

# Earth Systems I/Unit 4 Study Guide

ESIU4SG (Environmental Systems)

**Big Idea: “The Earth is a collection of interacting systems.”**

## Study Objectives (things to learn):

1. Describe the nature of environmental systems.
  - a. What is a system?
  - b. What is a feedback loop?
    - i. Describe a positive feedback loop.
    - ii. Describe a negative feedback loop.
  - c. Describe the difference between an open and closed system and identify an example of each.
2. Define ecosystems and evaluate how living and nonliving parts interact.
  - a. List and describe several characteristics of ecosystems.
  - b. Describe the difference between net and primary productivity.
  - c. Create a table showing how net primary productivity varies between biomes or ecosystems.
3. Compare and contrast how carbon, phosphorus, nitrogen, and water cycle through the environment.
  - a. Describe the carbon cycle and its reservoirs.
  - b. Describe the phosphorous cycle and its reservoirs.
  - c. Describe the nitrogen cycle and its reservoirs.
  - d. Describe the water cycle and its reservoirs.
4. Identify and evaluate the impact humans have had on each of the above biogeochemical cycles.
5. Discuss the value of using a carbon footprint calculator for understanding the carbon cycle and for changing behavior.

## Terms to be familiar with:

biogeochemical cycles   feedback loop   negative feedback loop   positive feedback loop   dynamic equilibrium  
closed system   open system   eutrophication   lithosphere   atmosphere   hydrosphere   biosphere  
gross primary production   net primary production   biomass   nitrogen fixation   denitrifying bacteria

## Things to do:

- Read: Chapter 7 (pages 183 – 205)
- Notebook: **10pts**
  - ✓ “Biosphere 2” (page 190, 191)
  - ✓ Notes on Study Objectives (right side)
  - ✓ Case Study: “The Dead Zone”
  - ✓ Testing Your Comprehension (ques. 1-8 on page 212)
  - ✓ Seeking Solutions (ques. 3 on page 212)
- Carbon Footprint Activity **10pts**  
(<http://www.carbonfootprint.com/index.html>) ( <http://www.safeclimate.net/calculator/> )
- Environmental Systems Quiz1(SO’s 1 and 2) **10pts**
- Environmental Systems Quiz2(SO’s 3 and 4) **10pts**
- Environmental Systems Exam **20pts**

Web Reference: **Dead Zone:** <http://www.smm.org/deadzone/top.html>