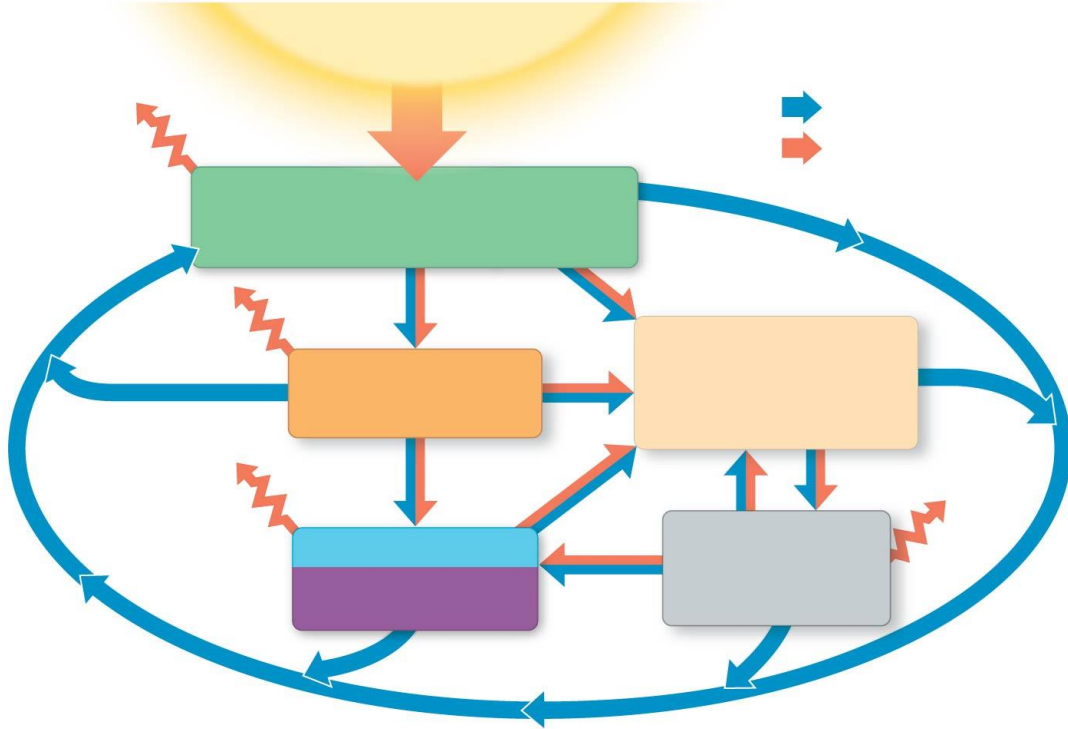


CH 55 Guided Reading: Ecosystems and Restoration Ecology Study Guide  
10ed

1. **Define and describe** an *ecosystem*?
2. **Where** does energy enter most ecosystems? **How** is it converted to chemical energy and then passed through the ecosystem? **How** is it lost?  
-  
-  
-
3. Besides the energy flow that you described in question 2. Chemicals such as carbon and nitrogen *cycle* through ecosystems. So energy \_\_\_\_\_ through an ecosystem and matter \_\_\_\_\_.
4. It seems amazing, but **how** did the introduction of foxes onto arctic islands convert grassland to tundra?
5. Both energy and matter can be neither \_\_\_\_\_ nor \_\_\_\_\_.
6. **What** trophic level supports all others?
7. **List three** groups of organisms that are *photosynthetic autotrophs*.
8. **Define** *trophic levels*? **What** is always the first trophic level?
9. **Define** *detritivores*? **What** is their importance in chemical cycling?

10. **What** are the two main categories of detritivores?

11. **Label** the diagram below.



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12. **What** is *primary production*? **Distinguish** between *gross primary production* and *net primary production*.

13. **Write an equation** here that shows the relationship between gross and net primary production.

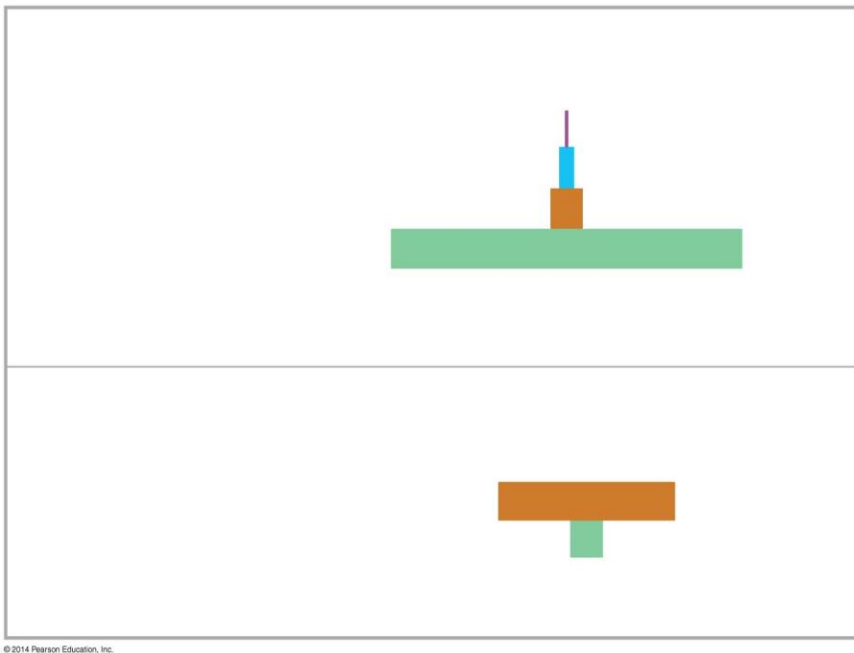
14. **Why** is net primary production, or the amount of the new biomass/unit of time, the key measurement to ecologists?

15. **Which** ecosystem would tend to have a greater biomass/unit area, a prairie or a tropical rain forest? **Explain.**
16. Net primary productivity is the amount of new biomass/unit of time, and is the result of photosynthesis. To understand what can affect productivity, **begin by writing the summary equation for photosynthesis.**
17. As you look at the equation for photosynthesis, note that you could measure the rate of photosynthesis, and therefore indirectly productivity, in several ways. **List them here.**
18. **What** are some factors that limit primary productivity in aquatic ecosystems?
19. **Define** a *limiting nutrient*? **What** is the limiting nutrition off the shore of Long Island, New York? **What** is the limiting nutrition in the Sargasso Sea?
- - 
  -
20. Phytoplankton growth can often be increased by additional nitrates and phosphates. **What** are common sources of each?
21. **Define** *eutrophication*? **What** are factors that contribute to eutrophication?
22. **Define and describe** *trophic efficiency*?

23. Generally, **what** percentage of energy available at one trophic level is available at the next?

24. Consider a food chain with 1,000 *joules* (an energy unit) available at the producer level. If this food chain is grass → grasshopper → lizard → crow, **how much energy** would you predict would be found at the level of the crow?

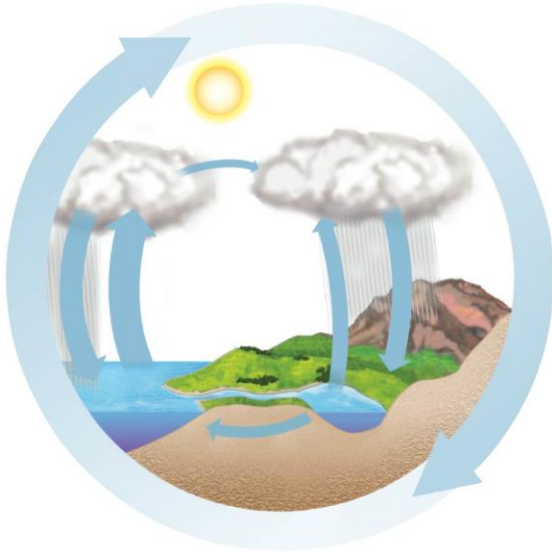
25. Notice that most biomass pyramids have the greatest biomass on the bottom of the pyramid. **Label** the trophic levels on both of the following figures. **Explain** why the second pyramid of biomass is inverted.



26. **Why** do people who have limited diets in overpopulated parts of the world eat low on the food chain?

27. After reviewing the Making Connections Figure 55.13, **explain why** the tundra is considered an ecosystem sensitive to disturbance?

28. Use the following figure to **describe the water cycle**. Specify the roles of *evaporation*, *transpiration*, and *rainfall*.



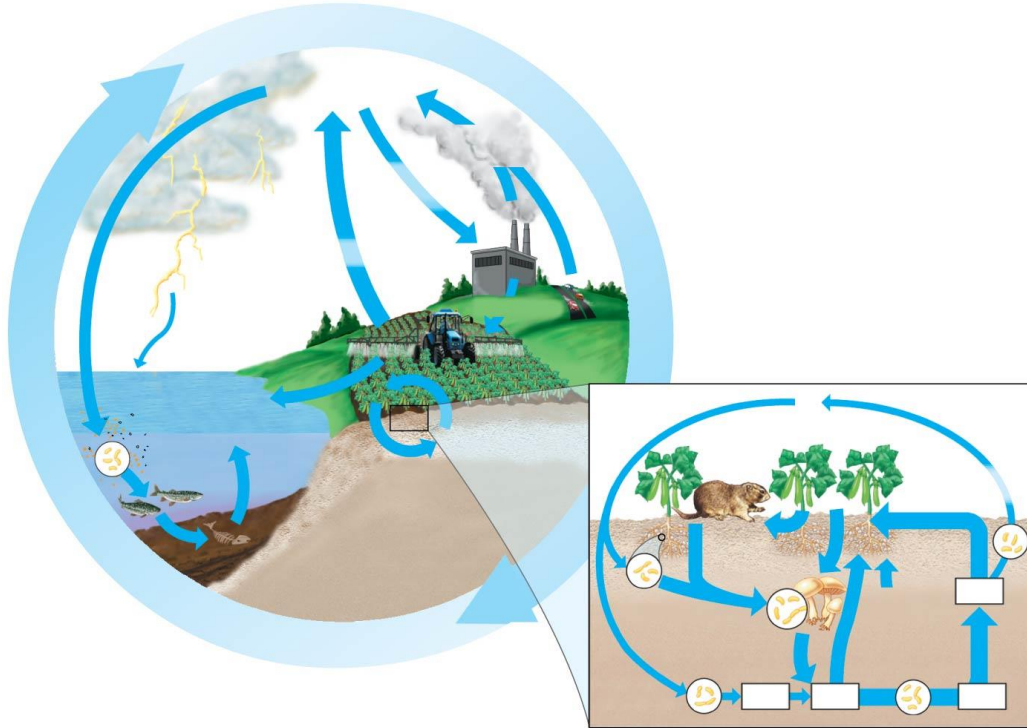
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29. Use the following figure to **describe the carbon cycle**. In doing so, **explain** how carbon enters the living systems and how it leaves, indicate the role of microorganisms in the cycle, and identify the reservoir for carbon. Give some thought to how concepts from the chapters on photosynthesis and cellular respiration are tied to the carbon cycle.



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30. Use the following diagram to **describe the nitrogen cycle**. In doing so, **indicate** the role of microorganisms in *nitrogen fixation*, *nitrification*, and *denitrification*.



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31. Review the Case Study: Nutrient Cycling in the Hubbard Brook Experimental Forest. **What** effect has deforestation been shown to have on chemical cycling?

32. **Explain** the goal of restoration ecology?

33. Restoration ecology uses two key strategies. Explain how each strategy works:

**Bioremediation**

**Biological augmentation**