

Chapter 42 Notes/Reading Guide

1. Describe the organism that is turning Taylor Glacier red.
2. Based on the description of the organism, would you hypothesize that it is bacteria or archaea? Explain your answer.
3. What are the components of an ecosystem?
4. How are energy and matter transferred through an ecosystem?

42.1

1. Describe how a food chain demonstrates the first law of thermodynamics.
2. As you move up the trophic levels of the food chain, about 10% of the energy from the previous level is transferred to the next level. How does this support the second law of thermodynamics?
3. How is the law of conservation of mass similar to the first law of thermodynamics?
4. Can elements be gained or lost from an ecosystem?
5. Does this (answer to #4) contradict the law of conservation of mass?
6. List several ways that nutrients can enter an ecosystem.
7. List several ways that nutrients can be removed from an ecosystem.
8. If a nutrient is removed from an ecosystem at a higher rate than it is replaced, it will eventually become a L_____ N_____. (Look ahead in your vocabulary list for this term)
9. What types of organisms make up the first trophic level?
10. How do they get food?
11. Provide an example of each:
 - a. Primary producer
 - b. Primary consumer
 - c. Secondary consumer
 - d. Tertiary consumer
 - e. Detritivore
 - f. Decomposer
12. From the list above, which term describes a person who is vegan?
13. Which describes a person that ate a chicken biscuit for breakfast?
14. Why are detritivores so important in a healthy ecosystem?

42.2

1. The amount of light converted into chemical energy in a given time period is called:
2. How much energy does the sun provide to the Earth each day?
3. How much of the sun's radiation is used by plants and converted into chemical energy?
4. What happens to the rest of the solar energy?
5. What is the difference between gross primary production and net primary production?
6. If you have a job, the amount of money you make before taxes are taken out- is that amount your gross pay or net pay?
7. Write the formula for NPP. Label each term.
8. Numerically, how does NPP usually compare to GPP in an ecosystem?
9. The net primary productivity for a temperate forest was measured at 2000 mg C/m²/day. The respiratory rate of the community was determined to be 1000 mg C/m²/day. The gross primary productivity for this community is:
10. What is the difference between NPP and standing crop?
11. What biomes contribute the most to the planet's NPP?
12. The only difference between NPP and NEP is the "R" that you subtract. In NPP, the respiration rate of just the autotrophs was subtracted. In NEP, whose respiration rate is subtracted?
13. How does NEP better represent how much carbon is in an ecosystem?
14. What is commonly measured to determine the value of the NEP?
15. How far does light penetrate in the ocean?
16. What 2 nutrients are often the limiting nutrients in oceans and lakes?
17. Why are these nutrients typically low?
18. Which nutrient- phosphorus or nitrogen- was determined to be the cause of algae blooms of the coast of Long Island?
19. Why are areas of the ocean with "upwelling" the best spots for fishing?
20. List several areas of the ocean that experience upwelling.
21. How does eutrophication happen in a lake?

22. How do NPP and evapotranspiration correlate?
- 23.
24. What is the limiting nutrient in most plant growth?

25. List and describe 4 ways that plants have evolved to handle limited amounts of nitrogen.

42.3

1. What percentage of plant material is eaten by herbivores?
2. What does secondary production measure?
3. Refresh: What does primary production measure?
4. Why do birds and mammals have a low production efficiency compared to insects?
5. What percent of energy is generally transferred between trophic levels?
6. Most biomass pyramids narrow sharply as you move toward the top. Why are certain aquatic ecosystems inverted pyramids?
7. How does eating meat vs. eating plant material compare in efficiency and energy use?