



Life Science

Animals and Plants in Their Environment

Advanced Level

# Adapting to Survive

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Covered  
•  
Student Book  
•  
Assessments and  
Reading Activities

# Adapting to Survive

What roles do plants and animals play in their environments?

## CORE CURRICULUM STATEMENTS

### **Individual organisms and species change over time.**

Individuals within a species may compete with each other for food, mates, space, water, and shelter in their environment.

All individuals have variations, and because of these variations, individuals of a species may have an advantage in surviving and reproducing.

### **Organisms maintain a dynamic equilibrium that sustains life.**

Senses can provide essential information (regarding danger, food, mates, etc.) to animals about their environment.



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# Student Book

*Adapting to Survive*

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# Adapting to Survive

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## CORE CURRICULUM STATEMENTS

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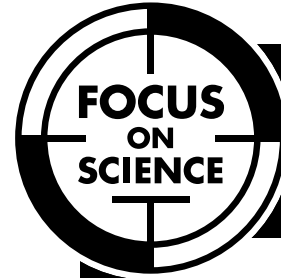
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Life Science

Animals and Plants in Their Environment

# Adapting to Survive

by Linda Barr





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– Predict –

*What do you think you will  
learn from this book?*

---

## INTRODUCTION

# Survivors!

Could you survive in the Arctic for the rest of your life? Maybe, but first you would have to have to use special equipment to stay warm, such as finding some very warm clothing. You would also need to eat food with lots of energy to help keep you warm. Yet polar bears thrive in the Arctic just as they are.

You could survive in the desert, too, but you would have to have to find ways to deal with high heat and little water. Still, scorpions can meet all of their needs in the desert despite the heat and dryness there.

Plants and animals are **adapted** to where they live. Their parts and behaviors must match their ecosystem, or they will not be able to meet their needs and survive.

**adapted:** changed in order to fit a certain purpose  
**ecosystem:** all the living things that live in a certain area

---

What are the needs of plant and animal populations? To live and grow, they must get energy, which means sunlight for plants and food for animals. Organisms also need water, oxygen from the air, and shelter from the weather and each other. Plus, they need enough space to live and a way to get rid of their wastes.

In this book, you will learn the different ways that living things have adapted to their ecosystems so they can meet all of their needs and survive. Of course, an organism that is adapted to the icy Arctic would have difficulty surviving in the rain forest. Like you, plants and animals are adapted to certain ecosystems. They might die if they were forced to live in another one.

– Apply –

*What kind of ecosystem are you adapted to?  
Where can you live most easily?*

## Adaptations for Climate

Plants and animal populations adapt in many ways to the **climate** in their ecosystem. For example, polar bears have two layers of fur and a layer of fat 4.5 inches thick to keep them warm in the bone-chilling Arctic. Their small ears allow only a little heat to escape from their bodies. Bumps on their feet stop them from slipping on the ice. Penguins also have a thick layer of fat, and they can fluff out their feathers to trap air. Then their feathers act like a blanket to help keep them warm.

To survive in cold ecosystems, plants grow low to the ground to stay out of the wind. The plants here tend to be small and grow quickly because the soil is poor and the growing season is short.

**climate:** the weather year-round

In the desert, animals must deal with high heat. Here, many animals live in tunnels underground and come out only at night, when it's cooler, to find food. Unlike the polar bear, the jackrabbit has very large ears to help its body release heat into the air.

In the desert, animals must deal with scarce water. Snakes and lizards have scales to help reduce water loss. Some animals obtain all the water they need only from the plants they eat.

Desert plants soak up all the available water and store it in their leaves, stems, and roots. To reduce water loss, many cactus plants have narrow needles, not wide leaves. Cells in their stems use sunlight to produce energy. Most desert plants have a waxy surface that helps slow water evaporation.

– Infer –

*Why do polar bears have small ears while jackrabbits have very large ears?*



---

The rain forest is warm and wet, but organisms still need adaptations to survive here. Although thousands of animals live in the rain forest, many of them never set foot on the ground. That's where the jaguars and other **predators** roam. Food and safety are in the trees, so many animals are adapted to living there.

Life is not easy for rain forest plants, either. Daily rains wash most of the nutrients out of the thin layer of soil on the forest floor. That's why plants must quickly absorb the nutrients from decaying plant and animal matter.

The trees grow so close together that they block sunlight from reaching the forest floor. To get enough sunlight, plants that grow closer to the ground grow very wide leaves, and vines climb up tree trunks.

**predator:** animals that get their energy by eating other animals

---

## Migration

Many ecosystems are warm in the summer and cold in the winter. As the temperature drops, food and water become harder to find. To survive the winters, some animals **migrate** hundreds or thousands of miles to warmer places.

Many types of birds, ducks, whales, and insects migrate. Monarch butterflies travel up to 1,800 miles. Some fly from Canada all the way to forests in Mexico. Monarchs that live west of the Rockies gather in Pacific Grove, California. Gray whales migrate as far as 6,200 miles. They swim from the icy coast of Alaska to warmer waters off Mexico. Many types of whales have their babies where it's warm.

In the spring, these animals head back north. Now food and water are easier to find there.

**migrate:** to move south for the winter and then return north in the spring

## Adaptations to Find and Eat Food

### Body Parts

Hawks and other large birds have sharp eyesight that helps them spot their **prey**. For example, a falcon can see a chipmunk from nearly a mile away. A box jellyfish cannot see nearly as far, but it has 24 eyespots to locate its prey—and predators. A chameleon can see in two directions at once.

Many animals have a strong sense of smell that helps them find food. The **membrane** that helps you smell a pizza covers only 0.6 square inches inside your head. This membrane in dogs covers more than 23 square inches, so it's no wonder they have a better sense of smell.

Catfish use their whiskers to find food. Butterflies have taste buds on their feet, while earthworms have taste buds all over their bodies.

**prey:** animals that are eaten by other animals  
**membrane:** a thin, soft tissue

### Hibernation

Others animals **hibernate** to survive the winter. First, they eat as much as possible to store extra energy in their body fat. During true hibernation, the animal's body temperature drops, and its heart beats more slowly. Its breathing rate drops, too. For example, a woodchuck's body temperature drops from 98 degrees Fahrenheit (37 degrees Celsius), to only 38°F (3°C). Its heart rate drops from 80 beats a minute to 4 or 5. Other true hibernators include squirrels and bats. While hibernating, they use their body fat for energy.

Some animals go into a deep sleep during the coldest months, but they are not truly hibernating. Their bodies slow down, but not as much as hibernating animals. These animals wake up at times and eat. This group includes bears, skunks, and raccoons.

– Differentiate –  
 Why aren't bears true hibernators?

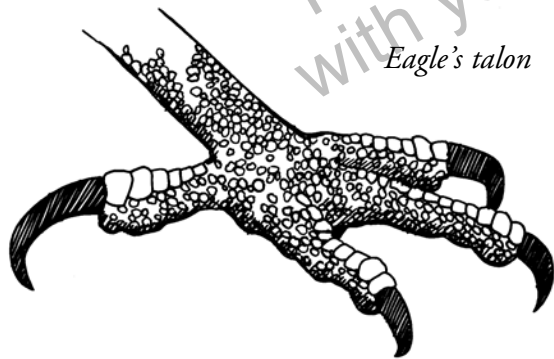
**hibernate:** to become inactive, with much slower body functions

---

After cheetahs spot their prey, they use their long, strong legs to run up to 70 miles an hour. They can run this fast only a short distance, but that's far enough to catch most animals.

Long legs help herons and other birds wade in shallow water, hunting for fish. Webbed feet help frogs and ducks swim faster than their prey. Frogs also have long tongues to catch insects. Most birds have wings that allow them to swoop down on their prey. Some, such as eagles, use **talons** to grab their food before it gets away.

Bears, lions, and other meat-eaters have strong claws and long, sharp teeth to catch and tear apart their prey. Sharks constantly grow new teeth, which fall out easily. One shark may have 20,000 teeth during its life.



*Eagle's talon*

**talons:** claws on the feet of meat-eating birds

---

Meat-eaters have sharp, biting teeth, while plant-eaters have flat, grinding teeth. Birds' beaks also are adapted to what they eat. An eagle's sharp, curved beak helps it tear apart fish. Woodpeckers have short thin beaks for reaching into tree bark to get insects. Seed-eaters, such as cardinals, have short, thick beaks for cracking open seeds. Hummingbirds have long, thin beaks for sipping nectar from flowers. Pelicans' bills have large pouches for storing the fish they catch.

The anteater has a special tongue. It can jab its long tongue into an ant nest 150 times a minute—faster than the ants can run away. Its tongue is sticky and covered with barbs that trap the ants. A giant anteater can eat 30,000 insects in one day!

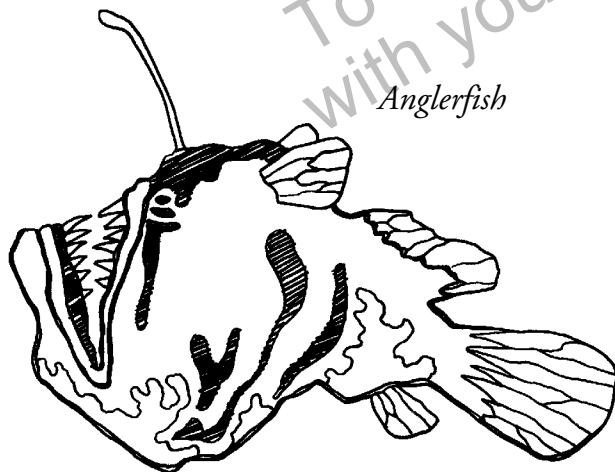
– Infer –

*Birds have different kinds of beaks. Do you think animals have different kinds of teeth? Why or why not?*

---

Fish in the deep, dark ocean have parts that help them find and eat their food, too. Some make their own light to find food, locate mates, or confuse predators. Some of these fish carry glowing bacteria, while others have special organs that produce light. The anglerfish has a fin on its head that works like a fishing pole and dangles lighted “bait” in front of the anglerfish’s mouth. When a small fish comes to eat the “bait,” the anglerfish eats the fish instead.

The gulper eel, which lives a mile under the ocean’s surface, is almost all mouth and can stretch open its huge jaws to eat a fish almost as big as it is. This eel can grow up to six feet long!



*Anglerfish*

---

Some animals have behaviors that help them meet their need for food. For example, hyenas hunt in packs. A group will work together to separate a weak animal, such as a young antelope, from its herd and capture it. Then they share the meal.

Bats make sounds that echo back to them like radar. They use these echoes to find tiny insects up to 18 feet away.

Tickbirds find their food by getting friendly with large grazing animals, such as cattle. As they pick ticks (sucking insects) off the cattle’s skin, the birds get a meal, and the cattle get rid of annoying ticks.

Some animals make sure they will have enough to eat by burying nuts and seeds. Gray squirrels bury each nut separately.

– Analyze –  
*What behaviors help people meet their need for food?*

## Adaptations to Escape from or Fight Predators

Some animals escape their predators by using **mimicry**. They mimic, or copy, another type of animal. For example, the viceroy butterfly looks like a monarch. Birds think that monarchs taste bad, but they can't tell a monarch from a viceroy, so they don't eat either one. Viceroys survive by looking like monarchs.

Other animals hide from predators, or prey, by using **camouflage**. They are the same color as their surroundings. For example, many female birds are brown, which helps them blend in with the trees and bushes where they build their nests. The Arctic fox and polar bear are both white to blend in with the snow where they live. Chameleons change the color of their skin to match their surroundings. Some insects look like sticks.

**mimicry:** behavior that copies another animal  
**camouflage:** coloring that helps to hide an animal from predators

Sometimes animals change their camouflage. For example, in England in the 1850s, nearly all of the peppered moths were mostly white with black spots. About that time, new industries began to send smoke and soot into the air. The soot turned the tree trunks where the moths rested black. Now birds easily saw the white moths—and ate them. Only the darkest moths survived and reproduced.

In time, nearly all of the “peppered” moths were mostly black. In 1956, new laws reduced air pollution, so after a while the tree trunks weren't dark anymore—and the moths weren't either. Now they look peppered again. We know about this change in adaptations only because scientists kept careful records of the moths over many years.

– Restate –

*How were the peppered moths camouflaged?*

## Adaptations to Reproduce

Instead of using camouflage, many animals escape from predators by flying, swimming, or running. An antelope, for example, can run up to 60 miles an hour. Fish often swim in huge schools to confuse predators. Some fish get eaten, but most escape.

Sharp claws and teeth not only help some animals catch their prey, but also protect them from predators. Ostriches and kangaroos can kick hard enough to turn away a predator. Elk, moose, and sheep use their antlers or horns to fight off other animals, while a walrus uses its tusks.

Skunks keep predators away with a really unpleasant smell. Some snakes, fish, and frogs have poison in their fangs or spines. Bees and jellyfish sting.

Predators—and people—soon learn to leave these animals alone.

– Explain –

*Why does an antelope need to be able to run really fast?*

Why does a **female** penguin lay one egg, while a female frog lays hundreds of them? The **male** penguin keeps that egg warm on his feet for 65 days while the female leaves to find food. The male can take care of only one egg, but he takes very good care of it. Female penguins don't need to lay more than one egg because nearly all of their eggs hatch.

Yet after the female frog lays her eggs, both parents leave. Most of those eggs die or are eaten by fish. Only a few hatch into tadpoles, but that is enough to allow frogs to continue to **reproduce** and survive.

Penguins and frogs reproduce differently, but they both use ways that are adapted to their ecosystem and their needs.

**female:** an animal or plant part that bears eggs or seeds  
**male:** an animal or plant part that fertilizes the eggs or seeds  
**reproduce:** to produce young or offspring

---

Many animals have special ways to attract **mates**. Male fireflies flash their lights, while male peacocks spread their tail feathers and male frogs croak. In time, females come to them, and the pairs **mate** and produce offspring.

Plants also have adaptations to help them reproduce. The seeds of desert plants wait until a rare rainstorm before they sprout. Dandelion seeds have “wings” that carry them away from the parent plant. In the same way, some seeds stick to passing animals and people so they will be carried to a place where they will have room to grow.

Many flowers are brightly colored and produce **nectar** to attract birds and insects. As they move from flower to flower, they spread the **pollen** that plants need to produce seeds.

**mates:** a male or female of the same kind of animal; two mates join to reproduce

**mate:** when a male and a female combine sex cells to produce offspring

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

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

---

Plants and animals are adapted to the conditions and the other living things in their ecosystems. Their survival depends on these adaptations. If an Arctic fox were brown instead of white, it would stand out in the snow. A hungry polar bear could quickly spot a brown fox. Brown fur would also make it difficult for this fox to sneak up on its own prey.

White fur helps the Arctic fox survive in its icy ecosystem, but that same thick fur would lead to its death in a hot desert. Every living thing, including you, is adapted to its own ecosystem and might not survive in a different one. What happens when that ecosystem changes? Read the next book in this series, *What Happens When Ecosystems Change?*, to find out!

– Summarize –

*Why can organisms survive only in ecosystems in which their needs can be met?*

---

## Glossary

**adapted**—changed in order to fit a certain purpose

**camouflage**—coloring that helps to hide an animal from predators

**climate**—the weather year-round

**ecosystem**—all the living things that live in a certain area

**female**—an animal or plant part that bears eggs or seeds

**hibernate**—to become inactive, with much slower body functions

**male**—an animal or plant part that fertilizes the eggs or seeds

**mates**—a male or female of the same kind of animal; two mates join to reproduce

**mate**—when a male and a female combine sex cells to produce offspring

**membrane**—a thin, soft tissue

**migrate**—to move south for the winter and then return north in the spring

**mimicry**—behavior that copies another animal

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

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

**predators**—animals that get their energy by eating other animals

**prey**—animals that are eaten by other animals

**reproduce**—to produce young or offspring

**talons**—claws on the feet of meat-eating birds

---

## To Find Out More . . .

Want to learn more ways that animals adapt to their ecosystems?

### Try these books

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

*Animal Planet: The Most Extreme Animals* by Discovery Channel. Jossey-Bass, 2007.

*Animal Sharpshooters* by Anthony D. Fredericks. Franklin Watts, 2000.

*Animals Under the Ground* by Phyllis J. Perry. Franklin Watts, 2002.

*Curious Critters of the Natural World: Reptiles & Amphibians* by Ready-Ed Publications. Zephyr Press, 2004.

### Access these Web sites

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)

Go to the “Earth Floor” and check out the information about diversity, adaptation, and the different biomes or ecosystems on our planet.

[www.cotf.edu/etel/modules/msese/explorerer.html](http://www.cotf.edu/etel/modules/msese/explorerer.html)



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# Assessments

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*Adapting to Survive*

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. Chameleons use camouflage to hide from predators and prey. How is a chameleon different from other animals that use camouflage?
  - Ⓐ A chameleon can change its color according to its surroundings.
  - Ⓑ A chameleons is able to change to look like another animal.
  - Ⓒ A female chameleon always stays brown to help it blend in with trees and bushes.
  - Ⓓ A male chameleon always stays white to blend in with the snow where they live.
2. Opossums and some snakes pretend to be dead in order to escape from a predator. What adaptation are these animals using?
  - Ⓐ camouflage
  - Ⓑ mimicry
  - Ⓒ baiting
  - Ⓓ herding

3. The picture shows an anglerfish who lives deep in the ocean. It has several adaptations that help it survive.



Identify one adaptation of the anglerfish.

---

Explain how the adaptation helps the anglerfish survive.

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# Check Understanding

Write your answer on the lines provided.

4. Antelopes and lions both live in the grassland prairies of Africa. Identify **one** adaptation that would help a lion catch its prey, an antelope.

---

---

Identify **one** adaptation that would help an antelope escape from its predator, a lion.

---

---

5. Frogs and ducks both live in water. Look at the pictures of their feet.



Identify how their feet are similar.

---

Explain how this similarity helps them.

---

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# Assessment Scoring Guidelines

1. Answer B is correct.

2. Answer B is correct.

3. Possible answer may include:

Sharp teeth

Allows it to tear into food

Fin on its head

Acts as a fishing pole by dangling lighted bait in front of the anglerfish's mouth

4. Possible answers include:

Color of lion's fur

Blends in with its surroundings

Strong, large claws

Able to grab and tear apart an antelope

Long strong legs

Allows the antelope to run fast

Antelopes stay in herds

Lions will pick out the weakest ones

5. Both the frog and the duck have webbed feet.

This allows them to move swiftly through the water to escape predators.



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# English Language Arts Activities

*Adapting to Survive*

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

# Prefixes

## TRY THE SKILL

The prefixes *non-*, *dis-*, *im-*, and *un-* all mean “not.” However, you must use the correct prefix with each root word. You can say, “I disagree with you,” but not “I nonagree,” “I imagree” or “I unagree.” The last three choices are not real words.

You must use these four prefixes carefully. Here are more examples:

<i>non-</i>	nonsense, nonfiction, nonstop
<i>dis-</i>	dishonest, disagree, disarm
<i>im-</i>	impossible, impolite, immature
<i>un-</i>	unsure, unhappy, uncover

Read each sentence and find the word with a line in front of it. Shade in the letter of the prefix that should be added to that word.

1. A hungry predator may become \_\_\_patient while waiting for prey to appear.  
 (A) non-  
 (B) dis-  
 (C) im-  
 (D) un-

2. A bear with thick fur would feel \_\_\_comfort in a hot desert.

- (A) non-
- (B) dis-
- (C) im-
- (D) un-

3. A fern is a \_\_\_flowering plant, but it still can reproduce.

- (A) non-
- (B) dis-
- (C) im-
- (D) un-

4. Is it \_\_\_fair for predators to blend in with their surroundings?

- (A) non-
- (B) dis-
- (C) im-
- (D) un-

# 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, do you remember the peppered moths that were described in this book? What if air pollution had not blackened the tree trunks where the moths rested? How would the moths be affected? Here are some possible predictions:

1. The moths would gradually turn mostly black.
2. The moths would gradually turn mostly white.
3. The moths would not change colors.

You know that after the trees turned black, only the dark moths survived because they blended in with the dark tree trunks, so the birds didn't see them. Choice 1 is incorrect because if the trees stayed the same color, there would be no reason for the dark moths to survive and the white moths to die. Choice 2 is incorrect because the moths were already mostly white, which seemed to camouflage them until the trees darkened. Choice 3 is the correct prediction because if the trees did not change color, there would be no reason for the moths to change color.

Use the answer choices below to make or support predictions. Shade in the letter of your choice.

1. Woodpeckers have short thin beaks for reaching into tree bark to get insects. Hummingbirds have long, thin beaks for sipping nectar from flowers. What is the most likely result if one hummingbird had a short, thin beak?
  - Ⓐ That hummingbird's beak would gradually get longer.
  - Ⓑ That hummingbird would learn to eat insects instead of nectar.
  - Ⓒ That hummingbird could reach less nectar and would not survive long.
  - Ⓓ That hummingbird would have babies with short, thin beaks.
2. Canada geese, which eat plants and grain, usually migrate when fall arrives. What is the most likely result if one goose hurt its wing and could not fly south?
  - Ⓐ It would hibernate instead of migrating.
  - Ⓑ It would starve to death after all the plants died.
  - Ⓒ It would survive by eating nuts and berries from the trees and bushes.
  - Ⓓ It would grow thicker feathers to stay warm during the winter.



# Cause and Effect

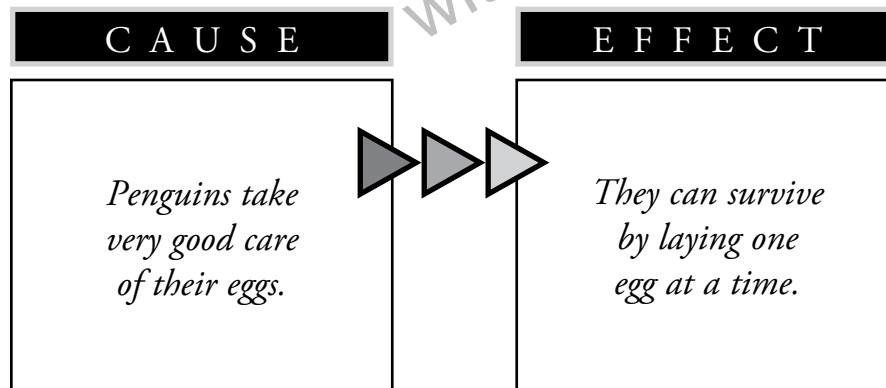
## TRY THE SKILL

To find out an effect, you ask, “What happened?”  
To find out a cause, you ask, “Why did that happen?”  
Read this passage from the book:

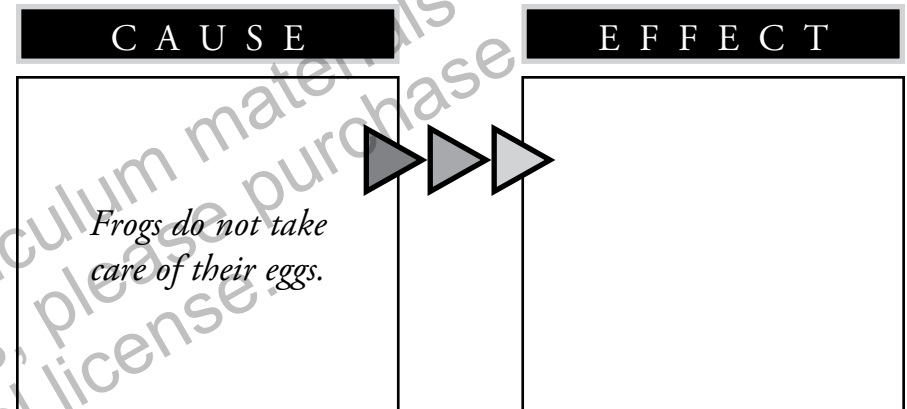
Why does a female penguin lay only one egg, while a female frog lays hundreds of them? The male penguin keeps that egg warm on his feet for 65 days while the female leaves to find food. The male can take care of only one egg, but he takes very good care of it. Female penguins don't need to lay more than one egg because nearly all of their eggs hatch.

Yet after the female frog lays her eggs, both parents leave. Most of those eggs die or are eaten by fish. Only a few hatch into tadpoles, but that is enough to allow frogs to survive.

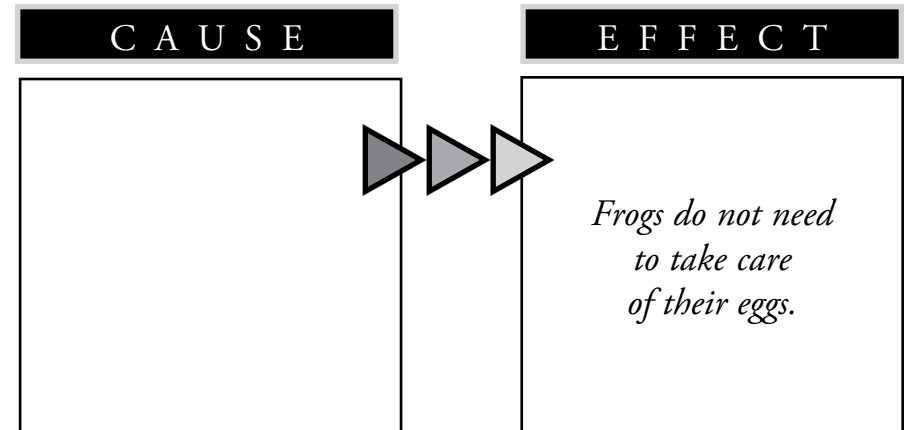
This graphic explains what happened.



Read the passage again. Then complete this graphic.  
Tell how the cause affects the reproduction of frogs.



Now complete this graphic. Tell why frogs do not need to take care of their eggs.



# Fact and Opinion

## TRY THE SKILL

A fact can be proved. For example, scientists can measure the thickness of the fat layer on polar bears. An opinion is what someone believes. For example, someone might write that polar bears are the fiercest predators in the Arctic. However, other people might disagree with this opinion.

Being able to tell facts from opinions makes you a better reader. Opinion sentences often have words such as *better*, *worse*, *should*, *difficult*, *toughest*, and *easy*. Here are more examples:

### Facts

Snakes and lizards have scales to help reduce water loss.  
Some desert animals do not drink water at all.

### Opinions

Hyenas are the best example of animals that hunt in packs.  
We should protect certain animals from predators.

Mark each statement below *F* for fact or *O* for opinion.

1. Most plants in very cold ecosystems are small. \_\_\_\_
2. The most interesting animals in the rain forest live in the trees. \_\_\_\_
3. Gray whales migrate from Alaska to warmer waters off Mexico. \_\_\_\_
4. The migration of gray whales is a fascinating journey. \_\_\_\_
5. Watching an eagle eat a fish is disgusting. \_\_\_\_
6. Eagles use their strong, sharp beaks to tear the fish apart. \_\_\_\_
7. The fish in the deepest part of the ocean come in amazing sizes and shapes. \_\_\_\_
8. Scientists should spend more time studying these fish. \_\_\_\_
9. Now write a fact and an opinion about how living things adapt to their ecosystems.

**Fact:** \_\_\_\_\_

\_\_\_\_\_

**Opinion:** \_\_\_\_\_

\_\_\_\_\_

# Answer Key

## Prefixes

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

## Make Predictions

1. C
2. B

## Cause and Effect

Effect: Most frog eggs die and do not hatch.

Cause: Frogs lay so many eggs that a few usually survive.

## Fact and Opinion

1. F
2. O
3. F
4. O
5. O
6. F
7. O
8. O
9. Possible fact: Adaptations help animals survive.  
Possible opinion: Animals are more adaptable than people.