

How do interactions in ecosystems cycle matter?

1. Abiotic and biotic interactions cycle matter in terrestrial and aquatic ecosystems.

- **D**_____ (soil insects, earthworms, moulds, mushrooms, and certain kinds of bacteria) are organisms that get their food energy by digesting wastes such as urine, feces, and the bodies of dead organisms.
- As decomposers digest these wastes, some of the chemical substances that make up these wastes enter the soil, water, and air. These substances include **c**_____, **n**_____, **i**_____, and other **c**_____ that living things need to use as **n**_____ (substances that living things need to sustain life).
- All living things use nutrients to grow and build their bodies to help them carry out life functions. When they die, decomposers return the nutrients to the environment to be available for use once again by other living things. This pattern of continual use and re-use of nutrients is called the **n**_____.

2. Photosynthesis and cellular respiration cycle carbon and oxygen in ecosystems.

- Photosynthesis and cellular respiration interact with each other as part of a cycle that uses and re-uses **c**_____ and **o**_____. This interaction takes place in both terrestrial and aquatic ecosystems.

3. Human activities can affect ecosystems by affecting nutrient cycles.

- Not all the carbon involved in the carbon cycle is used immediately by living things. Some of them is stored in the woody tissues of trees, while some of them is stored in the gradual decomposing remains of organisms, which become buried deeply in the ground. With time, temperature, and pressure, some of this stored carbon will eventually be transformed into the carbon-rich fuels that we know as **c**_____, **o**_____, and **n**_____ gas.
- Human activities have somewhat upset the balance of the carbon cycle. As a result, extra **c**_____ builds up in the air and helps to trap heat in the atmosphere (**g**_____).
- **N**_____, another nutrient that cycles in ecosystems, is a key building block for **p**_____, which all cells need. Seventy-eight percent of **a**_____ is nitrogen, but most organisms cannot use nitrogen from the air so they depend on certain kinds of bacteria in the soil and water to change nitrogen into forms that plants use.
- Although farmers and gardeners use **f**_____ to enhance growth of their plants, not all the nitrogen in the fertilizers is used by the plants because some stay in the soil. When it rains, or when fields are watered, some nitrogen is carried into aquatic ecosystems which causes an overgrowth of algae called an **a**_____.
- Algal bloom does not allow sunlight through the water, and deprives some aquatic organisms of oxygen, thereby killing them and anything that feeds on them. Eventually, that causes the death of the aquatic ecosystem. See page 35, figure 1.8 of Science Links 9.

Homework (Practice & Homework Book): pages 22,23,24,25

Name _____

Date _____

Topic
1.3
Summary

How do interactions in ecosystems cycle matter?

Textbook pages 28–39

Before You Read

Like other organisms, you rely on nutrients to stay healthy. Based on your current understanding, create a definition of what you think a nutrient is. Write your definition on the lines below.

✓ Reading Check

1. What is a cycle?

✓ Reading Check

2. Name a human activity that can cause changes to **nutrient cycle**.

How are nutrients cycled in ecosystems?

Decomposers are consumers that get their energy by consuming dead plant and animal matter. Soil insects, earthworms, moulds, mushrooms and certain kinds of bacteria are all decomposers. When they digest waste, they release certain **nutrients** and return them to the environment in usable forms. The nutrients include carbon, nitrogen, iron and other chemicals, and they are used by producers and consumers to carry out their life functions. This process means that nutrients are being used and reused in a constant cycle. ✓

How are oxygen and carbon cycled in ecosystems?

During the process of photosynthesis, producers such as plants take in carbon dioxide to make high-energy sugars and release oxygen into their surroundings. The sugar and oxygen are then cycled through the process of cellular respiration. Organisms take in the oxygen and use it to release the energy stored in the sugar. Water and carbon dioxide are given off as products of this reaction. The carbon dioxide is used again by plants for photosynthesis. This cycle allows carbon and oxygen to be used over and over.

Name _____

Date _____

**Cloze
Activity**
Topic 1.3

Use with textbook pages 28–39.

Interactions in ecosystems

Vocabulary

algal bloom
carbon
cellular respiration
consumers
decomposers
global warming
iron

nitrogen
nutrient cycle
photosynthesis
producers
proteins
sugar
water

Use the terms in the vocabulary box to fill in the blanks. Use each term only once.

1. _____ get their food energy by digesting wastes such as urine, feces, and the bodies of dead organisms.
2. _____, _____, _____ and other chemicals are examples of nutrients used by living things.
3. When _____ and _____ die, decomposers return the nutrients to the environment.
4. The pattern of continual use and reuse of nutrients that living things need is called _____.
5. _____ and _____ play a key role in the cycling of matter such as carbon and oxygen in ecosystems.
6. Producers use the carbon dioxide to make high-energy carbon-containing substances such as _____.
7. Organisms release _____ into their surroundings during cellular respiration.
8. Human activities like removing trees to make space for homes, buildings and farmlands are factors linked to the occurrence of _____.
9. Nitrogen is a major part of cells and a key building block for _____.
10. An _____ is caused by too much of a nutrient, such as nitrogen, entering an aquatic environment.

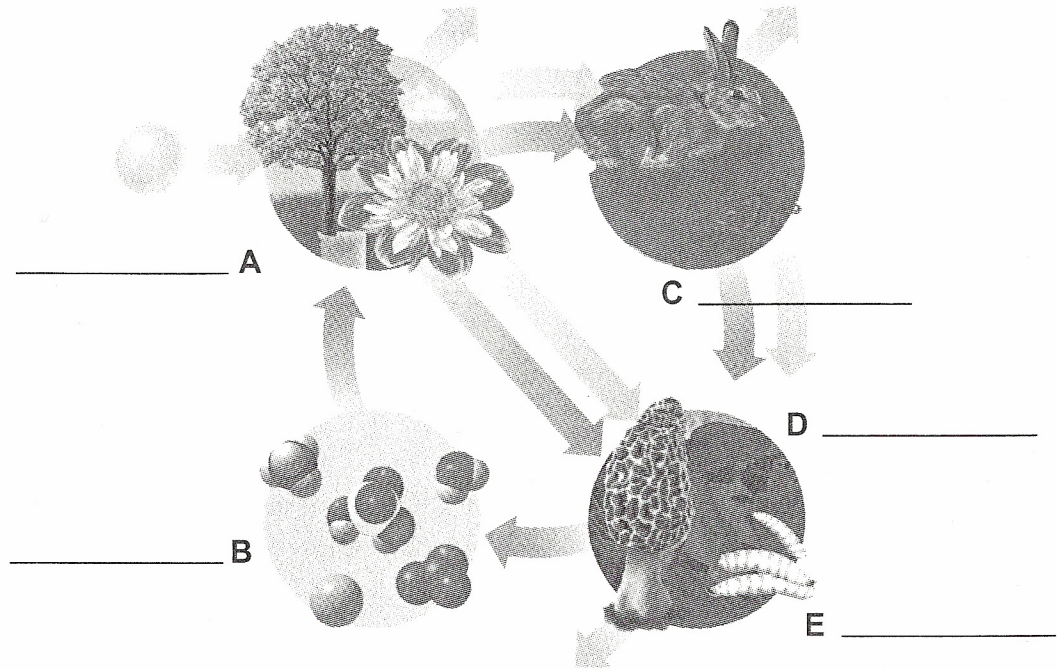
Name _____

Date _____

**Applying
Knowledge**
Topic 1.3

Use with textbook pages 30–35.

The cycling of nutrients



On the diagram above, label the following terms: consumers, decomposers, heat, non-living nutrient substances, producers.

Use the general model of a nutrient cycle to answer the questions below.

1. How does the process of photosynthesis contribute to this model of a nutrient cycle?

2. How does the process of cellular respiration contribute to this model of a nutrient cycle?

3. How is the process of decomposition related to this diagram?

4. How do human activities affect a nutrient cycle?

Name _____

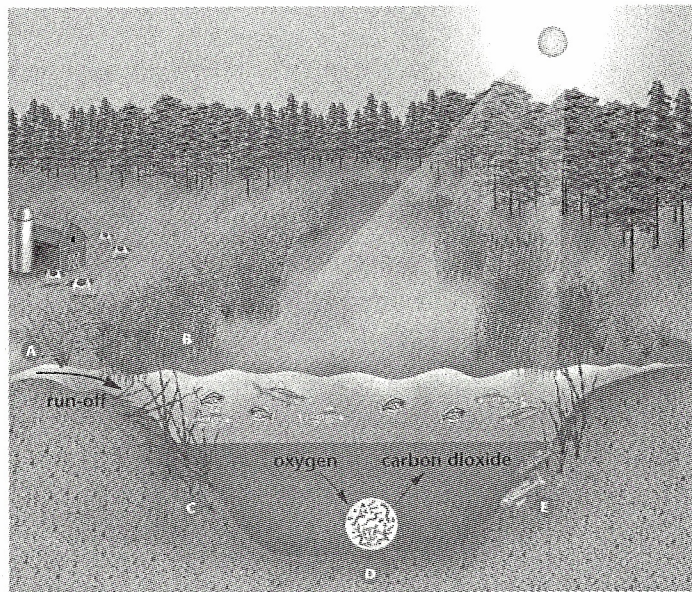
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**Interpreting
Illustrations**
Topic 1.3

Use with textbook page 35.

Nitrogen cycle and algal blooms

Use the diagram to answer the questions below.



Why is the nitrogen important?

What is happening at B?

What is happening at C?

What is happening at E?

What could be the cause of the changes to this aquatic ecosystem?

Name _____

Date _____

Assessment**Topic 1.3**

How do interactions in ecosystems cycle matter?

Use with textbook pages 28–39.

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

| Term | Descriptor |
|-------------------------|--|
| 1. _____ algal bloom | A. any substance that a living thing needs to sustain life |
| 2. _____ cycle | B. the pattern of continual use and reuse of a nutrient |
| 3. _____ decomposer | C. a natural or synthetic material spread on or worked into to soil to increase its capacity to support plant growth |
| 4. _____ drought | D. organism that obtains energy by consuming dead plant and animal matter |
| 5. _____ fertilizer | E. overgrowth of algae caused by excess nitrogen in an aquatic ecosystem |
| 6. _____ global warming | F. an increase in the average temperature of Earth's atmosphere, especially a sustained increase sufficient to cause climatic change |
| 7. _____ nutrient | |
| 8. _____ nutrient cycle | |

G. a pattern of change that repeats itself forever

H. a lack of rain for a long time

9. What is the difference between evaporation and condensation?

10. Give three examples of decomposers.

11. What two gases are recycled by the processes of photosynthesis and cellular respiration?

12. What happens when extra carbon dioxide builds up in the atmosphere?
