

Name \_\_\_\_\_

Hour \_\_\_\_\_

## Phosphorus Cycle Review

Phosphorus is essential to life. Like nitrogen and other inorganic nutrients, phosphorus cycles through the biosphere. Phosphorus is found in living organisms in the form of phosphate. Phosphates facilitate the energy-transfer reactions that are crucial for life. Almost every metabolic and photosynthetic reaction involves the release of chemical energy from phosphate in the molecule adenosine triphosphate (ATP). Phosphate is also an important component of DNA, RNA, and bone tissue. An adult human skeleton contains about 1.4 kg of phosphates. Phosphates are also found in phospholipids, the primary structural molecules in cell membranes.

Nutrient cycles can be classified as gaseous or sedimentary, according to the source of the nutrient in the environment. The nitrogen and carbon cycles are gaseous. The phosphorus cycle is sedimentary because most phosphorus comes from rocks.

Most phosphates are leached from rock by rain and snow and carried to bodies of water, including lakes, streams, and oceans. Plants absorb the dissolved phosphates. When animals eat plants, they incorporate the phosphorus. Animals excrete some phosphates, but most return to the soil when animals die and decompose.

Phosphates are mined and used in commercial industry. Many fertilizers and detergents, toothpastes, and baking powders contain phosphates. Unfortunately, the phosphates used as detergents may also act as unwanted fertilizers. After they are used, detergents can end up in ground water or lakes or rivers, where they cause excessive algal blooms. The algae use much of the oxygen and block sunlight other aquatic organisms need to live.

**EVALUATION** Review the information you have been given about the phosphate cycle. Then answer the following questions.

1. You have phosphates in your body. Where are they? How did they get there?

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2. How is the phosphorus cycle like the nitrogen cycle? How is it different?

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3. Research the ways agriculture uses phosphates. What effect do they have on the environment?

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**Chapter 3 The Biosphere** **Section Review 3-3**

**Reviewing Key Concepts**

**Short Answer** *On the lines provided, answer the following questions.*

- 1. How are the flow of matter and the flow of energy through ecosystems different?  
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- 2. Describe how nutrients are passed between organisms and the environment.  
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**Reviewing Key Skills**

- 3. **Applying Concepts** What role does the land have in the water cycle?  
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- 4. **Inferring** What are the main sources of carbon dioxide in the atmosphere?  
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- 5. **Predicting** What would happen if the bacteria that cause denitrification were removed from the nitrogen cycle?  
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- 6. **Inferring** What is the importance of nitrogen fixation?  
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- 7. **Applying Concepts** How are bacteria important to the nitrogen cycle?  
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- 8. **Comparing and Contrasting** How does organic phosphate move through a food web?  
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- 9. **Comparing and Contrasting** What is one way that the phosphorus cycle differs from the carbon and nitrogen cycles?  
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- 10. **Comparing and Contrasting** Compare the typical limiting nutrient in saltwater and freshwater environments.  
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