



Life Science

Animals and Plants in Their Environment

On Level

What Happens When Ecosystems Change?

FOCUScurriculum

866-315-7880 • www.focuscurriculum.com

LOOK
INSIDE
FOR:

Core Curriculum
Covered
•
Student Book
•
Assessments and
Reading Activities

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.



Life Science

Animals and Plants in Their Environment

On Level

Student Book

What Happens When Ecosystems Change?

To use FocusCurriculum materials
with your students, please purchase
a school license.

What Happens When Ecosystems Change? What role 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.

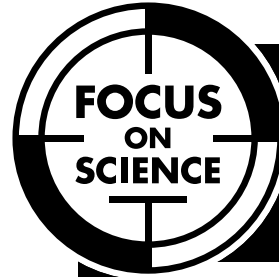
When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

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.

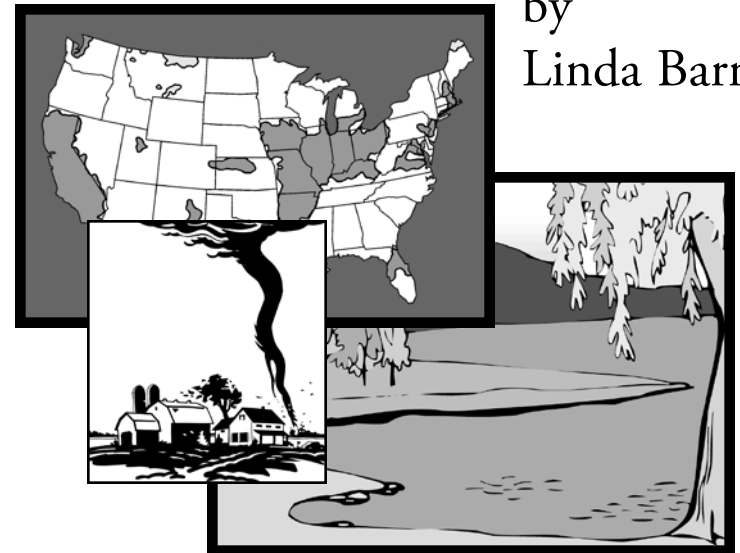


Life Science

Animals and Plants in Their Environment

What Happens When Ecosystems Change?

by
Linda Barr





Life Science
Animals and Plants in Their Environment

What Happens When Ecosystems Change?

by
Linda Barr

FOCUScurriculum

Curriculum materials for **your** content standards

Table of Contents

Introduction:

Things Change4

Chapter 1:

Changes Caused by Wind,
Water, and Fire.5

Chapter 2:

Changes Caused by Plants
and Animals10

Chapter 3:

Changes Caused by People13

Chapter 4:

Changes in the Climate.18

Glossary22

To Find Out More23

Index.24

– 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

Hurricanes can cause huge changes. In 2005, Hurricane Katrina hit the Gulf Coast. That is a very **populated** part of the United States. Many people lost their lives. Many more lost their homes. Damaged buildings are still being repaired. Hundreds of homes have been abandoned.

Wildlife was also greatly affected. Important habitats on islands off the coast of Louisiana were destroyed. Hundreds of acres of **marsh** along the coast became open water. At least sixteen wildlife refuges were damaged. Nesting sites for rare sea turtles were destroyed. Further inland, forests were knocked down. Much timber and many habitats were lost.

populated: a place where many people live
marsh: land that is underwater some of the time

Katrina washed **pollution** into lakes and rivers. It included human and animal waste. It also included spilled oil and gasoline. Many fish and wildlife lived in or near that water. The effects on them are still being measured.

Tornadoes

Tornadoes are smaller than hurricanes. Still, their winds can destroy both human and animal habitats. They can also destroy lives. In 1974, thirty-three people died when a huge tornado ripped through Xenia, Ohio.

Flooding

High winds often bring heavy rains. Flooding can wash away plants that provide shelter and food for animals. Floods can also strip away rich topsoil. The soil left behind contains fewer nutrients for the plants that survive the flood.

pollution: harmful substances that enter the environment

On the other hand, that rich topsoil doesn't just disappear. A flooding river carries this soil downstream. When the rain stops, the river flows more slowly and drops the topsoil it is carrying. That's why crops and other plants grow well in low-lying fields along rivers.

Forest Fires

Forest fires also change habitats. You might think that lightning starts most of these fires, but it's responsible for only one in ten fires. People cause the rest of the fires, mostly by accident. About one-fourth of all forest fires are set on purpose.

A wall of flames can quickly wipe out habitats, but forest fires can also help living things.

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

For example, ashes from burned wood add nutrients to the soil. When trees burn and fall, more sunlight reaches the forest floor. The extra nutrients and sunlight help new plants grow. Soon after a fire, small plants begin to sprout, followed by bushes and then **saplings**. In time, a young forest grows where the old one once stood.

After wind, water, or fire destroys trees and plants, some animals that ate those plants will survive. Yet they need to eat and cannot wait for new plants to grow, so many of them will move to another ecosystem. There, they must **compete** for food, water, shelter, and space with the plant-eaters that already live there.

saplings: young trees
compete: to fight for something

When the plant-eaters leave an ecosystem, the **predators** there go hungry. They, too, must move or starve. However, when hawks, for example, move to a nearby forest, they must compete with the hawks that already live there. Now this forest has too many predators. They will soon wipe out the mice, rabbits, and other small animals living there.

With the plant-eaters gone, the plants in this forest will thrive. Yet the hawks and other predators will begin to starve. Now most of the predators in that forest must move to yet another habitat. If they stay, they will die.

In this way, what happens to one habitat can affect many others.

– Restate –

How does a forest habitat change after a fire?

predators: animals that get their energy by eating other animals

Changes Caused by Plants and Animals

Animals can change their own habitats. For example, too many deer can strip a forest of leaves, killing many of the plants and trees. Then they and other plant-eaters must find a new source of food.

Beaver Dams

When beavers build a dam, they block a river or stream. Plants and animals that need flowing water lose their habitat, but animals that like ponds, such as wood ducks, move in. Beavers cut down trees to make their dam. They like some trees, such as aspens and willows, more than others, so they change the forest near their dam. As the aspens and willows disappear, new plants grow in the sunlight where those trees used to stand.

– Evaluate –

Does a beaver dam cause helpful or harmful changes?

Earthworms

You might have read that earthworms help the soil. They dig burrows, or tunnels, that help mix air and water into the soil. They also eat decaying plants and produce wastes that make the soil richer.

However, scientists at the University of Minnesota have found that earthworms can harm certain forests. Near the Great Lakes are forests without earthworms. The trees there produce tons of dead leaves every year. The leaves form a thick layer on the forest floor. Many plants in the forest obtain their nutrients from this layer of decaying leaves. The layer of leaves also protects roots under the soil, helping to keep them cool in summer and warm in winter.

Changes Caused by People

If earthworms were present in these forests, they would eat the decaying leaves, changing them into a thick layer of their own wastes. Insects and small animals that live in the decaying leaves would lose their habitat. Plant roots would not grow as well in the thick earthworm wastes. These wastes also would not protect the soil from heat or cold.

The earthworms actually destroy the forest floor. Some types of plants, such as wild oats and sugar maple trees, disappear after the earthworms appear. Other plants, such as ash trees, grow better.

As you can see, living things can change their own habitats, for better or for worse. As the habitat changes, the plant and animal populations there must adjust, leave, or die.

– Infer –

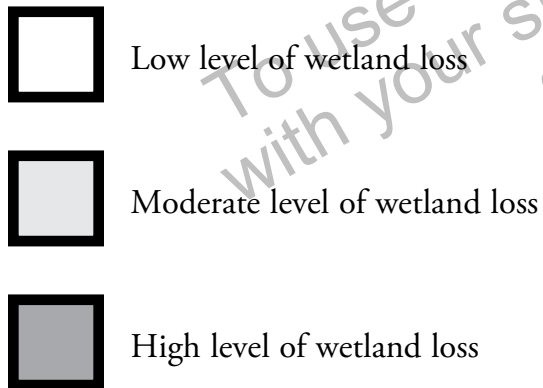
How have our ideas about earthworms changed as we have gained new knowledge?

People change their ecosystem in many ways. **Developers** cut down forests to make room for new houses. People gain new homes. Yet many living things lose their habitats. People also turn grasslands into farm fields. This wipes out habitats. It also means fewer roots from trees and plants hold the soil in place. Now it's easier for wind and water to carry it away.

For many years, developers filled in wetlands to make room for more houses. Now we understand how 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 70,000 to 90,000 more acres of wetlands every year.

developers: companies that build new houses, stores, and other buildings

Loss of Wetlands 1780s–1990s



– Interpret –
Has New York lost much wetlands?

Pollution

Some human activities cause pollution. We put fertilizers and weed and insect killers on our farm fields and lawns. Rain washes these chemicals into streams and lakes, where they can harm or kill the living things there.

We burn gasoline to power the engines in our cars and trucks. Much of our electricity is produced by burning coal. The gases released by burning **fossil fuels** rise into the air. There, they mix with drops of water and form **acid rain**. Acid rain sometimes falls in the Adirondack Mountains in New York. Acid rain makes it harder for trees to absorb water and nutrients from the soil. This rain pollutes lakes and rivers, killing fish, frogs, and other living things in the Adirondacks.

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. By accident, an insect might get packed in a box and shipped across the nation. A snail might catch a ride across the ocean on the outside of a ship. Seeds might stick to airplane wheels. A gardener in California might trade seeds with a friend in Maine.

What's the problem? New plants might grow faster than the ones already there. New animals might have no predators. Soon the new plant or animal is crowding out the old ones. The plant is spreading everywhere. The animal is quickly reproducing and eating all the available food. With human help, new plants and animals are changing habitats.

– Formulate –

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

Protecting Habitats

As we learn more about habitats, we are trying to protect them. When developers cut down trees, they plant new ones. They add ponds and parks to housing developments. They bring water to dry areas, creating new habitats.

Farmers are finding safer ways to protect their crops from insects and weeds. We are trying to burn less gasoline. We are using less energy by making more products from recycled glass, plastic, and paper. That means burning less coal.

Many habitats are now protected. For example, the Wertheim National Wildlife Refuge on Long Island is a safe place for about 300 species of birds. Two to three thousand ducks spend the winter at the refuge. The Carmans River located there is one of the last bodies of water to freeze in winter.

Changes in the Climate

Are rising temperatures worldwide a problem? People have different opinions about that. Some think this increase is just part of a cycle. Earth, they point out, goes through periods of warm weather and then periods of cold weather. Earth has even had ice ages. These people believe that our climate will cool off again in time.

Other people are worried about the rising temperatures. They think big changes are ahead for Earth. Carbon dioxide and other gases are building up in our **atmosphere**. They are increasing the **greenhouse effect**. These gases are trapping more of the sun's heat. If we keep producing large amounts of these gases, 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 and an opinion is what someone believes. As we gain knowledge, sometimes our opinions or conclusions change. We do not fully understand many things about Earth's climate. Our ideas are changing as we learn more. According to the U.S. **EPA**, we know these things:

- Human actions are changing Earth's atmosphere. These actions include burning gasoline and other fossil fuels. Burning fossil fuels releases 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 in the temperature can make a big difference. During the last ice age, Earth was an average of only seven degrees cooler than it is today! At that time, **glaciers** covered most of the United States. The Finger Lakes in New York were carved by glaciers.

A warmer climate could mean more rain in some areas. It could mean less rain in others. A change in rainfall, plus higher temperatures, could happen too fast for plant and animal populations to adjust. Many kinds of living things would die.

The glaciers near the North and South Poles are already melting. During the last one hundred years, the level of the oceans has risen six to eight inches. If all of the glaciers melt, whole 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 are becoming more aware of the changes that we are making in our ecosystems. We cannot stop hurricanes or tornadoes. Yet we can control some of the other changes. As you have read, 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 adapt to some changes—if they happen slowly. However, fast changes can be harmful. Some changes are harmful even if they happen slowly. That’s why we must think carefully about the changes that we make. They must have positive results. We, along with all other living things, will 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

saplings—young trees

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

Index

acid rain, 15

Adirondack Mountains, 15

beaver dams, 10

earthworms, 11–12

Finger Lakes, 20

flooding, 6–7

forest fires, 7–8

greenhouse effect, 18–21

Hurricane Katrina, 5–6

tornado, Xenia, 6

Wertheim National
Wildlife Refuge, 17

wetlands, 13–14

Published by FOCUScurriculum

866-315-7880

www.focuscurriculum.com

Copyright © 2019 FOCUScurriculum

Order Number: LS-32QL

Created by Kent Publishing Services, Inc.

Designed by Signature Design Group, Inc.

No part of the book may be reproduced without purchasing a license from the publisher. To purchase a license to reproduce this book, contact FOCUScurriculum. The publisher takes no responsibility for the use of any of the materials or methods described in this book, nor for the products thereof.



Life Science

Animals and Plants in Their Environment

On Level

Assessments

What Happens When Ecosystems Change?

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

Check Understanding

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

1. A forest fire often forces many plant-eating animals to move to a new habitat. What is likely to happen after the plant-eaters leave?

A Predators will go hungry.
 B Plant-eaters will not survive.
 C Plant-eaters will become predators.
 D Predators will become plant-eaters.
2. Soil in an empty field blows away during a strong wind. What is a possible change to the habitat that caused this soil to erode?

A Earthworms moved into the area.
 B A beaver built a dam in a river nearby.
 C People cut down trees to build houses.
 D Plant-eating animals left the habitat.

3. Forest fires destroy habitats and force animals living there to search for a new habitat. However, forest fires also have benefits to habitats.

Identify one positive effect of a forest fire.

Explain how the effect of this forest fire benefits the habitat.

Check Understanding

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

4. Habitats can change for a variety of reasons. Natural forces cause some changes. People cause other changes.

Identify one natural and one human change that can take place in a habitat.

(1) _____

(2) _____

Explain how each change affects the habitat.

(1) _____

(2) _____

5. Which tool would be most useful for observing a tornado?

- Ⓐ thermometer
- Ⓑ hand lens
- Ⓒ binoculars
- Ⓓ graduated cylinder

6. Students in New York were studying a population of deer near their school. Over two years, most of the deer had moved to another area. Identify two factors that might have caused the deer to move.

(1) _____

(2) _____

7. Which human activity typically *does not* have a harmful effect on the environment?

- Ⓐ using pesticides
- Ⓑ clearing land
- Ⓒ growing plants
- Ⓓ burning fossil fuels

Assessment Scoring Guidelines

1. Answer A is correct.
2. Answer C is correct.
3. The fire leaves behind burned wood and ashes.
The burned wood and ashes provide nutrients to the soil, helping new plants grow.

More sunlight reaches the forest floor.
The extra sunlight help new plants grow.
4. Students should identify one natural and one human change to an ecosystem and explain how they affect it.
For example:

Natural Changes

Hurricanes—vegetation, wetlands, and wildlife are destroyed

Tornados—vegetation and wildlife are destroyed

Floods—wash away plants and shelters for animals, strips away topsoil leaving behind fewer nutrients for plants to grow; deposit rich topsoil in other areas

Forest fires—destroy vegetation and shelter forcing animals to leave; adds nutrients and more sunlight to the forest floor

Beaver dams—change the flow of water forcing changes to animals living in the water; remove trees allowing other plants to grow

Earthworms—provide nutrients to the soil; can disrupt the forest floor protecting some trees and plants

Human Changes

Development—destroys vegetation and wetlands; causes soil erosion

Pollution—creates acid rain damaging vegetation

Transporting plants and animals—can introduce invasive species

5. Answer C is correct.
6. Trees and plants in the area were cleared away.
Their source of water became polluted.
Predators moved into the area.
There was not enough food in the area to support all the deer.
Acid rain destroyed many of the plants in the area.
7. Answer C is correct.



Life Science

Animals and Plants in Their Environment

On Level

English Language Arts Activities

What Happens When Ecosystems Change?

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

Synonyms and Antonyms

TRY THE SKILL

Words and phrases that mean the same, such as *old* and *ancient*, are synonyms. Words and phrases that mean the opposite, such as *old* and *young*, are antonyms.

Knowing the synonyms and antonyms of the words you read can help you understand them. Knowing synonyms and antonyms can also help you write reports and stories. Here are more examples:

Word	Synonym	Antonym
exchange	trade	keep
unite	join	separate
surrender	give up	fight
allow	permit	deny
repair	fix	destroy
remote	distant	close
novice	beginner	expert
frequently	often	rarely
melt	thaw	freeze
vacant	empty	occupied

Read the sentence and the clue in parentheses. Then write the correct word from the box on the line. You will use one of the words twice.

vanish compete clog
produce adapt

1. The plants spread enough to _____ the stream. (a synonym for *block*)
2. Flowers need pollen in order to _____ seeds. (an antonym for *destroy*)
3. The morning sun caused the fog to _____. (an antonym for *appear*)
4. A beaver dam can _____ a number of changes in a habitat. (a synonym for *create*)
5. Plants that cannot _____ may die. (a synonym for *adjust*)
6. Two hawks often _____ for the same nesting space. (an antonym for *cooperate*)

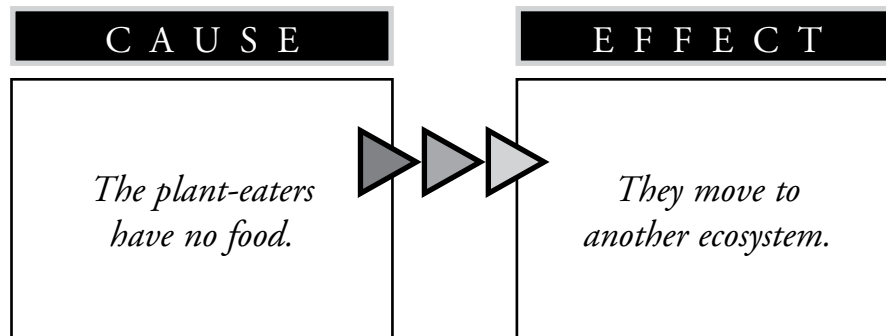
Cause and Effect

TRY THE SKILL

You will better understand what you read if you figure out what causes what. To identify a cause, you ask, “Why did that happen?” To identify an effect or result, you ask, “What happened?” Read this paragraph from the book:

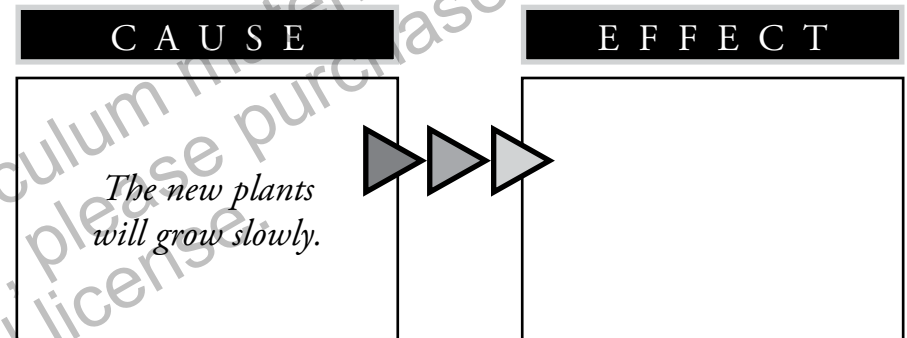
After wind, water, or fire destroys trees and plants, some animals that ate those plants will survive. Yet they need to eat and cannot wait for new plants to grow, so many of them will move to another ecosystem. There, they must compete for food, water, shelter, and space with the plant-eaters that already live there.

This graphic explains one cause-and-effect relationship in this passage.

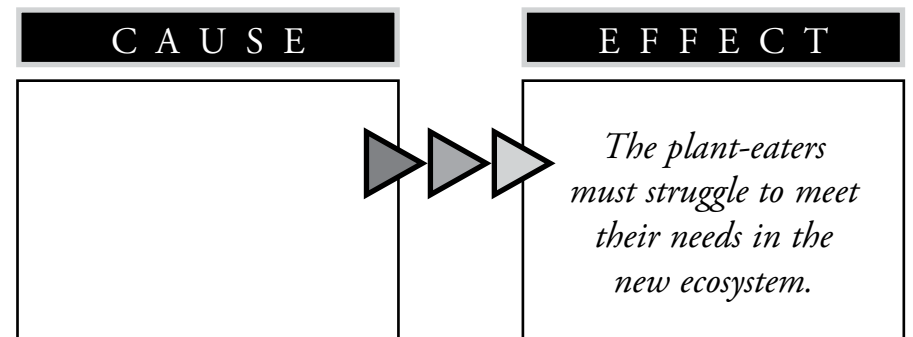


Read the paragraph again. Then complete each graphic.

1. Tell how the cause affected the plant-eaters.



2. Tell why the plant-eaters will have problems in their new ecosystem.



Make Predictions

TRY THE SKILL

If you understand what you read, you should be able to predict what will happen in a certain situation. For example, let's say that a large herd of deer has moved into a forest. How will the rabbits there be affected? Here are four possible predictions:

1. The rabbits in the forest will have more to eat, so they will thrive.
2. The rabbits will have less to eat, so some may starve or move to another ecosystem.
3. The hawks in the forest will eat deer now instead of rabbits.
4. Deer do not eat rabbits, so the rabbits will not be affected.

Think about what you know and what you have learned from this book.

You know that deer and rabbits both eat plants. That means they will compete for the same food. Choice 1 is incorrect because the rabbits will not have more to eat. Choice 2 seems correct because the rabbits will be competing with the deer for food. Choice 3 is incorrect because hawks are too small to eat deer. Choice 4 is incorrect because even though deer do not eat rabbits, they do eat the same food as rabbits. Choice 2 is the correct prediction.

Shade in the circle that makes or supports your prediction.

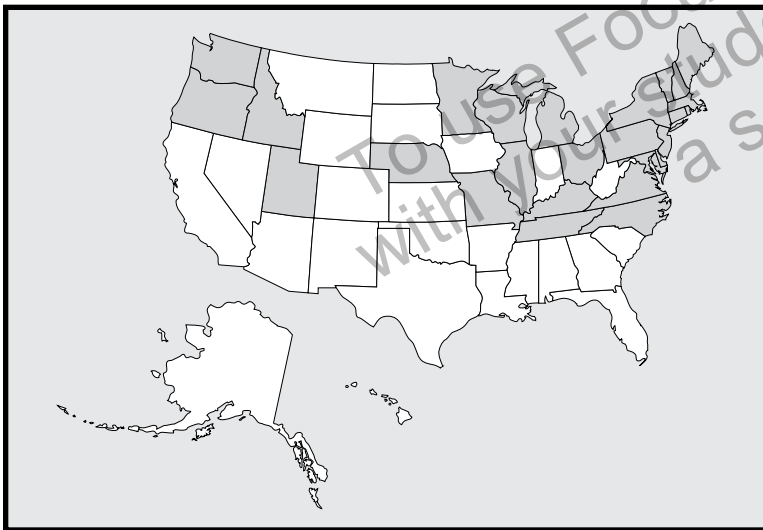
1. A road is built through a forest. Fences along the sides of the road keep animals from crossing it and getting hit by cars. What is the most likely way that the animals in the forest will be affected?
 - (A) The road will make it easier for them to get from one part of the forest to another.
 - (B) Small animals will be safe from the predators on the other side of the road.
 - (C) People driving along the road will stop and feed the animals.
 - (D) The road will force many animals to find a new source of food or shelter.
2. Let's say that the temperatures worldwide rise two degrees over the next twenty years. How do you know that both plants and animals would be affected?
 - (A) Plants and animals can adjust to changes if they happen slowly.
 - (B) Plants are more affected by changing temperatures than animals.
 - (C) That increase is more than has taken place over the last one hundred years.
 - (D) Plants and animals would both grow better in warmer temperatures.

Analyze Graphic Information

TRY THE SKILL

Maps can present complicated information in a way that readers can quickly understand. They show “the big picture.” The map below shows how purple loosestrife has spread across the nation. This flowering weed was brought here from Europe. It spreads quickly, especially in wetlands. It is invasive, crowding out the other plants there. One loosestrife plant can have thirty flowering stems. Each stem can produce two to three million seeds!

The Spread of Purple Loosestrife



Study the map and then shade in the circles next to the correct choices.

1. Based on this map, purple loosestrife
 - (A) is spread evenly across the United States.
 - (B) is a real problem in the southern states.
 - (C) is a real problem in the northeastern states.
 - (D) is moving quickly into the Southwest.
2. Based on this map, purple loosestrife
 - (A) does not grow in any of the states that are light-colored.
 - (B) is a problem in New York.
 - (C) has spread all the way to Alaska.
 - (D) probably first grew in Washington State.
3. Based on this map, purple loosestrife
 - (A) will probably soon be a problem in Indiana.
 - (B) grows in every state that has wetlands.
 - (C) grows well in dry ecosystems.
 - (D) is under control in California.

Answer Key

Synonyms and Antonyms

1. clog
2. produce
3. vanish
4. produce
5. adapt
6. compete

Cause and Effect

1. Effect: The plant-eaters cannot wait and must move to another ecosystem.
2. Cause: The new ecosystem already has many plant-eaters.

Make Predictions

1. D
2. C

Analyze Graphic Information

1. C
2. B
3. A