

Section 2.2

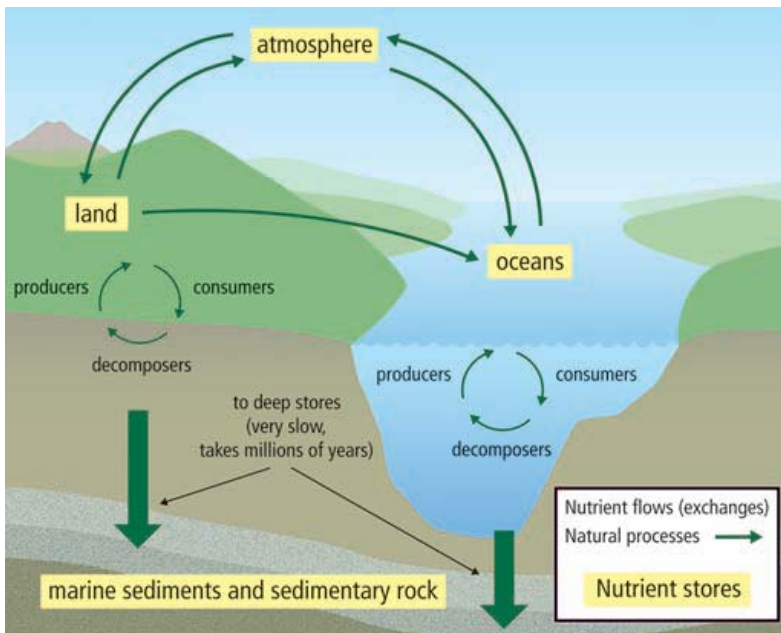
Nutrient Cycles in Ecosystems

Check Your Understanding



Checking Concepts

1. Use the following nutrient cycle diagram to answer questions (a) to (d).



- (a) Identify the abiotic components.
- (b) Identify the biotic components.
- (c) Why are some arrows thicker than others?
- (d) What would you add to this diagram to show the processes by which nutrients naturally leave stores in rock?

2. Describe the importance to living organisms of each of the following.
 - (a) carbon
 - (b) nitrogen
 - (c) phosphorus
3. Explain how each of the following is stored in the biosphere.
 - (a) carbon
 - (b) nitrogen
 - (c) phosphorus
4. In what form is carbon stored in the ocean?
5. Explain how human activities have influenced:
 - (a) the carbon cycle
 - (b) the nitrogen cycle
 - (c) the phosphorus cycle
6. How does geologic uplift contribute to the phosphorus cycle?
7. The following processes circulate carbon in an ecosystem. Identify which processes circulate carbon rapidly and which processes circulate carbon very slowly.
 - (a) photosynthesis
 - (b) volcanic activity

(c) sedimentation and rock formation

(d) respiration

8. Explain the term "leaching."

9. List three ways in which plants influence the cycling of nutrients.

10. Match the following processes with the descriptions in (i) to (iii).

(a) nitrogen fixation (b) nitrification (c) denitrification	(i) Nitrate is converted to nitrogen gas. (ii) Ammonium is converted to nitrate. (iii) Nitrogen gas is converted to ammonium.
---	---

11. Explain the relationship between *Rhizobium* bacteria and plants.

12. How can lightning benefit an ecosystem?

Understanding Key Ideas

13. How do animals take up each of the following?

(a) carbon

(b) nitrogen

(c) phosphorus

14. Within Biosphere II, scientists found that the carbon dioxide levels decreased each day and increased each night.

(a) What would account for these changes?

(b) Why do carbon dioxide levels not fluctuate daily in Earth's atmosphere?

15. Create separate flowcharts to explain each of the following nutrient cycles.

(a) carbon

(b) nitrogen

(c) phosphorus

16. State what evidence shows that human activities are affecting the reproduction of:

(a) animals

(b) plants

17. What are the sources of increased nitrogen levels on agricultural land?

18. What makes agricultural land a major source of nitrogen fixation?

19. Summarize the effects of human interference in each of the following nutrient cycles.

(a) carbon

(b) nitrogen

(c) phosphorus

Pause and Reflect

Some human activities, such as burning wood from trees, move carbon already in short-term stores. Other activities, such as burning fossil fuels, bring back carbon stored long ago. Can planting trees make up for the carbon emissions of either or both of these types of human activities?