

Problem Set #1, Life on Earth (pp. 54-58)

1. Rainforests are considered to be one of the most diverse ecosystems on the planet, list three examples of human activities that lead to the destruction of rainforests?
2. Of the three reasons listed in the case study which one do you think is the most harmful (subjective, meaning there is no right or wrong answer)
3. a). List Earth's four systems. b). Which of these systems do you live in?
4. What is the difference between the troposphere and stratosphere?
5. Why is the stratosphere important to life on the planet?
6. List the three factors that sustain life on Earth.
7. What happens to the energy from the sun as it approaches earth? (THIS WILL BE A QUIZ QUESTION ON MONDAY). Look at figure 3-4 on page 57
8. Explain the natural greenhouse effect in your own words. Imagine that you had to explain it to a 2nd grader.
9. List and memorize the different greenhouse gases (there are five of them listed)
10. What are some human activities that contribute to the greenhouse effect and ultimately global climate change?

Problem Set #2, Components of an Ecosystem (pp. 58-62)

1. Ecology is the study of interactions between living (biotic) and non-living (abiotic factors) in nature. List three examples of biotic and three examples of abiotic factors.
2. What is a trophic level?
3. Why are producers called autotrophs (self-feeders)?
4. Memorize the photosynthesis equation (both written and chemical formula)
5. What are phytoplankton?
6. Why are consumers called heterotrophs (other-feeders)?
7. Differentiate between herbivores, carnivores, and omnivores.
8. Differentiate between decomposers and detritivores.
9. *Why would it be better for a tree to fall down in a forest naturally than a human cutting down a tree for decoration in their house during Christmas?
10. Differentiate between aerobic and anaerobic respiration?
11. Be prepared to *explain* at least one reason why microbes are important to human life.

Problem Set #3, Energy in Ecosystems (pp.63-66)

1. On the beginning of page 63, Miller provides an excellent example of a food chain. (sun → leaf on plant → caterpillar → robin → hawk → decomposers). Provide an example of your own food chain, you may share this during class so be ready.
2. What important information about ecosystems do food chains provide?
3. What is a food web?
4. What is biomass?
5. How does Miller summarize the 2nd law of thermodynamics? Write it. Hint, *In other words...*
6. *Why is it better for the planet to be vegetarian/vegan (to eat lower on the food chain)? Hint: *see connections energy flow and feeding people*
7. What is the difference (differentiate) between NPP and GPP?
8. What are the top three terrestrial ecosystems in terms of NPP? (figure 3-15).

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Hydrologic (water) Cycle:

1. Describe the following processes/concepts related to the hydrologic cycle:
 - a. Evaporation
 - b. Infiltration
 - c. Transpiration
 - d. Percolation
 - e. Condensation
 - f. Surface Runoff
 - g. Precipitation
2. Why is gravity important for the water cycle
3. Describe the role the sun has in the water cycle?
4. What is an aquifer?
5. What are some ecological (environmentally beneficial) services that water provides?
6. Describe three significant anthropogenic (human) interventions in the hydrologic cycle
7. Read Science Focus, answer the critical thinking question.

Carbon Cycle:

8. Why is carbon important for life?
9. What form of carbon is the carbon cycle based on?
10. What is respiration? How does it relate to photosynthesis?
11. How are humans altering the carbon cycle?

Nitrogen Cycle:

12. Why is nitrogen important to life on planet earth?
13. What is the most abundant form of nitrogen on earth? How much of it is there?
14. What is the problem with this form of nitrogen? How is it “fixed?”
15. Describe each of the following processes of the N-Cycle: (include a description of the events and chemical transformations occurring in each step):
 - (a) Nitrogen Fixation
 - (b) Assimilation
 - (c) Denitrification:
 - (d) Nitrification:
 - (e) Ammonification:
16. Describe some humans activities that interfere with the nitrogen cycle

Phosphorus Cycle:

17. What is the most common form of phosphorous found on earth?
18. How is the phosphorous cycle different from the water, nitrogen and carbon cycle
19. Explain why the phosphorus cycles slowly compared to the other cycles
20. Describe some humans activities that interfere with the Phosphorous cycle?

Sulfur Cycle:

21. In what form does Sulfur exist on earth? Where can they be found?
22. How do humans alter the Sulfur cycle?

OTHER:

23. AP Review Questions for Chapter 3 #1-13

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