



SCIENCE • GRADE 4

California Content Standards
Life Sciences: 3.A
Life Sciences: 3.B
Life Sciences: 3.C
Life Sciences: 3.D

Below Level

# Interdependence in Ecosystems

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FOR:

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Student Book

•  
Reproducible  
English-language  
Arts Activities

# Interdependence in Ecosystems

## California's Content Standards Met

### GRADE 4 SCIENCE

**LIFE SCIENCES: 3**—Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:

- a. Students know ecosystems can be characterized by their living and nonliving components.
- b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.
- d. Students know that most microorganisms do not cause disease and that many are beneficial.

### GRADE 4 ENGLISH LANGUAGE ARTS

#### 1.0 WORD ANALYSIS, FLUENCY, AND SYSTEMATIC VOCABULARY DEVELOPMENT

*Vocabulary and Concept Development 1.4*—Know common roots and affixes derived from Greek and Latin and use this knowledge to analyze the meaning of complex words (e.g., international).

*Vocabulary and Concept Development 1.6*—Distinguish and interpret words with multiple meanings.

#### 2.0 READING COMPREHENSION

*Comprehension and Analysis of Grade-Level-Appropriate Text 2.2*—Use appropriate strategies when reading for different purposes (e.g., full comprehension, location of information, personal enjoyment).

*Comprehension and Analysis of Grade-Level-Appropriate Text 2.6*—Distinguish between cause and effect and between fact and opinion in expository text.



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# Student Book

*Interdependence in Ecosystems*

Print pages 5 – 18 of this PDF for the student book.

# How to Make the Student Book

- The student book is contained on pages 5–18 of this PDF. It begins on the next page.
- To make one student book, or a two-sided master copy that can be photocopied, you will print on both sides of seven sheets of 8.5" x 11" paper.
- Do a test printout of one book first to familiarize yourself with the procedure.
- Follow these instructions carefully.

## First—Select the Paper

Since you will be printing on both sides of the sheets of paper, select a good quality white paper. We recommend using at least a 22 lb sheet.

## Second—Check Printer Settings

Be sure you have the correct page setup settings for your computer and printer. You will print these pages in landscape format.

## Third—Print EVEN Pages

Open the PDF of the book you want to print. Select print from your file menu. In your printer's dialogue box enter pages 5–18 to print. Then select EVEN pages only. It is important to print only the EVEN pages first. Click "Print" to print the even pages. (**Important note:** The first page that prints will be blank. DO NOT discard this page. It will be needed to print the cover in the next step.)

## Fourth—Print ODD Pages

When the even pages have printed, flip the stack of pages over to print the odd pages. Place the stack back in your printer. Select print from the file menu again. In your printer's dialogue box, select pages 5–18 to print. Then select ODD pages. Click "Print" to print the odd pages.

## Fifth—Fold the Book

You now have a complete book. Check to be sure the pages are in the correct order with the book's cover as the top page. Then fold the stack of paper in half.

## Sixth—Staple the Book

Use an extended-length stapler to staple the pages together. Place two staples in the spine of the book.

## Please Note

Printers vary in how they output pages. Do a test printing of one book and adjust the procedure as necessary.

If you want to make a one-sided master copy, print ALL pages 5–18 at once. Then select "one-sided to two-sided" on the copy machine.

BL

# Interdependence in Ecosystems California's Content Standards Met

## GRADE 4 SCIENCE

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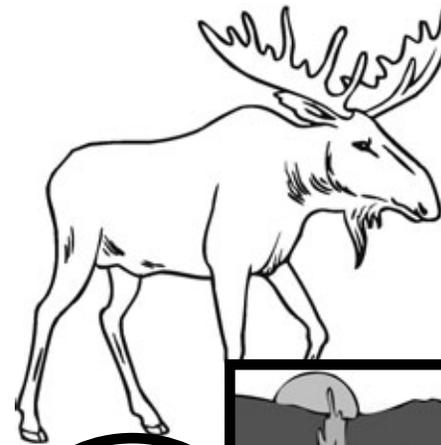
Life Sciences: 3.C

Life Sciences: 3.D



# Interdependence in Ecosystems

by  
Linda Barr





SCIENCE • GRADE 4

California Content Standards

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## INTRODUCTION

# Parts of an Ecosystem

An ecosystem has living and nonliving things. The living things are animals including you, plants, and other living things. The nonliving things are such things as water, sunlight, soil, and air.

The nonliving things affect the living things. Think about a tropical rain forest. It has lots of water. It's also warm and sunny. Many kinds of plants and animals can live there.

Evergreen forests are drier. They are colder, too. Fewer kinds of plants and animals can live there.

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

---

Deserts are very hot and dry. Few plants or animals can live there. Grasslands are cooler and wetter than deserts. Still, they do not get enough rain for trees. That's why they are called grasslands.

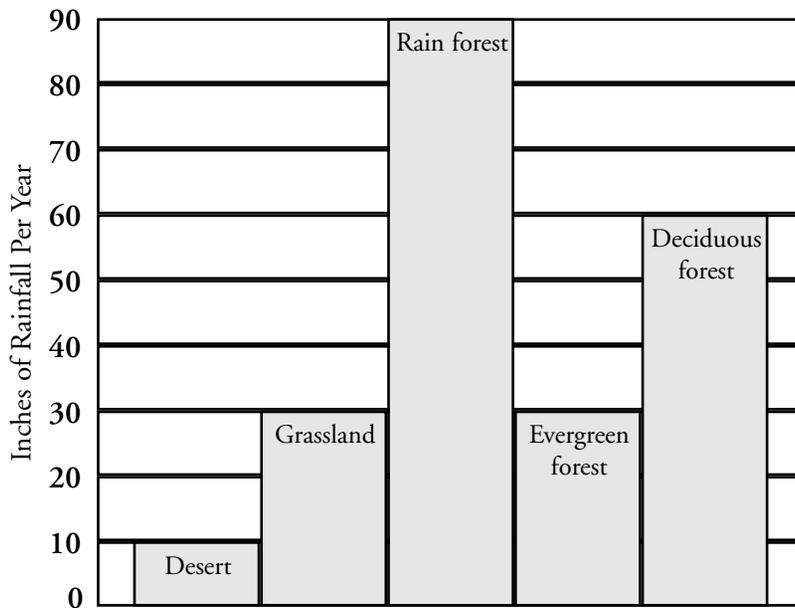
Many living things can live only in certain places. For example, elephants could not survive in a desert. Yet some living things can live in many **habitats**. One is the cockroach. It **adapts** to the conditions of its habitat.

*What are some living and nonliving things in the ecosystem where you live?*

**habitat:** the place where a living thing can meet all of its needs  
**adapt:** to change as conditions change

This graph shows the average rainfall in several ecosystems. Which ecosystem receives the most rain? Which receives the least?

**Rainfall in Different Ecosystems**



*How does the amount of rainfall affect the living things in each ecosystem?*

# Adaptation

## Body Parts

Over many years, animals adapt to where they live. Their body parts change to help them survive. Animals in cold places develop thick layers of fur and fat. Some desert animals grow scales. Scales help keep water in their bodies.

Frogs and ducks live near water. Their webbed feet help them swim fast. A jaguar's strong legs and sharp claws and teeth allow it to run fast and capture its **prey**.

**prey:** an animal that is eaten by other animals; examples: mouse, rabbit, or bird

---

## Behaviors

In winter, some animals cannot find enough food. They **migrate** to a warmer place. In spring, they come back.

Some animals survive winter by **hibernating**. First, they store fat in their bodies by eating a lot. Next, they find a hole and go into a deep sleep. Their heart rates slow down, and their bodies get cooler. They breathe less often. Their bodies use energy from the stored fat. Hibernators include mice, chipmunks, squirrels, and bats.

**migrate:** to travel from one place to another and back again  
**hibernate:** to go into a very deep sleep-like state for a long while

---

## CHAPTER 2

# Interdependence

*Interdependence* means “depending on each other.” Animals depend on plants for food. Some animals eat plants. Other animals eat animals that ate plants. Animals also depend on plants for shelter.

Plants depend on animals, too. To produce seeds, flowers need **pollen** from other flowers. To make sure they get pollen, they produce **nectar**. As bees and birds sip this nectar, pollen gets on them. They take it to the next flower. It can now produce seeds.

**pollen:** the male sex cell for plants  
**nectar:** a sweet liquid found in many flowers

---

Plants depend on people, too. People spread seeds in gardens and on farms. When you walk through a field, some seeds may hook on to your clothes. They drop off in places where they have more room to grow.

Animals depend on plants for food and shelter. Plants depend on animals to help spread their pollen and seeds.

*How do you depend on plants?*

## Changes in Ecosystems

### Changes in Living Things

Interdependence also means that a change in one living thing affects other living things. For example, a **herd** of deer may grow larger. The deer might eat most of the plants in a forest. Then many other plant-eaters there may starve. Next, the meat-eaters will starve.

What if the hawks in a forest die? Now the forest will have more mice, squirrels, and rabbits. They will eat more plants. Soon many plant-eaters in that forest will be hungry.

**herd:** a number of animals feeding or living together

---

The number of plants can also increase. Wind may bring seeds from other plants such as kudzu. Kudzu grows quickly and crowds out other plants. It takes **nutrients** from the soil. Without food, other plants struggle to grow. The animals that eat them suffer, too.

Because of interdependence, a change in plants or animals can upset an ecosystem.



*How might the living things in your ecosystem change?*

**nutrients:** any substance found in food that is needed for the life and growth of plants and animals

---

## Changes in Nonliving Things

Changes in nonliving things affect the living things. For example, months without rain can kill plants. That means less food for plant-eaters. In time, fewer plant-eaters mean fewer meat-eaters. Yet too much rain can drown plants and animals.

What if the weather cools off? Plants that need warmth might die. What if it gets hotter? Then other plants may die. Either way, some plants will disappear. Animals that eat certain plants might struggle to survive.

---

## Adapting to Changes

### Slow Changes

Some changes are slow. Maybe an ecosystem receives a little less rain every year. Some roots might grow deeper. Some animals might be born with skin that helps keep water in their bodies. These survivors will produce seeds or young. Many of the new plants and animals will be able to live with less water.

Some plants or animals will die as the **climate** dries out. In time, only those that can survive with less rain will remain.

*How might the nonliving things  
in your ecosystem change?*

**climate:** the average weather conditions of a place over a period of years

---

## Fast Changes

Change can also happen more quickly. A few months without rain can kill many plants. They do not have time to adapt.

Animals may move to a new ecosystem. Yet it may not have enough food for more plant-eaters or meat-eaters. The ecosystems changes quickly by the new animal.

---

## Human Changes

People can cause change. One example is **pollution**. Chemicals may wash into rivers and lakes. Some plants and animals may die or stop growing.

Cutting down a forest destroys many habitats. Some animals may move to a nearby forest. Yet many living things cannot move. They will die without food and shelter.

*What other human actions can quickly change the conditions in an ecosystem?*

**pollution:** harmful substances that enter the environment

---

Sometimes an animal makes changes to survive. If a bear cannot find berries, it will eat something else. When it finds berries again, it will eat them. This kind of change is called **accommodation**.

Some animals eat only certain food. They do not adapt well to change. For example, pandas eat mostly bamboo. Bamboo forests are disappearing. So are pandas.

When an ecosystem changes, some living things can adapt. Others cannot. Many will die.

**accommodation:** a temporary change for survival

## Other Types of Organisms

There are other large groups of living things that are different from plants and animals. However, they greatly affect ecosystems.

### Monerans

Almost all monerans are one-celled microorganisms called **bacteria**.

For example, bacteria called Salmonella are often found on eggs that have not been washed properly. Cooking kills them.

Yet certain kinds of bacteria are helpful. Some live inside you. They help your body break down food. Do you like yogurt? Other bacteria turn milk into yogurt.

*Should we find ways to kill all bacteria? Why or why not?*

**bacteria:** a group of one-celled microorganisms; can be shaped like a sphere, a rod, or a spiral

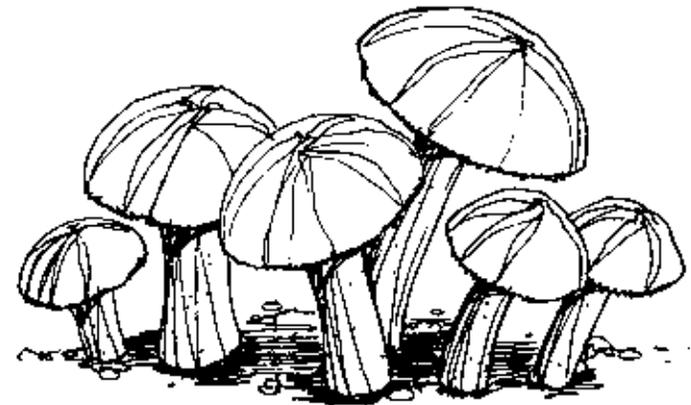
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### Fungi

Fungi are another large group of organisms. They include mushrooms, yeast, and molds. Fungi get their energy by eating plants and animals.

Some fungi are helpful. They break down dead plants and animals. This returns their nutrients to the soil. Then living plants can use those nutrients. Bakers use yeast to make bread. Many people eat mushrooms.

Other fungi ruin crops. They spoil food. They cause itchy athlete's foot.



**fungi:** a group of microorganisms that get their energy by breaking down dead plants and animals

---

## Protista

A third group of organisms is called protista. Some protists are like animals. They get their energy by eating other tiny living things.

Other protists are like plants. They can turn sunlight into energy. Billions of protists float on the ocean. They produce most of the oxygen we breathe.

**protista:** a major group of organisms: some are plantlike and some behave like animals

---

Protists are also eaten by tiny organisms. They are then eaten by small fish. Small fish are eaten by bigger fish. Protists begin every ocean food chain. Without them, we would have fewer fish to eat. We would also have less oxygen to breathe.

## Linked Together

You have read how animals depend on plants. Many plants, in turn, depend on animals. The living and nonliving parts of an ecosystem can change. One change can affect the whole ecosystem.

*Write a paragraph that summarizes what you learned in this book.*

---

## Glossary

**accommodation**—a temporary change for survival

**adapt**—to change as conditions change

**bacteria**—a group of one-celled microorganisms; can be shaped like a sphere, a rod, or a spiral

**climate**—the average weather conditions of a place over a period of years

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

**fungi**—a group of microorganisms that get their energy by breaking down dead plants and animals

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

**herd**—a number of animals feeding or living together

**hibernate**—to go into a very deep sleep-like state for a long while

**migrate**—to travel from one place to another and back again

**nectar**—a sweet liquid found in many flowers

**pollen**—the male sex cell for plants

**nutrients**: any substance found in food that is needed for the life and growth of plants and animals

**pollution**—harmful substances that enter the environment

**prey**—an animal that is eaten by other animals; examples: mouse, rabbit, or bird

**protista**—a major group of organisms; some are plantlike and some behave like animals

---

## To Find Out More . . .

Want to learn more about interdependence in ecosystems?

### Try these books

*Animal Adaptations* by Elizabeth Rose. PowerKids Press, 2006.

*Changing Climate* by Sally Morgan. Franklin Watts, 2005.

*Climate Change* by Shelley Tanaka. Groundwork Books, 2006.

*How Do Animals Adapt?* by Bobbie Kalman. Crabtree, 2000.

*What Do Animals Do in Winter?* by Melvin and Gilda Berger. Ideals, 1995.

*What Is Migration?* by John Crossingham and Bobbie Kalman. Crabtree, 1997.

### Access these Web sites

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

[www.nationalgeographic.com/geographyaction/habitats/](http://www.nationalgeographic.com/geographyaction/habitats/)

Find out more about how animals adapt at the Online Learning Haven.

[www.learninghaven.com/science/articles/animals\\_and\\_adaptation.htm](http://www.learninghaven.com/science/articles/animals_and_adaptation.htm)

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Published by FOCUScurriculum

33 Milford Drive, Suite 1

Hudson, OH 44236

866-315-7880

[www.focuscurriculum.com](http://www.focuscurriculum.com)

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Order number: CASC-44BL

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ENGLISH-LANGUAGE ARTS • GRADE 4

California Content Standards
Vocabulary and Concept Development: 1.4
Vocabulary and Concept Development: 1.6
Comprehension and Analysis of Grade-Level-Appropriate Text: 2.2
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Below Level

# English-language Arts Activities

*Interdependence in Ecosystems*

Print pages 20–24 of this PDF for the reading activities.

# Homographs

## TRY THE SKILL

Homographs are words that are spelled the same but have different meanings. Sometimes they also have different pronunciations.

Think about the word *desert*. With the accent on the first syllable, *desert* means “a hot, dry habitat.” However, with the accent on the second syllable, *desert* means “to abandon.”

The word *second* is another example. It can mean “after the first”—She was the second person in line. *Second* can also mean “part of a minute”—I watched for about ten seconds.

If a sentence includes a word with two meanings, context clues can help you decide which meaning is being used.

Read each sentence and find the underlined word. Then read the two meanings of that word. Shade the circle next to the meaning that is used in the sentence.

1. Before hibernating, squirrels store food in their bodies.  
Ⓐ to save    Ⓑ a place that sells things
2. After the trees were cut down, little of the wolves' habitat was left.  
Ⓐ the opposite of right    Ⓑ remaining
3. Some rivers wind through dry habitats.  
Ⓐ blowing air    Ⓑ wrap around
4. In the spring, whales migrate back north.  
Ⓐ not the front    Ⓑ to go where you have been before
5. Many habitats lie along rivers.  
Ⓐ rest    Ⓑ something that is not true

# Identify a Purpose

## TRY THE SKILL

As you choose something to read, you usually have a purpose in mind, such as these:

- to gain or understand information
- to learn how to do something
- to gather information in order to form an opinion
- to be entertained

For example, you read this book to gain information about how plants and animals depend on each other.

As you look through books, magazines, and articles, think about your purpose for reading. Choose reading material that matches your purpose.

---

Read the description of each selection. Shade the circle that identifies its main purpose.

1. This selection tells why we need to protect forest habitats.
  - Ⓐ to inform
  - Ⓑ to tell how to do something
  - Ⓒ to persuade
  - Ⓓ to entertain

2. This selection tells how to get rid of harmful insects and weeds without using chemicals.
  - Ⓐ to inform
  - Ⓑ to tell how to do something
  - Ⓒ to persuade
  - Ⓓ to entertain
3. This selection tells about a time when kudzu took over a city.
  - Ⓐ to inform
  - Ⓑ to tell how to do something
  - Ⓒ to persuade
  - Ⓓ to entertain
4. This selection tells how acid rain forms.
  - Ⓐ to inform
  - Ⓑ to tell how to do something
  - Ⓒ to persuade
  - Ⓓ to entertain

# Cause and Effect

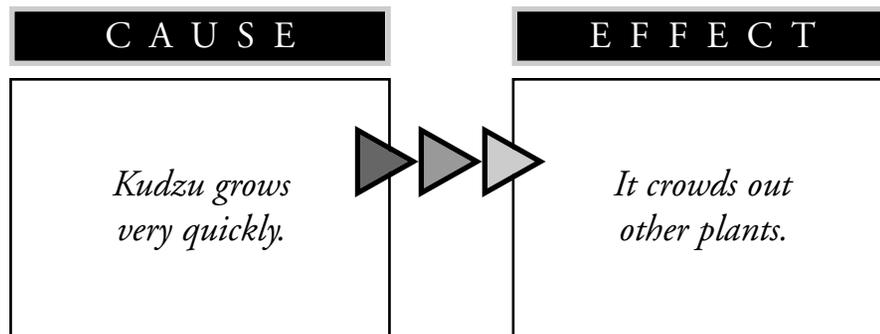
## TRY THE SKILL

To identify an effect, you ask, “What happened?” To identify the cause, you ask, “Why did that happen?” To practice, read this passage from the book:

The number of plants can also increase. Wind may bring seeds from other plants such as kudzu. Kudzu grows quickly and crowds out other plants. It takes nutrients from the soil. Without food, other plants struggle to grow. The animals that eat them suffer, too.

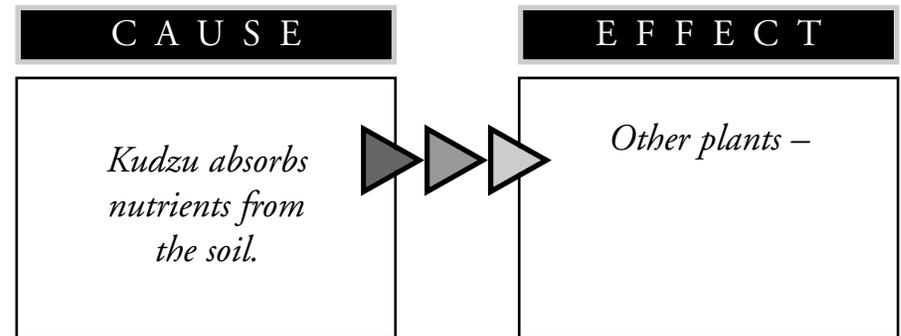
Because of interdependence, a change in plants or animals can upset an ecosystem.

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

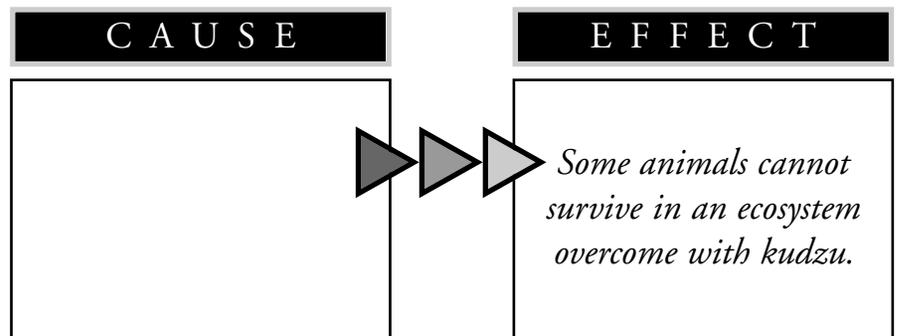


Read the paragraph again. Then complete each graphic.

1. Tell how this cause affects other plants.



2. Tell why animals cannot survive in this ecosystem.



# Understand Prefixes

## TRY THE SKILL

A prefix is a group of letters added to the beginning of a word. A prefix often changes the meaning of that word.

To figure out what the word means, you must know what the prefix means. In this book, you learned words with these prefixes:

*inter-* means “between” as in *interdependence*

Example:

The Internet carries messages between people.

*non-* means “not” as in *nonliving*

Example:

That child plays nonstop.

*micro-* means “small” as in *microorganism*

Example:

A microscope allows you to see things that are very small.

Read each sentence. Then read the word choices and think about their prefixes. Shade the circle next to the correct word to complete that sentence.

1. A tiny \_\_\_ caused this disease.  
Ⓐ microbe  
Ⓑ nonsense  
Ⓒ intermission
2. Is there an \_\_\_ between the acts of the play?  
Ⓐ microbe  
Ⓑ nonsense  
Ⓒ intermission
3. I like to read \_\_\_ instead of made-up stories.  
Ⓐ microwave  
Ⓑ nonfiction  
Ⓒ international
4. A \_\_\_ works using short waves of energy.  
Ⓐ microwave  
Ⓑ nonfiction  
Ⓒ international

# Answer Key

## Homographs

1. A
2. B
3. B
4. B
5. A

## Identify a Purpose

1. C
2. B
3. D
4. A

## Cause and Effect

**Effect:** Other plants cannot get the nutrients they need. They might stop growing or die.

**Cause:** Kudzu crowds out many plants. Some animals cannot find enough of the plants they usually eat.

## Understand Prefixes

1. A
2. C
3. B
4. A