**Ecosystem Ecology Study Guide**

**Nutrient Cycles**

* To be filled out while viewing the lecture and read the assigned text.

1. List the five top nutrients essential to life:

Place a star next to the element above that is required in “organic” molecules.

1. What is meant by the term “inorganic reservoir?”
2. In any given nutrient cycle, where does a molecule spend the majority of its time?
3. A biogeochemical cycle implies that there is a biotic/living component to the cycle, geo/Earth based component and a chemical component. List the four cycles here:

This lecture does not go through the details of each system, the book is quite sufficient for that purpose, but a few important aspects of each are highlighted here.

1. What form of carbon is the most abundant throughout the cycle (i.e. where is the main reservoir)? What process brings carbon into a food web?
2. List some ways human activity increases carbon in the atmosphere?
3. A carbon sink is a natural reservoir in the environment that stores carbon-containing molecules. The largest carbon sinks on earth can be found as rainforests in the tropics. The biggest threat to these carbon sinks is\_\_\_\_\_\_\_\_\_\_.
4. What are some effects greenhouse gasses have on the environment?
5. What is the name of the process by which water in the hydrologic cycle moves from its primary reservoir into the clouds? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the name of the process by which water is delivered from the atmosphere to the land? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. The hydrologic cycle has been happening since before there was life on Earth, yet this cycle has been disrupted in just a few centuries. Identify four ways that the hydrologic cycle has become disrupted by human actions.
8. Define nitrogen fixation.
9. What types of organisms bring nitrogen into a food web?
10. In the 1990’s, acid rain was a huge concern to biologists and environmentalists. Legislation has greatly reduced the threat of acid deposition, but recovery of some ecosystems has been slow. Why do you think the recovery process is so long? (Hint: Think about the processes involved in nitrogen cycling and where bottlenecks may occur)
11. The Phosphorous cycle is unique in that the primary source of this important element is not atmospheric; instead life depends upon this element from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (name the source). Phosphorous is essential to make bones and teeth in vertebrate animals, but all of life on Earth depends upon for basic building molecules to make cells and even DNA.
12. Humans apply phosphorous to crops (to give to plants to help them grow) in what form? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. If too much of this source in #17 above is applied then it may be carried by the agent of the hydrologic cycle, known as surface water runoff into streams, ponds, lakes and the ocean. An excessive amount of phosphorous especially to fresh water ecosystems can have far reaching consequences; it may lead to a process of nutrient enrichment called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
14. What are the consequences of this process?
15. Your book discusses the creation of “dead zones”. Define “dead zone” and outline the process in the development of it.

**Terms to Master from the Text:**

(These may show on exams or in associated labs for this section)

acid deposition

nitrogen fixation

aquifer

nutrient

nutrient cycle

fossil fuel

biogeochemical cycle

global warming

phosphorus cycle

greenhouse effect

phytoplankton

greenhouse gas

carbon cycle

reservoir

hydrologic cycle

legume

deforestation

macronutrient

transpiration

denitrifying bacteria

micronutrient

nitrogen cycle