

July 21 – 25, 2008

Lesson Plan – Cycles in Nature

Objective: To understand the cyclic nature of water, carbon and nitrogen in the natural environment.

Content Standards:

- .1. Describe water and carbon biogeochemical cycles and their effects on Earth.
2. Describe characteristics common to living things, including growth and development, reproduction, cellular organization, use of energy, exchange of gases, and response to the environment.
3. Describe biotic and abiotic factors in the environment.
4. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, and nitrogen.
5. Explain the importance of biogeochemical cycles in an aquatic environment.

Resources: Illustrations of each cycle; poster board or butcher block paper; textbook with explanation of the cycles; colored markers, computers access.

Background Information: Water is not lost; it just moves from place to place. We call this movement between the atmosphere and the Earth the water cycle. Producers take in carbon in the form of carbon dioxide during photosynthesis. It is then passed to the consumers as they eat. When the consumer's cells break down food to release energy (respiration), carbon is passed back into the atmosphere as carbon dioxide. Oxygen is

also involved in this cycle. Producers release oxygen during photosynthesis and consumers use it during respiration. Nitrogen passes back and forth between the atmosphere and living things. Bacteria and fungi (decomposers) break down dead organic matter and wastes to return the nitrogen to the soil in the form of ammonia. In the soil, nitrogen-fixing bacteria transform it into both nitrogen gas that returns to the atmosphere and nitrates that can be utilized by plants.

Procedure:

1.) Direct students to read about the carbon-oxygen, nitrogen, and water cycles. Tell students to relate what they have read to the illustrations provided online of the three cycles. Discuss the cycles and their importance.

2.) Additional online resources:

<http://ga.water.usgs.gov/edu/watercycle.html>

<http://www.physicalgeography.net/fundamentals/9s.html>

<http://www.physicalgeography.net/fundamentals/9r.html>

4.) Relevant video clips are available free for download from Alabama Public Television. (The teacher will need to sign up for a free account in order to get a username and password.) Search for the following titles: *Learning About Water, Second Edition* (13-minute video); *The carbon cycle, nitrogen cycle, phosphorous cycle, and energy cycle* (5-minute key concept video clip from *Biologically Speaking: Ecosystems and the Cycles of Nature*); and *Carbon Cycles and Cycles* (18-minute video).

([APTPlus](#))

Collection of over 1800 educational videos available to Alabama teachers free for download.

5.)Activity: Divide into small groups. Each group will draw original illustrations of the three cycles using organisms (biotic) and nonliving things (abiotic) in the local community.

6.) Small groups will share illustrations with the class and ask other groups to answer their questions. Provide a place for students to display their illustrations. Teacher may wish to incorporate student questions into a test or worksheet covering the three cycles.