect their data and samples.
4. The students will then bring their samples back to the Deep River lab area and perform other necessary tests.
5. Students will complete the table provided as they analyze their samples.

Assessment:

Students will type a lab report that shows all proper sections required. Students will also type a 1-page essay showing their conclusions attached to the back of their lab explaining their results. The essay must relate their results of their data to any external factors that affected their results and caused any differences between sample sites.

Further Investigations:

Deep River has many external forces affecting its ecology. One side is bordered by an automobile junkyard. The students could test for any effects this might have on the soil. Heavy rains could also affect soil chemistry. Soil samples after a heavy rain could be compared against soil samples after a long drought.

River water testing (such as phosphates, nitrates, and the hardness) could be added to emphasize how any pollutants from factories, residential communities, or farming communities can affect the river.

References:

Chemistry Textbook, Prentice Hall, (2003)

Date Collection Table:

	GPS Location: Latitude/Longitude	Soil / Air Temperature	pH	% Moisture
Site 1	Latitude: Longitude:	/		
Site Description				
	GPS Location: Latitude/Longitude	Soil / Air Temperature	pH	% Moisture
Site 2	Latitude: Longitude:	/		
Site Description				
	GPS Location: Latitude/Longitude	Soil / Air Temperature	pH	% Moisture
Site 3	Latitude: Longitude:	/		
Site Description				