

## Cycles in Ecosystems

Use your textbook to help you fill in the blanks.

### What is the water cycle?

1. The constant movement of water as a liquid and a gas between Earth's air and its surface is the \_\_\_\_\_ . The energy for the water cycle comes from the \_\_\_\_\_ .
2. Solar energy causes water on Earth's surface to change to gas and rise into the atmosphere during the process of \_\_\_\_\_ .
3. As gaseous water rises and cools, it turns into droplets of liquid water during the process of \_\_\_\_\_ .
4. Water droplets may fall from the atmosphere back to Earth's surface as \_\_\_\_\_ , such as rain and snow.
5. Some water soaks into the ground and collects in pores in soil and rock to become \_\_\_\_\_ .
6. Plants take water from the soil and return it to the air through their leaves during \_\_\_\_\_ .

### What is the carbon cycle?

7. The constant exchange of carbon among Earth's living organisms is the \_\_\_\_\_ .
8. During photosynthesis, plants take \_\_\_\_\_ from the air and use it to make food that other living things use.

9. Animals and plants burn carbon-rich foods during cellular \_\_\_\_\_, and then release carbon dioxide to the atmosphere.
10. Fossils fuels, which form from the decayed remains of living things, release the carbon in them when they are \_\_\_\_\_.

### What is the nitrogen cycle?

11. Although most of Earth's atmosphere is nitrogen, the gas must first be \_\_\_\_\_ so that it is in a form that most living things can use.
12. Nitrogen can be fixed by volcanic action, by \_\_\_\_\_, and by nitrogen-fixing \_\_\_\_\_.
13. Plants use nitrogen to make \_\_\_\_\_, which get into the bodies of animals when they eat plants or plant-eating animals.
14. Nitrogen returns to the soil in the \_\_\_\_\_ of animals, and when plants and animals decay.

### How is matter recycled?

15. People can reduce their use of natural resources through \_\_\_\_\_.

### Critical Thinking

16. Why is it necessary for water, carbon, nitrogen, and oxygen to be recycled through Earth's ecosystems?

---



---

# Cycles in Ecosystems

## What am I?

Choose a word from the word box below that answers each question.

- |                        |                          |                         |
|------------------------|--------------------------|-------------------------|
| <b>a.</b> carbon cycle | <b>d.</b> evaporation    | <b>g.</b> precipitation |
| <b>b.</b> compost      | <b>e.</b> groundwater    | <b>h.</b> runoff        |
| <b>c.</b> condensation | <b>f.</b> nitrogen cycle |                         |

- \_\_\_\_\_ I am the changing of a gas into a liquid as the gas cools. What am I?
- \_\_\_\_\_ I am the continuous changing of nitrogen gas into compounds in the soil and its later release back to the air. What am I?
- \_\_\_\_\_ I am precipitation that flows over the land's surface into rivers and lakes and is not absorbed into the ground. What am I?
- \_\_\_\_\_ I am a mixture of decayed plant and animal material that can be used as fertilizer. What am I?
- \_\_\_\_\_ I am the continuous exchange of carbon among living things. What am I?
- \_\_\_\_\_ I am the changing of a liquid into a gas. What am I?
- \_\_\_\_\_ I am water that sinks beneath the ground and collects in tiny holes in soil and rock. What am I?
- \_\_\_\_\_ I fall to Earth's surface as rain, snow, sleet, or hail. What am I?

## Cycles in Ecosystems

Fill in the blanks.

atmosphere	fixation	runoff
decomposers	nitrates	
evaporation	precipitation	

The Sun provides energy for the water cycle. Heat causes water to rise from Earth's surface as a gas through a process called \_\_\_\_\_. Water then condenses in the atmosphere and falls, as \_\_\_\_\_, into oceans and the ground, or over land as \_\_\_\_\_.

In the carbon cycle, plants use carbon dioxide to make food. Carbon dioxide is released back into the \_\_\_\_\_ when living things use this food. Organisms called \_\_\_\_\_ release carbon dioxide when they break down dead organisms.

Nitrogen \_\_\_\_\_ places nitrogen in a form in which it can be used by most living organisms. Plants use nitrogen in the form of \_\_\_\_\_. Other organisms get nitrogen from plants and return it to the soil through their wastes.

## Changes in Ecosystems

Use your textbook to help you fill in the blanks.

### How can ecosystems change?

1. Ecosystems are changed by living \_\_\_\_\_ that change the environment around them, and by \_\_\_\_\_ events such as floods.
2. Humans can change or destroy the \_\_\_\_\_ of organisms when they cut \_\_\_\_\_ to build homes.

### What happens when ecosystems change?

3. Some organisms respond to changes in ecosystems by adapting or \_\_\_\_\_ to another place.
4. When a type of organism cannot respond to changes in an ecosystem, it may become \_\_\_\_\_.
5. When a species is in danger of extinction, it is called an \_\_\_\_\_ species.
6. Species that could become endangered because of their low populations are known as \_\_\_\_\_ species. The biggest threat to a species is the loss of \_\_\_\_\_.

### How do ecosystems come back?

7. Over time, one group of species in an ecosystem is replaced by a different group of species through a process called \_\_\_\_\_.

8. In a region where few if any species existed before or where previous species were wiped out, \_\_\_\_\_ occurs.
9. The first species to take hold in barren areas are \_\_\_\_\_ species, such as mosses and lichens.
10. As larger plants and predators begin to live in an area, the community may become a(n) \_\_\_\_\_, such as a prairie.
11. With enough moisture, \_\_\_\_\_ may start to grow in a grassland.
12. In time, a fully developed ecosystem will support a(n) \_\_\_\_\_ community, which is the final stage of succession.

### **What is secondary succession?**

13. When a new community develops where a community had once existed, it is called \_\_\_\_\_ succession.
14. Secondary succession might occur in a forest that has been burned by a(n) \_\_\_\_\_ or at an abandoned farm.

### **Critical Thinking**

15. A volcano erupts and lava flows over what had once been a fertile farm field. Describe the type of succession that will occur, and explain why.

---



---

## Changes in Ecosystems

Match the correct letter with the description.

- |                       |                         |
|-----------------------|-------------------------|
| a. climax community   | e. pioneer species      |
| b. endangered species | f. primary succession   |
| c. extinct            | g. secondary succession |
| d. pioneer community  | h. succession           |

1. Establishment of the first living community to develop in an area that used to be lifeless is called \_\_\_\_\_.
2. When a species dies out completely, the species is \_\_\_\_\_.
3. The establishment of a new community where a community had already existed is called \_\_\_\_\_.
4. The process of one ecosystem gradually changing into a different type of ecosystem is called \_\_\_\_\_.
5. A species that is in danger of becoming extinct is a(n) \_\_\_\_\_.
6. In the final stages of succession, a(n) \_\_\_\_\_ develops.
7. One of the first species to live in an area that used to be lifeless is a(n) \_\_\_\_\_.
8. Succession that occurs where there is no soil and where few, if any, living things exist is \_\_\_\_\_.

## Changes in Ecosystems

Fill in the blanks.

animal

plants

species

habitat

primary succession

trees

pioneer

secondary succession

Ecosystems change over time. People cause some of the changes, through pollution, \_\_\_\_\_ destruction, or hunting, or by introducing or removing \_\_\_\_\_.

However, many ecosystem changes are natural. When land is burned by a fire or a farm field is abandoned, \_\_\_\_\_ occurs. New \_\_\_\_\_ begin to grow in the soil. Weeds, then shrubs, and finally \_\_\_\_\_ grow. When few, if any, living things exist in an area, \_\_\_\_\_ will establish a first community. The first organisms to live in the area are called \_\_\_\_\_ species. After soil is established, larger plants can grow and larger \_\_\_\_\_ species can arrive. Eventually, forests develop. Finally, in the last stage of succession, a climax community is established.



# Biomes

Use your textbook to help you fill in the blanks.

## What are biomes?

1. Each of Earth's major land ecosystems is a(n) \_\_\_\_\_ . Each biome has its own specific animals, plants, soil, and \_\_\_\_\_ .
2. A sandy or rocky biome with a dry climate is a(n) \_\_\_\_\_ . Some organisms have \_\_\_\_\_ that allow them to survive in dry regions.

## What are some harsh biomes?

3. The ground in the \_\_\_\_\_ stays frozen all year. Trees cannot grow where this layer of constantly frozen ground called \_\_\_\_\_ exists.
4. Some grasses, \_\_\_\_\_ , and \_\_\_\_\_ grow in the tundra.
5. Although few animals live in the tundra, \_\_\_\_\_ bears, caribou, and Arctic \_\_\_\_\_ do make their homes there.
6. The \_\_\_\_\_ is a cool, forest biome just south of the tundra.
7. The dominant type of vegetation in the taiga biome is \_\_\_\_\_ .
8. Many of the animals in the taiga have thick \_\_\_\_\_ and layers of fat to protect them from cold weather.

### What are some forest biomes?

9. A hot biome near the equator that has lots of rain and more plants and animals than any other biome is the \_\_\_\_\_.
10. This biome has four \_\_\_\_\_, with different plants and animals in each one.
11. The \_\_\_\_\_ rain forest biome has lots of rain and a cooler climate than tropical forests.
12. The \_\_\_\_\_ is a forest biome with four seasons and trees that lose their leaves in autumn.
13. Winter in the deciduous forest can be cold, and many animals hibernate, \_\_\_\_\_ to warmer climates.

### What are grasslands?

14. The \_\_\_\_\_ is a biome where grasses, not trees, are the main type of plant life. In North America, the \_\_\_\_\_ is a large area of grassland.
15. The grassland biome is wetter than that of a desert but does not have enough precipitation to support many \_\_\_\_\_.

### Critical Thinking

16. Why is climate important in determining biomes?

---



---



---



---

# Biomes

Use the clues below to help you fill in the blanks.

biome	desert	taiga	tropical
deciduous	grassland	temperate	tundra

1. The \_\_\_\_\_ is a large, treeless biome where the ground is frozen all year.
2. A very rainy biome called the \_\_\_\_\_ rain forest is dominated by evergreen trees and has mild winters and cool summers.
3. Any of Earth's major land ecosystems with its own typical plants, soil, and climate is a(n) \_\_\_\_\_.
4. The \_\_\_\_\_ is a cool, northern forest biome dominated by conifers.
5. The \_\_\_\_\_ forest, a forest biome with four distinct seasons, has trees that lose their leaves each year in autumn.
6. The \_\_\_\_\_ is a sandy or rocky biome that has little precipitation and limited plant life.
7. With few trees, the \_\_\_\_\_ is a biome in which the main form of vegetation is grass.
8. The \_\_\_\_\_ rain forest is a hot, humid biome near the equator, that has abundant rainfall and a wide variety of life.

# Biomes

Fill in the blanks.

climate	hardwood	taiga
deciduous forest	permafrost	temperate
grassland	rainy	tropical rain forest

Earth has several major land ecosystems called biomes. Each of these has its own typical animals, plants, soil, and \_\_\_\_\_. The \_\_\_\_\_ biome is hot and \_\_\_\_\_ all the time and has more types of plants and animals than any other biome. There are also \_\_\_\_\_ rain forests, which are rainy, but have a cooler climate than tropical forests. In the \_\_\_\_\_ biome, deciduous trees dominate. These are \_\_\_\_\_ trees that lose their leaves each autumn. North of this biome is the \_\_\_\_\_, with its cold, snowy climate and forests of conifers.

The coldest, harshest biome is the tundra, which is a treeless area with a layer of \_\_\_\_\_ under the surface. Another largely treeless biome is the \_\_\_\_\_, where grasses are the main type of plant life. The desert biome is sandy or rocky, with little precipitation or plant life.

## Did You Know That Forests Breathe?

Read the passage titled “A Year in the Life of a Forest” in your textbook. The passage about the Howland Forest of Maine contains five paragraphs. In the blanks provided in the graphic organizer, write a sentence that summarizes the main idea of the first three paragraphs, followed by two sentences that contain supporting details. Use your own words. The first item has been done for you.

Main Idea	Details
<u>Paragraph 1 Main Idea:</u> Scientists measure gas levels in forests throughout the year.	Howland Forest is a deciduous forest in Maine.
	The change in seasons affects the levels of carbon dioxide there.
<u>Paragraph 2 Main Idea:</u>	
<u>Paragraph 3 Main Idea:</u>	



**Write About It**

**Main Idea and Details** 1. Tell how the levels of carbon dioxide change in the Howland Forest throughout the year.  
2. Research other biomes, and explain how they change during the year.

Now, use the information in your graphic organizer to write a paragraph telling how the levels of carbon dioxide change in the Howland Forest throughout the year.

---

---

---

---

---

---

---

---

---

---

Next, you will be conducting research about the yearly changes to another biome.

1. What biome do you choose to research? \_\_\_\_\_
2. What types of organisms live in this biome? \_\_\_\_\_
3. What changes can be observed in this biome as the seasons change? \_\_\_\_\_
4. Compare your biome research with that of the students seated closest to you. Why do seasonal changes in the different biomes vary? Give your opinion.

# Water Ecosystems

Use your textbook to help you fill in the blanks.

## What are water ecosystems?

1. There are freshwater ecosystems and \_\_\_\_\_ ecosystems.
2. Organisms that drift in the water are called \_\_\_\_\_. Active swimmers such as fish are called \_\_\_\_\_.
3. The creatures that live in the deepest part of a body of water are the \_\_\_\_\_. Many bottom-living creatures are scavengers or \_\_\_\_\_.
4. Producers, which live at or near the surface, release the \_\_\_\_\_ that allows most other water organisms to live in surface waters.

## What are freshwater ecosystems?

5. Organisms in running-water ecosystems are adapted to how \_\_\_\_\_ the water flows.
6. In standing-water ecosystems, such as lakes, most organisms live in the shallow water of the \_\_\_\_\_ zone.
7. Many nekton live in the \_\_\_\_\_ zone, which is away from the shore.
8. Benthos, including worms and mollusks, live in the \_\_\_\_\_ zone beneath the open-water zone.

### What are ocean ecosystems?

9. Organisms of the shallow \_\_\_\_\_ zone are covered and uncovered each day by the rise and fall of tides.
10. Sunlight allows producers and the animals that depend on them to live in the \_\_\_\_\_ zone.
11. Large organisms live near the surface in the top part of the \_\_\_\_\_ zone, which is called the bathyal zone.
12. Few creatures can live in the cold, dark waters at the bottom of the oceanic zone, which is called the \_\_\_\_\_ zone.

### Where do salt and fresh water meet?

13. The place where a river empties into the ocean is called a(n) \_\_\_\_\_. Estuaries usually contain \_\_\_\_\_ marshes, boggy areas covered with grasses.
14. When the tide comes in, an estuary's waters are mostly \_\_\_\_\_, but the waters are mostly \_\_\_\_\_ when the tide goes out.
15. Wetlands protect coastal regions during \_\_\_\_\_ by soaking up excess water.

### Critical Thinking

16. How is sunlight a limiting factor in water ecosystems?

---



---



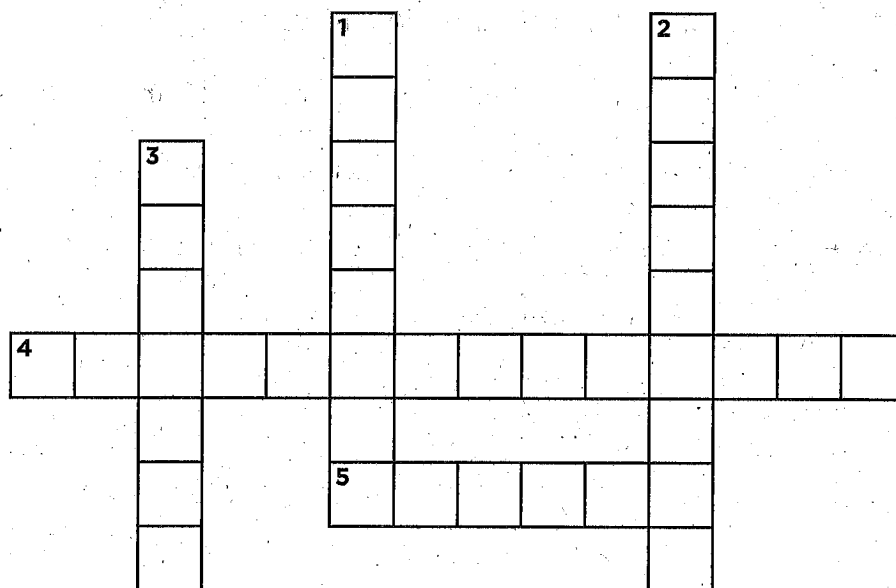
---



# Water Ecosystems

Match the correct letter with the description and fill in the crossword puzzle.

benthos	nekton	shore zone
intertidal zone	plankton	



## Across

- Place where organisms are covered and uncovered daily by the waters of changing tides
- The larger, active swimmers in a body of water

## Down

- Creatures that drift freely in the water
- The shallow water in standing-water ecosystems
- Organisms that live on the bottom of a body of water

# Water Ecosystems

Fill in the blanks.

benthos	nekton	oceanic	tides
intertidal	neritic	running-water	upper

Water ecosystems have many forms of life.

Organisms in water ecosystems are classified as plankton that float in the water; \_\_\_\_\_ that are large, free swimmers; and \_\_\_\_\_ that live on the bottom of a body of water. In general, more organisms live in the \_\_\_\_\_ layers of the water.

Organisms such as kelp, fish, and whales live in the ocean's \_\_\_\_\_ zone. Sharks, squid, and octopi live in the upper part of the ocean's \_\_\_\_\_ zone (few animals live in the lower part of this zone).

Freshwater ecosystems are divided into \_\_\_\_\_ bodies, standing-water bodies, and wetlands ecosystems.

Organisms of the ocean's (saltwater) \_\_\_\_\_ zone must be adapted to rise and fall of \_\_\_\_\_.

Organisms that live in estuaries are adapted to survive in both fresh and salty waters.

## Keep Our Water Clean



### Write About It

Write a letter to the mayor of your town. Explain a need that the students in your community have and why people should help. State your opinion clearly and support it with relevant facts and evidence organized in a logical way.

### Getting Ideas

Think of an issue that clearly affects life in your community. Form an opinion about it. Write this opinion in the top box in the chart below. Then jot down reasons that support this opinion in the bottom boxes.

Opinion		
Reason	Reason	Reason

### Planning and Organizing

Kristin's opinion is that the town should ban power boats from the lake. Here are three statements she wrote. Write Yes if the statement supports her opinion. Write No if it does not.

- \_\_\_\_\_ Power boats can pollute the water.
- \_\_\_\_\_ Power boats are a fun way to spend time on the lake.
- \_\_\_\_\_ Power boats kill fish and other water life.

**Drafting**

Write a statement to begin your letter. Make sure it clearly tells the issue you are concerned about and states your opinion.

---

---

---

Now write your letter to the mayor on a separate piece of paper. Use the form of a business letter. Start the body of your letter with the sentence you wrote above. Include reasons that will persuade the mayor to support your opinion. End by stating what you think should be done. Remember to be polite and respectful.

**Revising and Proofreading**

Now revise and proofread your writing. Ask yourself:

- ▶ Did I clearly state my opinion about a need that the students in my community have?
- ▶ Did I provide relevant reasons to support this opinion?
- ▶ Did I correct all mistakes in grammar, spelling, capitalization, and punctuation?

## Ecosystems and Biomes

Choose the letter of the best answer.

1. Which of these is a type of precipitation?
  - a. frost
  - b. clouds
  - c. dew
  - d. hail
2. In which natural cycle must an important gas in Earth's atmosphere be fixed before plants can use it?
  - a. sulfur cycle
  - b. carbon cycle
  - c. nitrogen cycle
  - d. oxygen cycle
3. Which of these processes is the changing of water vapor into liquid water?
  - a. condensation
  - b. infiltration
  - c. evaporation
  - d. transpiration
4. Which kind of species is in danger of totally disappearing from Earth?
  - a. threatened
  - b. endangered
  - c. extinct
  - d. pioneer
5. In the last stage of succession, the plants and animals in an ecosystem form a(n)
  - a. pioneer community.
  - b. endangered community.
  - c. climax community.
  - d. primary community.
6. Which type of succession would occur after a fire has burned a forest?
  - a. primary succession
  - b. tertiary succession
  - c. secondary succession
  - d. climax succession

Choose the letter of the best answer.

7. Which type of biome has the greatest diversity of plants and animals?
  - a. tundra
  - b. deciduous forest
  - c. desert
  - d. tropical rain forest
8. In which cold, northern biome are conifers the main type of plant life?
  - a. deciduous forest
  - b. tropical rain forest
  - c. taiga
  - d. tundra
9. In which biome do hardwood trees lose their leaves before the cold winter sets in?
  - a. tundra
  - b. taiga
  - c. deciduous forest
  - d. tropical rain forest
10. The cold temperatures and frozen ground prevent the growth of trees in the
  - a. taiga.
  - b. desert.
  - c. tundra.
  - d. grasslands.
11. Creatures that drift freely in water ecosystems are called
  - a. plankton.
  - b. benthos.
  - c. nekton.
  - d. crustaceans.
12. What are the large, active swimmers, such as fish and whales, in water ecosystems?
  - a. mollusks
  - b. benthos
  - c. plankton
  - d. nekton
13. The organisms that live along the bottom of water ecosystems are the
  - a. benthos.
  - b. nekton.
  - c. plankton.
  - d. shellfish.