



Life Science

Animals and Plants in Their Environment

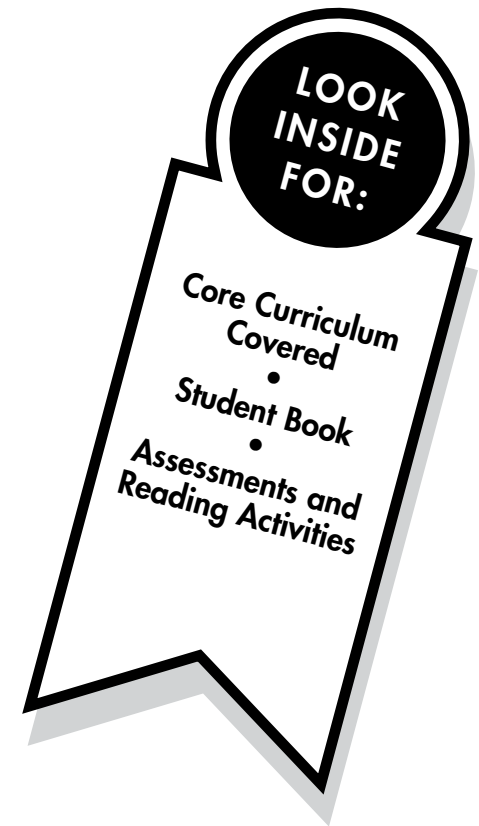
Basic Level

What Happens When Ecosystems Change?

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What Happens When Ecosystems Change?

What roles do plants and animals play in their environments?

CORE CURRICULUM STATEMENTS

Organisms maintain a dynamic equilibrium that sustains life.

The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, shelter, heat, and sunlight.

Plants and animals depend on each other and their physical environment.

An organism's pattern of behavior is related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and other resources, and the physical characteristics of the environment.

When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

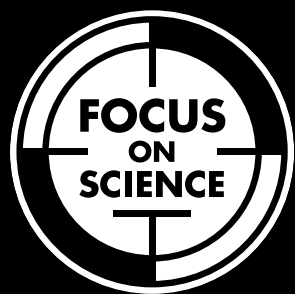
Human decisions and activities have had a profound impact on the physical and living environments.

Humans depend on their natural and constructed environments.

Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means of transportation, changing populations, and carrying out other activities.

Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.

Basic Level



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Animals and Plants in Their Environment

Student Book

What Happens When Ecosystems Change?

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BL

What Happens When Ecosystems Change? What role do plants and animals play in their environments?

CORE CURRICULUM STATEMENTS

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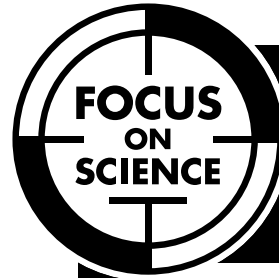
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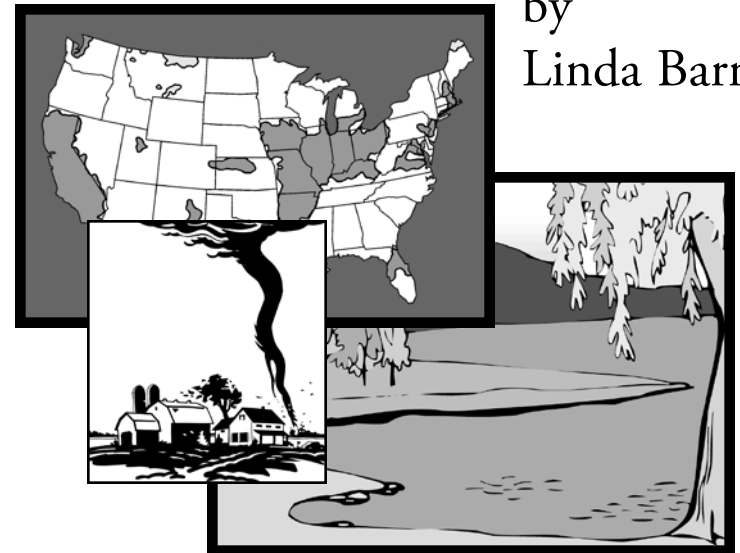


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What Happens When Ecosystems Change?

by
Linda Barr





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– Predict –

*Look at the chapter titles. What do you
think you will learn from this book?*

INTRODUCTION

Things Change

Has your habitat changed lately?
Have people built more houses near your home? Do new roads lead to those houses? Maybe a flood destroyed some homes.

Habitats can change in helpful or harmful ways. Natural forces, such as the weather, cause some changes. People cause many other changes. In this book, you'll read about ways that habitats and **ecosystems** change. You'll find out how living things respond to those changes.

habitat: the place where a living thing can meet all of its needs
ecosystem: a large community of living things and their environment; can include many different habitats

CHAPTER 1

Changes Caused by Wind, Water, and Fire

Hurricanes

In 2005, Hurricane Katrina hit the Gulf Coast. Many people died. Many more lost their homes. Damage is still being repaired.

Wildlife was also greatly affected. Island habitats were wiped out. Hundreds of acres of **marsh** along the coast became open water. Rare sea turtles lost their nesting sites. Forests lost timber and habitats.

Katrina washed **pollution** such as oil and gasoline into lakes and rivers. The effects on fish and wildlife are still being measured.

marsh: land that is underwater some of the time
pollution: harmful substances that enter the environment

Tornadoes

Tornadoes also destroy habitats.

Both humans and animals can lose their homes. Tornadoes kill, too. In 1974, one killed 33 people in Xenia, Ohio.

Flooding

Floods can wash away plants.

Animals lose both shelter and food.

Floods can also strip away rich topsoil.

Then plants that survive the flood do not get enough nutrients.

Yet that rich topsoil doesn't just disappear. Floods carry this soil downstream. When the rain stops, the river slows down and drops its topsoil. That's why crops grow well in low fields along rivers.

Forest Fires

Forest fires also change habitats. Lightning starts only one in ten fires. People cause the rest, mostly by accident. About one-fourth of forest fires are set on purpose.

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– Compare –
How does flooding both help and harm habitats?

Flames quickly wipe out habitats, but forest fires can also help living things. For example, ashes from burned wood add nutrients to the soil.

When trees fall, more sunlight reaches the forest floor. The nutrients and sunlight help small plants sprout. In time, a young forest replaces the old one.

Animals that eat plants cannot wait for new plants to grow. They must move to a nearby forest. They **compete** for food, water, shelter, and space with the plant-eaters that live there.

When the plant-eaters move to another forest, the predators must follow them. Now that forest has too many predators. They will soon wipe out the mice, rabbits, and other plant-eaters.

With the plant-eaters gone, the plants in this forest will thrive. Yet the predators will starve. Now all the **predators** in that forest must move to yet another habitat. If they stay, they will die.

Changes in one habitat can spread like ripples to other habitats.

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– Restate –

How does a forest habitat change after a fire?

compete: to fight for something

predators: animals that get their energy by eating other animals

Changes Caused by Plants and Animals

Animals can change their own habitats. For example, deer can strip a forest of leaves. Then they and other plant-eaters go hungry.

Beaver Dams

Beavers' dams block rivers and streams. Plants and animals that need flowing water lose their habitat. Yet animals that like ponds, such as wood ducks, move in. To build dams, beavers cut down trees. This changes the forest. As those trees disappear, new plants grow in the sunlight where they used to stand.

– Evaluate –

Does a beaver dam cause helpful or harmful changes?

Earthworms

Earthworms can change a habitat. They can help the soil. Their tunnels mix air and water into the soil. Earthworms also eat decaying plants and produce wastes that make the soil richer.

Yet earthworms can harm some forests. Near the Great Lakes are forests without earthworms. The trees produce a thick layer of dead leaves every fall. Many plants get their nutrients from these decaying leaves. The layer also helps keep roots cool in summer and warm in winter.

Changes Caused by People

People change their ecosystem in many ways. People cut down forests to make room for houses. Farmers turn grasslands into farm fields. Many habitats are lost.

People also used to fill in wetlands to build more houses. Now we know that wetlands help keep our water clean and reduce flooding. They also provide habitats for many rare plants and animals. New laws have slowed the loss of wetlands. Still, we lose thousands more acres every year.

If earthworms were in these forests, they would change decaying leaves into their own wastes. Insects and animals that live in the decaying leaves would lose their habitat. Plants would not grow as well in the thick wastes. Earthworm waste would not protect the plants' roots from heat or cold.

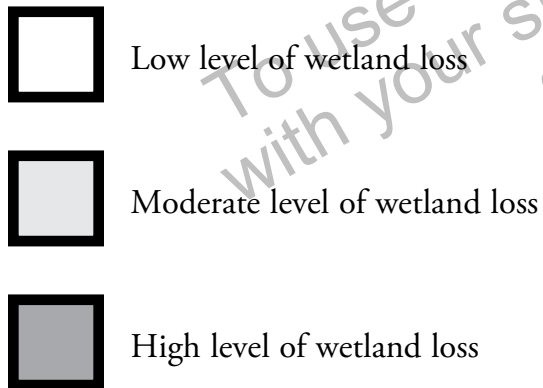
Some plants, such as wild oats and sugar maple trees, disappear after earthworms appear. Others, such as ash trees, grow better.

Living things can change their own habitats. Then other living things must adjust, leave, or die.

– Infer –

How have our ideas about earthworms changed as we have gained new knowledge?

Loss of Wetlands 1780s–1990s



– Interpret –
Has New York lost any wetlands?

Pollution

We also put fertilizers and insect killers on our crops and lawns. Rain washes them into streams and lakes. This causes pollution.

We burn gasoline to make our car engines run. We burn coal to produce electricity. Burning **fossil fuels** releases gases into the air. They rise and form **acid rain**. This keeps trees from absorbing water and nutrients from the soil. It pollutes water.

fossil fuels: coal, oil, and natural gas
acid rain: rain, snow, or sleet that has been made acidic by pollution in the air

Transporting Plants and Animals

People also take plants and animals to new habitats. An insect might crawl into a box and get shipped across the nation. Gardeners in California and Maine might trade seeds.

What's the problem? That insect might have no predators where it ends up. New plants might grow faster than the ones already there. Soon the new insect or plant is crowding out the old ones. With human help, new plants and animals are changing habitats.

Protecting Habitats

We are trying to protect habitats. When people build homes, they also plant trees and add ponds and parks. We use safer ways to get rid of insects and weeds. We try to burn less gasoline. We use less energy (fossil fuels) by making products from recycled materials.

Many habitats are now protected. One is the Wertheim National Wildlife Refuge on Long Island. It's a safe place for ducks and many other birds.

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– Formulate –

What are some other ways that people might take plants or animals to new habitats?

Changes in the Climate

Are rising temperatures worldwide a problem? Some people think not. They say Earth goes through periods of warm weather and then cold weather. It has even had ice ages. They say our climate will cool off again in time.

Other people are worried. Carbon dioxide and other gases are building up in our **atmosphere**. The **greenhouse effect** is trapping more of the sun's heat. These people say that if this continues, Earth will keep getting warmer.

atmosphere: the blanket of air surrounding Earth
greenhouse effect: gases allow the sun's energy to pass through Earth's atmosphere, but then prevent most of this energy from escaping back into outer space

Learning More

We know that a fact is something that can be proven. An opinion is what someone believes. As we learn more, sometimes our opinions change. Our ideas about Earth's climate are changing as we learn more. The U.S. **EPA** tell us that these facts are true:

- Human actions are changing Earth's atmosphere. As we burn fossil fuels, we send greenhouse gases into the air.
- The amount of greenhouse gases in our atmosphere has increased.
- An increase in these gases tends to warm Earth's climate.
- Earth's average temperature has increased over the past one hundred years. Our four warmest years have occurred since 1998.

EPA: the Environmental Protection Agency; a government agency that watches over our environment

A small change can make a big difference. During the last ice age, Earth was an average of only seven degrees colder than now! **Glaciers** covered most of our nation.

A warmer climate could mean more rain—or less rain. A quick change in rainfall and temperature could kill many living things.

Melting glaciers have caused the oceans to rise six to eight inches. If all of the glaciers melt, cities on the coasts may be flooded.

glacier: a very large piece of thick ice that moves slowly down a slope and spreads out on flat land

We cannot stop hurricanes or tornadoes. Yet we can control some of the other changes on Earth. We are protecting more of our forests. We are finding ways to reduce pollution. We are learning more about the greenhouse effect.

We know that populations of living things can adjust to some slow changes. Yet other slow changes are harmful.

We must make changes that have good results. We, and all other living things, have to live with these results.

– Propose –
What are some positive changes that people can make in their ecosystem?

Glossary

acid rain—rain, snow, or sleet that has been made acidic by pollution in the air

atmosphere—the blanket of air surrounding Earth

compete—to fight for something

ecosystem—a large community of living things and their environment; can include many different habitats

EPA—the Environmental Protection Agency; a government agency that watches over our environment

fossil fuels—coal, oil, and natural gas

glacier—a very large piece of thick ice that moves slowly down a slope and spreads out on flat land

greenhouse effect—gases allow the sun's energy to pass through Earth's atmosphere, but then prevent most of this energy from escaping into outer space

habitat—the place where a living thing can meet all of its needs

marsh—land that is underwater some of the time

pollution—harmful substances that enter the environment

predators—animals that get their energy by eating other animals

To Find Out More . . .

Want to learn more about environments and ecosystems?

Try these books

Changing Climate by Sally Morgan. Franklin Watts, 2005.

Climate Change by Shelley Tanaka. Groundwork Books, 2006.

Here are two books about endangered wildlife:

Elephant Rescue: Changing the Future for Endangered Wildlife by Jody Morgan. Firefly Books, 2004.

Rainforest Bird Rescue: Changing the Future for Endangered Wildlife by Linda Kenyon. Firefly Books, 2006.

Access these Web sites

Go to this site to learn more about different kinds of habitats.

www.nationalgeographic.com/geographyaction/habitats/

This EPA Web site will help you understand climate change.

www.epa.gov/climatechange/kids/index.html

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Assessments

What Happens When Ecosystems Change?

Print pages 20–22 of this PDF for the assessments.

What Happens When Ecosystems Change?

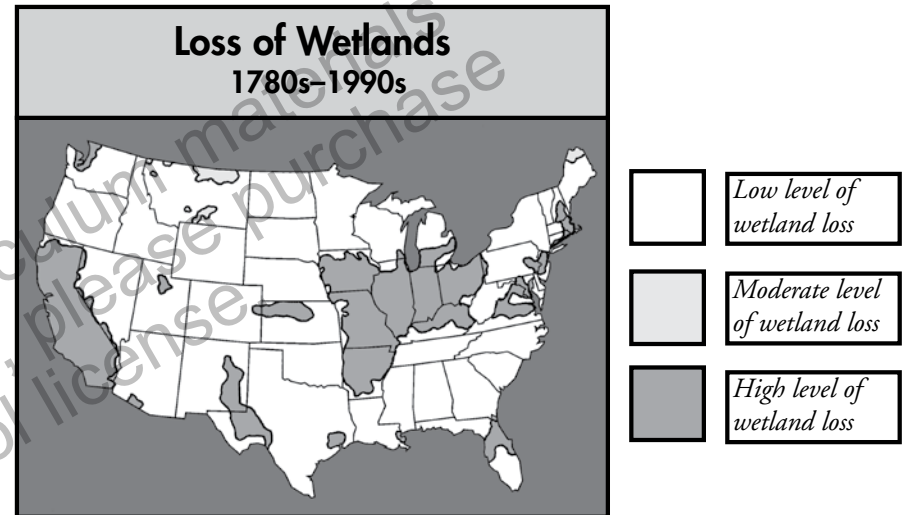
Check Understanding

Shade the circle next to the correct answer or write your answer on the lines provided.

1. A beaver chops down trees near a river and builds a dam. Identify **one** change to the habitat from the dam.

Explain what effect the change can have on the habitat.

Use the map below to answer question 2.



2. What conclusion can you draw about the loss of wetlands in New York?
- (A) There has been no loss of wetlands.
 - (B) There has been very little loss of wetlands.
 - (C) There has been some loss of wetlands.
 - (D) There has been a significant loss of wetlands.

Check Understanding

Shade the circle next to the correct answer or write your answer on the lines provided.

3. A gardener in California gives several native plants to a gardener in New York, who plants them. Identify **two** possible effects of introducing these new plants.

1) _____

2) _____

Explain the consequences of growing them in New York.

4. Students recorded the number of squirrels observed around their school for a period of five days. The data table below shows the number of squirrels each day.

Day	Number of Squirrels
Monday	12
Tuesday	15
Wednesday	10
Thursday	11
Friday	10

Based on the data table, which statement is correct?

- Ⓐ The number of squirrels went up steadily from Monday through Friday.
- Ⓑ The number of squirrels went down steadily from Monday through Friday.
- Ⓒ Monday had the greatest number of squirrels.
- Ⓓ There were more squirrels observed on Monday than on Thursday.

What Happens When Ecosystems Change?

Assessment Scoring Guidelines

1. The river above the dam stops flowing.
Animals that need flowing water cannot survive in the habitat anymore.

The river above the dam stops flowing.
Animals that need still water may move in and thrive.

The beaver cuts down trees.
New and sometimes different plants and trees may grow to replace them.
2. Answer A is correct.

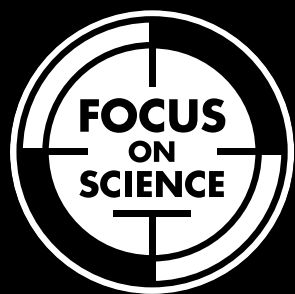
3. The plants may thrive and overtake native New York plants.
Some native species will no longer survive in New York

The plants may provide food or shelter for animals living in the area
Another source of food may help certain animals thrive in New York

The plants may not be able to grow in New York's climate.
There will be no positive or negative effect on New York's habitat.
4. Answer D is correct.

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Basic Level



Life Science

Animals and Plants in Their Environment

English Language Arts Activities

What Happens When Ecosystems Change?

Print pages 24–28 of this PDF for the reading activities.

Similes and Metaphors

TRY THE SKILL

Authors use similes and metaphors to make their writing more interesting. They want to help readers form pictures in their minds. A simile compares two different things using the words *like* or *as*. Here is one example:

Changes in one habitat can spread like ripples to other habitats.

The phrase, “spread like ripples” compares changes in a habitat to ripples in water.

A metaphor compares two different things without using the words *like* or *as*. Read this example:

The rain forest is a treasure chest of living things.

This sentence compares the rain forest full of plants and animals to a treasure chest full of gold and jewels.

Read each sentence. Then shade in the letter that explains the simile or metaphor.

1. Reading the book was like walking down a new road.
 - Ⓐ Someone read a book while taking a walk.
 - Ⓑ Reading the book was a new experience.
 - Ⓒ The book was about walking down a road.
 - Ⓓ The book described all the houses on a new road.
2. The old cedar tree was the grandfather of the forest.
 - Ⓐ Grandfather liked to sit under the cedar tree.
 - Ⓑ Grandfather liked to tell stories about the cedar tree.
 - Ⓒ The cedar tree was one of the oldest trees in the forest.
 - Ⓓ The cedar tree looked like it had a beard.
3. The glacier was melting like an ice cream cone in August.
 - Ⓐ The glacier was shaped like an ice cream cone.
 - Ⓑ The glacier reminded me of an ice cream cone.
 - Ⓒ The glacier was the size of an ice cream cone.
 - Ⓓ The glacier was melting quickly.

Summarize Information

TRY THE SKILL

To understand what you read, you must be able to identify the main ideas and supporting details. A paragraph may have one or more important ideas, along with details that support each of them. For example, read this paragraph:

Flames quickly wipe out habitats, but forest fires can also help living things. For example, ashes from burned wood add nutrients to the soil. When trees fall, more sunlight reaches the forest floor. The nutrients and sunlight help small plants sprout. In time, a young forest replaces the old one.

What is the main idea of this paragraph?

This paragraph has two main ideas: 1) Forest fires help by increasing the nutrients in the soil and the amount of sunlight. 2) The forest grows back in time. The rest of the sentences offer details about how fires increase nutrients and sunlight and how a forest grows back.

Read this paragraph. Then shade in the letter of the correct answer.

People also used to fill in wetlands to build more houses. Now we know that wetlands help keep our water clean and reduce flooding. They also provide habitats for many rare plants and animals. New laws have slowed the loss of wetlands. Still, we lose thousands more acres every year.

1. What is the first important idea in this paragraph?
 - (A) Wetlands help keep our water clean.
 - (B) Wetlands are habitats for rare plants and animals.
 - (C) We have learned how wetlands help us.
 - (D) We are still losing much of our wetlands.
2. What is the second important idea in the paragraph?
 - (A) Wetlands are habitats for rare plants and animals.
 - (B) New laws have slowed the loss of wetlands.
 - (C) We have learned how wetlands help us.
 - (D) We are still losing much of our wetlands.

Ask and Answer Questions

TRY THE SKILL

Often we can figure out the answer to a question by asking ourselves other questions. For example, let's say that you and a group are hiking through the woods when you find a large stream. Many branches and small trees are lying across the stream, forming a pond behind them.

You wonder if beavers made this dam. To find out, you could ask yourself questions such as these:

“Have any recent storms been strong enough to blow trees and branches into this river?”

“Do the branches seem to be carefully placed, or are they every which way?”

“Do the ends of the branches seem to be chewed, or did they break off?”

“Are there any signs of beavers here?”

Answering those questions will help you figure out if this is a beaver dam. When you ask yourself questions, you are identifying what you need to know so that you can answer another question.

Read each paragraph and the question in italics. Then shade in the circle next to the question that would help you answer the question.

1. People also transport plants and animals. They take them to new habitats. An insect might crawl into a box and get shipped across the nation. Gardeners in California and Maine might trade seeds.

Why is transporting plants and animals a problem?

To answer this question, I should ask:

- Ⓐ Where are the new habitats of these plants and animals?
 - Ⓑ Why doesn't the insect die while it's in the box?
 - Ⓒ What happens when plants and animals enter a new habitat?
 - Ⓓ Why do gardeners trade seeds?
2. Some people are worried about rising temperatures worldwide. Carbon dioxide and other gases are building up in our atmosphere. The greenhouse effect is trapping too much of the sun's heat. These people say that if this continues, Earth will keep getting warmer.

Are rising temperatures a problem?

To answer this question, I should ask:

- Ⓐ How warm is Earth right now?
- Ⓑ What results from rising temperatures?
- Ⓒ What would happen if the atmosphere stopped trapping the sun's heat?
- Ⓓ Which activities release carbon dioxide into the atmosphere?

Fact and Opinion

TRY THE SKILL

A fact can be proved. For example, you can look up the number of people who died in the 1974 Xenia tornado. That number is a fact.

An opinion is what someone believes. For example, someone might believe that the Xenia tornado was the worst one to hit Ohio. However, other people might disagree with this opinion. Opinion sentences often have words such as *better*, *worse*, *should*, *difficult*, *toughest*, and *easy*. Here are more examples:

Facts

Heavy rain can wash away topsoil.

Hurricane Katrina hit the Gulf Coast in 2005.

Opinions

People should not turn grasslands into farms.

Too many homes have been built in the path of hurricanes.

Being able to tell facts from opinions makes you a better reader. Mark each statement below *F* for fact or *O* for opinion.

1. Hurricanes can spread pollution. _____
2. A forest that grows after a fire is never as good as the first forest. _____
3. All forest fires should be prevented. _____
4. Animals always change their habitats for the better. _____
5. Predators will go where there are plant-eaters. _____
6. Developers are ruining Earth's ecosystems. _____
7. A warmer climate will make glaciers melt faster. _____
8. Burning fossil fuels releases carbon dioxide into the air. _____

Now write one fact and one opinion about changes in ecosystems.

Fact: _____

Opinion: _____

Answer Key

Similes and Metaphors

1. B
2. C
3. D

Summarize Information

1. C
2. D

Ask and Answer Questions

1. C
2. B

Fact and Opinion

1. F
2. O
3. O
4. O
5. F
6. O
7. F
8. F

Possible fact: Ecosystems can change for the better or for the worse.

Possible opinion: People are now making more helpful changes in ecosystems.