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Section 3–3 Cycles of Matter (pages 74–80)

This section describes how matter cycles among the living and nonliving parts of an ecosystem. It also explains how nutrients are important in living systems.

Introduction (page 74)

1. What are the four elements that make up over 95 percent of the body in most organisms? _____

Recycling in the Biosphere (page 74)

2. How is the movement of matter through the biosphere different from the flow of energy? _____

_____

3. Matter moves through an ecosystem in _____.
4. What do biogeochemical cycles connect? _____

_____

The Water Cycle (page 75)

5. Water can enter the atmosphere by evaporating from the leaves of plants in the process of _____.
6. Circle the letter of each process involved in the water cycle.
   a. precipitation **b.** evaporation **c.** runoff **d.** fertilization

Nutrient Cycles (pages 76–79)

7. What are nutrients? _____

_____

8. What are the three nutrient cycles that play especially prominent roles in the biosphere?
   a. _____
   b. _____
   c. _____
9. Why is carbon especially important to living systems? _____

_____

10. What are three large reservoirs where carbon is found in the biosphere?
    a. As carbon dioxide gas in the _____
    b. As dissolved carbon dioxide in the _____
    c. As coal, petroleum, and calcium carbonate rock found _____
11. In what process do plants use carbon dioxide? _____

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12. Why do all organisms require nitrogen? _____

_____

13. Complete the table about the kinds of processes involved in the carbon cycle.

KINDS OF PROCESSES IN THE CARBON CYCLE

Kind	Examples
Biological processes	
	Release of CO_2 to the atmosphere by volcanoes
Mixed biogeochemical processes	
Human activity	

14. What is the main reservoir of nitrogen in the biosphere? _____

_____

15. What is nitrogen fixation? _____

_____

16. What is denitrification? _____

_____

17. What role does denitrification play in the nitrogen cycle? _____

_____

18. Circle the letter of each sentence that is true about the phosphorus cycle.

a. Phosphate is released as rocks and sediments wear down.

b. Plants absorb phosphate from the soil or from water.

c. Phosphorus is abundant in the atmosphere.

d. Organic phosphate cannot move through food webs.

19. Why is phosphorus essential to living things? _____

_____

_____

Nutrient Limitation (page 80)

20. What is the primary productivity of an ecosystem? _____

_____

21. If a nutrient is in short supply in an ecosystem, how will it affect an organism?

_____

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22. When is a substance called a limiting nutrient? _____

_____

_____

23. In the ocean and other saltwater environments, what is often the limiting factor?

_____

24. What is the typical limiting factor in streams, lakes, and freshwater environments?

_____

25. When an aquatic ecosystem receives a large input of a limiting nutrient, what is often the result, and what is this result called? _____

_____

_____

26. Why do blooms occur? _____

_____

_____

WordWise

Complete the sentences by using one of the scrambled words below.

dcreuorps	meiob	aieoeoibgchmcl yeccl
mtssyceoe	ythnssieoemhcs	ttnnreiu

The process by which organisms use chemical energy to produce carbohydrates is _____.

A collection of all the organisms that live in a particular place, together with their physical environment, is a(an) _____.

A chemical substance that an organism requires to live is a(an) _____.

Autotrophs, which make their own food, are also called _____.

A group of ecosystems that have the same climate and dominant communities is a(an) _____.

A process in which elements, chemical compounds, or other forms of matter are passed from one organism to another and from one part of the biosphere to another is a(an) _____.