

Name _____

Date _____

Biogeochemical Cycles Computer Assignment

Part One. Nitrogen Cycle

A. The visuals required for this section will be provided to you by your teacher, either as a handout or online.

1. Use “Nitrogen Cycling in an Undisturbed Forest” to respond to the following questions.

a. What form of nitrogen do plants absorb? _____

b. Proteins and Nucleic acids contain nitrogen in living and dead tissue. This form of nitrogen is referred to as _____.

c. When dead tissue decomposes, organic nitrogen is converted into what form?
_____.

d. Chemical transformation of inorganic ammonium involves chemosynthetic bacteria that oxidize ammonium into what chemical form of N?
_____.

e. By what process do some microbes convert atmospheric N gas into ammonium or nitrate? _____.

f. In what chemical form does nitrogen leave a forest ecosystem through leaching from soils into streams? _____.

2. Use “Nitrogen Cycling in a Developed Watershed” for the following questions.

a. Identify two major inputs of nitrogen in developed watersheds.

b. Identify human sources of nitrate and ammonium into waterways.

c. What impact can elevated levels of these chemicals have on waterways in the watershed?

d. What is the relationship between the combustion of fuels and acid rain? What form of nitrogen is involved?

e. What approximate percentage of nitrogen is typically lost to rivers in a developed watershed?

3. Use “Nitrogen Balance of the Hudson Watershed” for the following questions.

a. What is the total N input to the Hudson from the watershed in Kg N/ha – yr?

b. Of the various nitrogen inputs to the Hudson which are related to agriculture?

c. What possible N inputs are not included in the data shown?

d. What N input is related to combustion of fuels?

e. Which N output from the watershed to estuary is related to food input?

f. What is the % of N output from the watershed into the ocean from all possible inputs?

g. Why do you think the inputs of nitrogen to the Hudson River watershed are greater than the outputs? What happens to the “missing” nitrogen?

B. Log on to the internet and navigate to the following web site:

www.windows.ucar.edu/tour/link=/earth/Life/biogeochem.html

Read the background page and then click onto Nitrogen Cycle link.

1. Read the information provided.
2. Click on link called “changes to the nitrogen cycle”.
3. Click on “Fertilizing the Earth with Nitrogen”. Read and respond to the following questions.

a. Describe the formation of the annual summer dead zone in the Gulf of Mexico.

b. How many dead zones have been identified in the world’s oceans? _____

4. Click back to previous page and click on “Releasing Nitrogen Pollutants to the Air”. Read and respond to the following questions.

a. What are the three gaseous oxides of nitrogen?

b. Which two gases contribute to the formation of smog and acid rain?

c. Which is a greenhouse gas? _____

5. Click back to previous page and click on Biogeochemical Cycles. Now you will explore the Carbon Cycle.

Part Two: The Carbon Cycle

A. Click on the Carbon Cycle. Read and respond to the following questions.

1. How much carbon is produced by combustion each year? _____
2. Of this amount, how much diffuses and dissolves into seawater? _____
3. How much more carbon dioxide is in the atmosphere today than 150 years ago? _____
4. When was the last time the earth’s atmosphere had this much carbon dioxide? _____
5. How do scientists know this? _____

6. Describe how carbon dioxide is removed from the ocean reservoir and moved into carbonate rocks such as limestone.

B. Carbon Cycle Game. Now click on “Play the Carbon Cycle Game”. Visit each of the reservoirs of carbon and read about each. As you travel through the cycle answer all quiz questions (stars with question marks).

1. Name each of the carbon reservoirs on earth.

2. Which reservoir holds the most carbon? _____

3. How well did you do on the quiz questions (out of seven Q)? _____

4. What surprised you about the carbon cycle?
