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What's in This Book?

Daily Science provides daily activity pages grouped into six units, called Big Ideas, that explore a wide range of topics based on the national standards for life, earth, and physical sciences. Every Big Idea includes five weekly lessons. The first four weeks each center around an engaging question that taps into students' natural curiosity about the world to develop essential concepts and content vocabulary. The fifth week of each unit offers a hands-on activity and review pages for assessment and extra practice.

The short 10- to 15-minute activities in *Daily Science* allow you to supplement your science instruction every day while developing reading comprehension and practicing content vocabulary.

Unit Introduction

Key science concepts and national science standards covered in the unit are indicated.

Background information is provided on the topic, giving you the knowledge you need to present the unit concepts confidently.

Plants and animals depend on each other and on their environment for survival.

Key Concept
Interdependence of organisms and the environment

National Standard
All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants.

Teacher Background

WEEK 1: Why do beavers build lodges?

Connection to the Big Idea: When plants and animals share a habitat, the presence of one can greatly affect the other. This week, students study how beavers change their habitat, making survival easier for some organisms while destroying the habitat for others.

Content Vocabulary: erosion, habitat, lodge, silk, wetland

WEEK 2: Why do some plants have fruit?

Connection to the Big Idea: Plants reproduce by making seeds, and use waxy plants ensure that their seeds are distributed by producing fruit. This week, students learn that both plants and animals benefit from this relationship. They discover that some fruit-producing plants are completely dependent on humans for reproduction.

Content Vocabulary: angiosperms, mutation, ovary, pollen, pollination, stink

WEEK 3: Do all bees make honey?

Connection to the Big Idea: Bees make honey by fermenting flower nectar in special areas of the hive. This week, students discover that not all bees make honey. However, they learn that all bees depend on flowers for food, and flowering plants depend on bees for pollination.

Content Vocabulary: honeycombs, nectar, proboscis

WEEK 4: Where do animals get food in the winter?

Connection to the Big Idea: Winter brings shorter days and colder temperatures. Less food is available for both plants and animals. One way organisms respond is by eating less and using less energy. In anticipation of winter, many animals also begin to store food. Animals store food in two basic ways: by hoarding it or by storing it in trees as nuts, roots, or branches. Animals also migrate to places where food is more plentiful. Plants ultimately benefit from animals surviving the winter because animals help plants reproduce and scatter their seeds.

Content Vocabulary: dormant, hibernate, hoard, migrate

WEEK 5: Unit Review

These activities review key concepts of plant and animal interdependence.

p. 32 **Comprehension:** Students answer multiple-choice questions about key concepts from the unit.

p. 33 **Vocabulary:** Students match vocabulary words from the unit to their definitions and complete a cloze paragraph.

p. 34 **Visual Literacy:** Students answer questions based on information presented in a graphic organizer showing beaver hibernation changes.

p. 35 **Hands-on Activity:** Students investigate the seeds in three types of fruit and record their observations in a chart. Review the materials and instructions on the student page ahead of time.

An overview of the four weekly lessons shows you each weekly question, explains what students will learn, and lists content vocabulary.

Week 5 review activities are summarized.

Weekly Lessons (Weeks 1–4)

Each week begins with a teacher page that provides additional background information specific to the weekly question.

Ideas are given for presenting the daily activity pages, including content vocabulary and materials needed for any demonstrations or group activities.

Day One
Vocabulary: hoard
Materials: page 27

Day Two
Materials: page 28

Day Three
Vocabulary: dormant
Materials: page 29

Day Four
Vocabulary: migrate
Materials: page 30

Day Five
Materials: page 31

WEEK 4: Where do animals get food in the winter?

Discuss with students what winter is like where you live and what challenges animals face during the winter months. Ask students to think about the ways in which animals survive in winter. After students complete the activities, have them discuss the following:

Day One

Briefly discuss the reason we need to eat food; provide energy needed for the proper functioning of body systems. Prior to reading the text and completing the activities, ask students to speculate what might happen if a person or an animal eats more food than its body can use. (will gain weight) Then have students complete the activities.

Day Two

After students read the passage, confirm that they understand the difference between hibernation and migration. You may wish to explain that hibernation is a dramatic form of dormancy. True hibernators can't be awakened easily and are unresponsive to external stimuli. Their body temperature drops significantly, and their heart rate slows. Many animals do not hibernate, although this continues to be argued. Their temperature drops only a few degrees, and females can give birth during winter, something that is not possible for true hibernators. Then have students complete the activity.

Day Three

Ask students to speculate how an animal that can't store enough food or body fat might survive winter. After students read the passage, have them look at the illustrations and read the captions together. Before students complete the activities, ask them to identify the activity that they think that they understand that prey on means "to hunt and eat". When students have completed the activities, have volunteers share their responses and explain their thinking.

Day Four

Have students complete the page independently. Then review the answers together.

Day Five

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WEEKLY QUESTION

Day 1 **Where do animals get food in the winter?**

Name _____

A. Number the events in the correct order.

In winter, squirrels stored acorns.
In autumn, acorns fall from oak trees.
Squirrels hoard the acorns in trees.
Squirrels gather fallen acorns.

B. Which of these foods are birds likely to hoard: worms or sunflower seeds? Why?

C. Do you think animals that live in tropical places hoard food? Why or why not?

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Big Idea 1 • Week 4 27

The student activity pages for Days 1–4 of each week use an inquiry-based model to help students answer the weekly question and understand fundamental concepts related to the Big Idea.

You may wish to have students complete the pages independently or collaboratively.

Weekly Lessons, continued

Each student page begins with a short introduction.

Day 2 Weekly Question: Where do animals get food in the winter?

To prepare for winter, many animals eat more food during the warm months than they actually need. The extra food is stored in their bodies in the form of fat. During winter, when food is less available, the animals' bodies absorb the fat to provide energy.

Bearers store body fat in their tails. Queen bumblebees drink lots of nectar to fatten up their bodies and fill their honeycombs.

Day 3 Weekly Question: Where do animals get food in the winter?

One way animals adapt to winter is by becoming dormant. A dormant animal may look like it is sleeping, but it is really conserving energy by keeping still. For example, chipmunks are dormant during the winter, but become active only once in a while to eat food stored in their dens.

Other animals, such as bats and snakes, shut down so completely in winter that their body temperatures drop and hibernate. During hibernation, their body processes slow down.

Day 4 Weekly Question: Where do animals get food in the winter?

Some animals deal with winter by migrating, or moving to warmer places where food is still plentiful. Ducks and geese, for example, fly hundreds or even thousands of miles south from their summer feeding grounds. During winter in the Arctic, a type of reindeer called caribou (KAIR-uh-bo) will travel hundreds of miles to find food. Even insects migrate to find better climates. For example, monarch butterflies fly all the way from Canada and the northern United States to spend the winter in Mexico.

Day 5 Weekly Question: Where do animals get food in the winter?

A. Use the words in the box to complete the sentences.

hibernate migrate dormant hoard

- In the fall, some animals _____ to warmer places.
- Some bees become _____ when temperatures drop.
- Squirrels gather and _____ acorns for the winter.
- When bats _____, they don't need to eat.

B. Write true or false.

- Migrating butterflies fly south in the winter.
- The body temperatures of hibernating animals rise.
- Honeybees eat honey during the winter.
- Blue jays hoard food for the winter.

C. Draw a line between the animal and the food it eats in winter.

beaver	acorns
wolf	branches
squirrel	honey
honeybee	caribou

Vocabulary

dormant: Inactive; inactive in order to save energy

hibernate: Hibernacy: a state of dormancy where body processes slow down

Vocabulary words and definitions are provided for students.

Day 5 reviews the week's key concepts and vocabulary.

Unit Review (Week 5)

Visual Literacy: Students practice skills such as labeling diagrams, reading captions, and sequencing steps in a process.

Hands-on Activity: Students participate in a hands-on learning experience.

Comprehension: Students review key concepts of the unit by answering literal and inferential comprehension questions.

Unit Review Comprehension: Helping Each Other Out

A. Fill in the bubbles next to the correct answer.

- Honeybees ____ plants.
Ⓐ pollinate Ⓑ eat the flowers of Ⓒ live inside Ⓓ destroy
- Beavers, squirrels, and blue jays all ____ for the winter.
Ⓐ go south Ⓑ live in dens Ⓒ hibernate Ⓓ migrate
- Trees provide beavers with ____.
Ⓐ seeds Ⓑ pollen Ⓒ hibernation Ⓓ shelter
- Animals help plants distribute their ____.
Ⓐ seeds Ⓑ leaves Ⓒ roots Ⓓ flowers
- To find food in winter, some animals will ____.
Ⓐ hibernate Ⓑ pollinate Ⓒ plant seeds Ⓓ migrate
- List three ways that plants and animals help each other.
1. ____
2. ____
3. ____

Unit Review Visual Literacy: Tracking Beavers

Beavers were once very plentiful. By the early 1900s, 99% of beavers were gone. Beavers are now protected. The graph below shows the number of beavers in Ohio from 1980 to 2007. Use the graph to complete the sentences.

Unit Review Vocabulary: Meaning Match

A. Next to each word, write the letter of the correct definition.

1. angiosperms	a. inactive
2. proboscis	b. flowering plants
3. wetland	c. moving of rocks and soil by water
4. migrate	d. to enter a state of deep sleep
5. dormant	e. to move to find food and shelter
6. mutation	f. unable to reproduce
7. erosion	g. a shallow-water habitat
8. sterile	h. pollen grains fertilizing a flower ovary
9. pollination	i. a long, tube-like tongue
10. hibernation	j. a trait change passed down to offspring

B. Write the words from the box that complete the paragraph.

silt nectar pollen habitat honeycomb
ovary hoard ledge pollinate

Plants and animals that share a ____ often help each other survive. Plants provide food and shelter for animals. In turn, animals help plants reproduce. When bees and other insects gather ____, they also carry ____ from flower to flower. This helps to ____ the flowers. The ____ of each flower then produces seeds and grows into a fruit. Other animals scatter the seeds.

Unit Review Hands-on Activity: Seed Catalog

Almost all fruit has seeds, but the number of seeds and what they look like can be very different. Discover just how different they can be!

What You Need

- 3 different types of fruit, cut open to reveal the seeds
- plastic knife
- centimeter ruler
- pencil
- paper to cover the work surface
- paper towels (for cleanup)

What Did You Discover?

Name of fruit			
Number of seeds in fruit			
Size of seed, in centimeters			
Color of seed			
Special characteristics (shape, texture, etc.)			

Vocabulary: Students review the vocabulary presented in the unit.

Big Idea 1



Plants and animals depend on each other and on their environment for survival.

Key Concept

Interdependence of organisms and the environment

National Standard

All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants.

By fourth grade, students are becoming familiar with concepts that lead to the basic understanding of ecosystems—that plants and animals sharing a habitat very often depend on each other for survival. In this unit, students will learn that:

- animals help plants reproduce;
- plants provide food and shelter for animals; and
- plants and animals interact with each other and the environment to cause changes that can be both beneficial and harmful.

Teacher Background

Plants and animals that share a habitat are often connected in such a way that the actions of one have a direct impact on the other. The relationship between a plant and an animal, in fact, can be key to the survival of both organisms. For example, plants provide food and shelter to animals, and animals help plants reproduce.

Bees and flowers are an ideal example of this interdependent relationship. Flowers provide nectar for bees, which some bees use to make honey; meanwhile, bees pollinate the plants. Over time, this relationship brings about adaptations in both organisms that make their mutual survival more likely.

Throughout this unit, students will investigate how plants and animals depend on each other for their survival.

For specific background information on each week's concepts, refer to the notes on pp. 8, 14, 20, and 26.

Unit Overview

WEEK 1: Why do beavers build dams?

Connection to the Big Idea: When plants and animals share a habitat, the presence of one can greatly affect the other. This week, students study how beavers change their habitat, making survival easier for some organisms, while destroying the habitat for others.

Content Vocabulary: *erosion, habitat, lodge, silt, wetland*

WEEK 2: Why do some plants have fruit?

Connection to the Big Idea: Plants reproduce by making seeds, and one way plants ensure that their seeds are distributed is by producing fruit. This week, students learn that both plants and animals benefit from the production of fruit. They discover that some fruit-producing plants are completely dependent on humans for reproduction.

Content Vocabulary: *angiosperms, mutation, ovary, pollen, pollination, sterile*

WEEK 3: Do all bees make honey?

Connection to the Big Idea: Bees make honey by concentrating flower nectar in special areas of the hive. This week, students discover that not all bees make honey. However, they learn that all bees depend on flowers for food, and flowering plants depend on bees for pollination.

Content Vocabulary: *honeycomb, nectar, proboscis*

WEEK 4: Where do animals get food in the winter?

Connection to the Big Idea: During winter, food is scarce and animals react in different ways. Some animals migrate to areas where food is available. Others survive the winter by storing food as body fat, hoarding plant material such as nuts, or by hibernating. This week, students learn about the different ways animals survive the winter. They learn the difference between hibernating and becoming dormant, as well as why some animals migrate.

Content Vocabulary: *dormant, hibernate, hoard, migrate*

WEEK 5: Unit Review

These activities review key concepts of plant and animal interdependence.

p. 32: Comprehension Students answer multiple-choice questions about key concepts from the unit.

p. 33: Vocabulary Students match vocabulary words from the unit to their definitions and complete a cloze paragraph.

p. 34: Visual Literacy Students answer questions based on information presented on a line graph that shows beaver population changes.

p. 35: Hands-on Activity Students investigate the seeds in three types of fruit and record their observations in a chart. Review the materials and instructions on the student page ahead of time.

Big Idea 1



Plants and animals depend on each other and on their environment for survival.

Week 1

Why do beavers build dams?

Beavers, like all animals, depend on their habitat for survival. However, few animals affect their habitat as profoundly as beavers do. Beavers build dams to block the water in streams and create deep ponds. These ponds protect beavers from predators and create space for beavers to store their food cache in the winter. However, beaver dams can cause floods, completely changing the habitat where they live.

Day One

Vocabulary: *habitat*

Materials: page 9;
pictures of dams

Introduce the week by asking students what a *dam* is. Show pictures of dams of various sizes, made from concrete or earth. Tell students that they will learn about an amazing little animal that also builds dams. After introducing the vocabulary word, direct students' attention to the illustration and ask what they can tell about a beaver's habitat. Then have students read the passage and complete the activities. For the oral activity, pair students or discuss as a group.

Day Two

Vocabulary: *lodge*

Materials: page 10

After introducing the vocabulary word, ask students to find the *lodge* shown on the page. Then have students read the passage to learn specific information about a beaver *lodge*. After students complete the activities, discuss their responses to activity C.

Day Three

Materials: page 11

Review what students have learned on Days 1 and 2—that trees provide beavers with building material for their dams and lodges. Tell them that today they will read about another reason trees are important to beavers. After students have read the passage and studied the picture, some may wonder how beavers are able to breathe when the pond is frozen over. Explain that the *lodge* walls, although thick, are not airtight. For activity B, you may wish to compose a response as a group and have students copy it onto their pages.

Day Four

Vocabulary: *erosion, silt, wetland*

Materials: page 12

Before students complete activity A, you may wish to discuss the positive and negative effects of beavers on the environment. If appropriate, draw the chart on the board and have students suggest answers for you to fill in.

Day Five

Materials: page 13

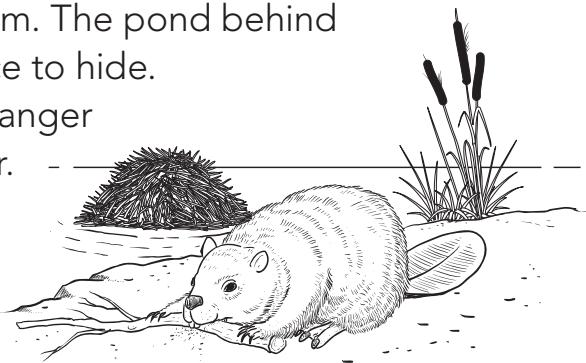
Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question** _____**Why do beavers
build dams?**

Beavers are brown, furry mammals that live in lakes and rivers. To survive in this type of **habitat**, beavers build dams. They use their large front teeth to cut down trees and then pile up the wood to block the flow of water. This causes deep ponds to form behind the dam. The pond behind the dam gives beavers a place to hide.

Beavers can get away from danger by diving into the deep water.

The pond also provides a place for beavers to live and to store their food.

**A. Read each sentence.**Write *true* or *false*.

1. A beaver's habitat has trees and water. _____
2. Beaver dams allow streams to flow freely. _____
3. Beavers run into the forest for safety. _____
4. A beaver can cut down trees with its teeth. _____

B. Use information from the passage to complete the sentences.

1. Beaver _____ are made of sticks and logs.
2. Water behind a dam gets _____.
3. Deep water provides _____ for beavers.



What animals live in your area? What are their habitats like?

**WEEK 1****Vocabulary****habitat**

HAB-ih-tat
a place where a plant or an animal naturally lives

Day 2**Weekly Question****Why do beavers build dams?**

Beavers live in **lodges** that they build in the middle of the ponds created by their dams. The lodges are made of mud, sticks, and logs. Beavers enter the lodge through an underwater entrance. The inside of the beaver lodge is small compared to the outside of the lodge because beavers need thick walls to protect them from other animals.

- A.** Look at the diagram of the lodge. Label the entrances.
Then write a sentence that gives information about the walls.



- B.** Use the words in the box to complete the sentences.

entrance pond underwater lodge

- For safety, a beaver _____ is built with thick walls.
- The _____ surrounding a beaver lodge is like a moat around a castle.
- The _____ to the beaver lodge is _____.

- C.** Foxes, bobcats, and coyotes hunt beavers. Why might beavers live in water?

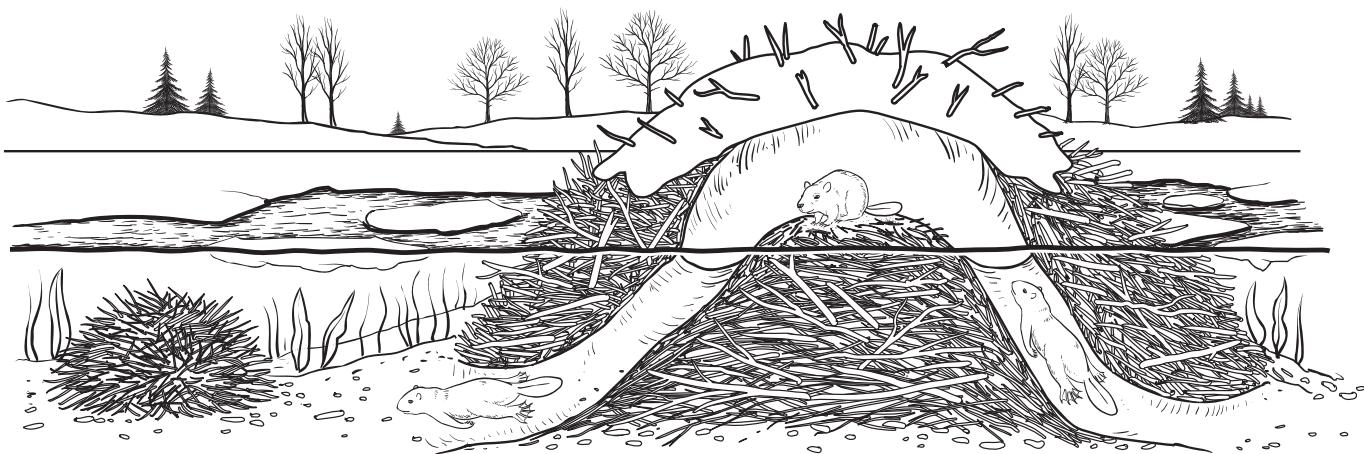
Vocabulary**lodge**

lahj

the dome-shaped home that beavers build from mud, sticks, and logs

**Day
3****Weekly Question****Why do beavers
build dams?****WEEK 1**

Trees are an important part of a beaver's habitat. Not only do they provide wood for shelter, but they provide food. Beavers are plant eaters, and their diet includes bark, leaves, and roots. During the summer, beavers stash logs and branches in underwater piles near their lodges to save for the winter. This is another reason why a beaver pond must be deep. If it is not deep enough, the pond may freeze all the way to the bottom in winter and the beavers will not be able to swim to their food.



A. Check the box next to the caption that best describes the illustration.

- Trees are only important to beavers during the winter.
- Beavers use logs they gather in the summer as food during the winter.
- Without leafy trees, most beavers will not survive the winter.

B. Explain in your own words why beavers need trees.

**Day
4****Weekly Question****Why do beavers build dams?**

Beavers cause changes to the environment that can be both positive and negative. Ponds built by beavers create new **wetland** habitats for fish, frogs, and water birds. These wetlands also help slow soil **erosion** and keep more water in the ground, which allows plants to grow.

Beavers, however, also destroy trees that are homes for birds and other animals. In addition, beaver dams slow the flow of water in streams and cause **silt** to build up. Dams can also flood the land behind them.

- A.** List two positive effects and two negative effects of beaver dams.

Positive Effects	Negative Effects

- B.** Use the vocabulary words to complete the sentences.

- When _____ builds up, it can make streams shallower.
- _____ is a problem for farmers because water carries away the soil they need to grow crops.
- Two animals that live in a _____ are ducks and frogs.

Vocabulary**erosion**

ee-ROH-zhun
the moving of rocks and soil by water or wind

silt

silt
small particles of soil deposited by water

wetland

WET-land
a habitat where shallow water covers most of the ground

**Day
5****Weekly Question** _____**Why do beavers
build dams?****A.** Write the word that answers each clue.

lodge habitat erosion wetland silt

WEEK 1

1. small bits of soil that settle at the bottom
of a river or lake

2. the place where plants or animals live

3. a beaver's shelter

4. a place mostly covered in shallow water

5. the washing or blowing away of soil

B. Check all the reasons why beavers build dams.

- Dams trap fish for the beavers to eat.
- Dams create ponds that are deep enough not to freeze solid in winter.
- Dams provide a sturdy structure for beavers to live in.
- Dams create ponds that beavers can hide in.

C. Write true or false.

1. In winter, a beaver cannot use the underwater entrance.

2. Beaver dams have no effect on the environment.

3. Beaver lodges are protected by water.

4. Beavers cut down trees.

5. Beaver dams only help beavers.

Big Idea 1



Plants and animals depend on each other and on their environment for survival.

Week 2

Why do some plants have fruit?

Plants reproduce by making seeds, and one way plants ensure that their seeds are distributed is by producing fruit. Fruits are fleshy structures that contain the seeds of the plant. Fruit attracts animals. When animals eat the fruit, they end up helping the plant distribute its seeds. This happens when seeds pass unharmed through the animals' digestive systems or when foraging animals simply discard the part of the fruit that contains the seeds. In this way, both organisms benefit.

Day One

Vocabulary: ovary, pollen, pollination

Materials: page 15; flowers with visible pollen, such as lilies; facial tissues for cleanup

After introducing the vocabulary, pass around the flowers, asking students to touch a stamen and notice the clearly visible pollen. Show students a flower with petals removed and identify the ovary at the base of the flower. Have students guess what fruit the illustration on page 15 shows (pomegranate) by explaining that the fruit is red and full of juicy seeds. Compare parts of the illustration to the flower you brought in. Then have students complete the page.

Day Two

Vocabulary: angiosperms

Materials: page 16

Introduce the vocabulary word and have students read the passage. After students have completed the activities, discuss their answers to activity A. As a group, generate a list of angiosperms that students are familiar with. (e.g., dandelion, rose, daffodil, etc.) If you wish to extend the lesson, explain that to reproduce, ferns produce spores and pine trees produce cones instead of flowers.

Day Three

Materials: page 17; cut-up pieces of fruit with seeds showing

Before students read the passage, discuss with them what foods they eat that have seeds. Ask students whether they eat the seeds and, if not, what they do with the seeds. When students have completed the activities, discuss their answers to activity C and ask them if they have accidentally helped to distribute seeds.

Day Four

Vocabulary: mutation, sterile

Materials: page 18

Introduce the vocabulary. After students read the passage, mention that mutations are common in plants and that this is how we often get new kinds of fruits or flowers with unusual colors or a combination of colors. Then have students complete the activities. For activity B, you may wish to tell students that some fruits with seeds have a seedless variety. (watermelons, grapes, oranges, etc.)

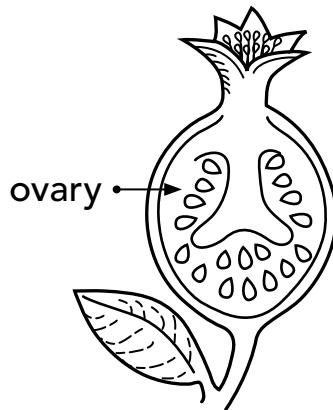
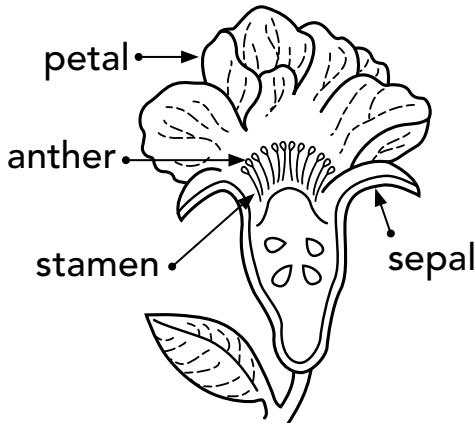
Day Five

Materials: page 19

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****Why do some plants have fruit?**

Do you think plants make fruit just for you to eat? Actually, the main reason plants make fruit is because the fruit contains seeds, and seeds are how plants reproduce. The process of making fruit begins with a flower. After a flower blooms, grains of **pollen**, which are from the male part of the flower, combine with the female cells in the flower's **ovary**. This process is called **pollination**, and as a result, seeds form. The flower's ovary enlarges to form a fruit that surrounds the seeds.



- A.** Number the steps in the correct order to show the process by which plants make fruit.

- ___ Seeds form.
- ___ A plant produces flowers.
- ___ The plant's ovary grows into a fruit.
- ___ Flowers are pollinated.

- B.** If animals ate flowers before they were pollinated, would this help or hurt a plant's ability to spread to new places? Explain your answer.
-
-

**WEEK 2****Vocabulary****ovary**

OH-vuh-ree
the female part of a flower that contains the seeds formed after pollination

pollen

POL-un
a fine powder that comes from the male part of a flowering plant

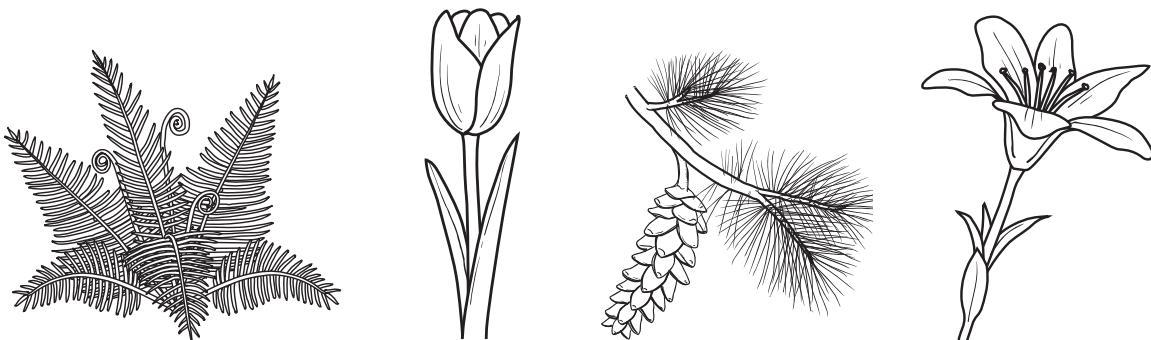
pollination

POL-uh-NA-shun
the process by which grains of pollen combine with cells in the ovary to produce seeds

Day 2**Weekly Question****Why do some plants have fruit?**

Plants with flowers, called **angiosperms**, are very successful at reproducing. Today, angiosperms make up 90% of all plants on land. One reason for the success of angiosperms is the role flowers have in the production of fruit and seeds. Flowers attract bees and other pollinators. In turn, insects spread the pollen that is necessary to pollinate the plant and produce fruit.

- A.** Circle the angiosperms. Then explain how you knew they were angiosperms.



- B.** Use words from the passage to complete the sentences.

1. Most land plants are _____.
2. Pollen is necessary to _____ plants.
3. Flowers are a means to attract _____.

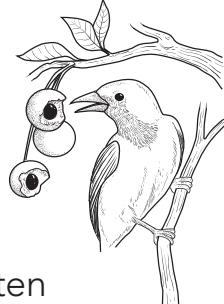
- C.** Describe the role of flowers in the reproduction of angiosperms.
-
-

WEEK 2**Vocabulary****angiosperms**

AN-jee-oh-SPERMS
plants that produce flowers

**Day
3****Weekly Question****Why do some plants
have fruit?**

Angiosperms benefit from animals not only when the animals spread the flower's pollen but also when they eat the plant's fruit. How is that? Animals help scatter a plant's seeds. Sometimes, animals just throw away the part of the fruit that contains the seeds. Other times, the seeds are eaten but passed through the animal's digestive system undamaged.


**Big
Idea 1**
WEEK 2
A. Use information from the passage to complete the sentences.

- 1.** Plants make fruit to ensure that their _____ are distributed.
- 2.** Seeds can pass through an animal's _____ system.
- 3.** Animals help _____ seeds far and wide.
- 4.** Animals often throw away the part of the _____ that has seeds.

B. Write true or false.

- 1.** Birds scatter seeds. _____
- 2.** Seeds are always destroyed if eaten. _____
- 3.** Fruit protects seeds from being eaten. _____

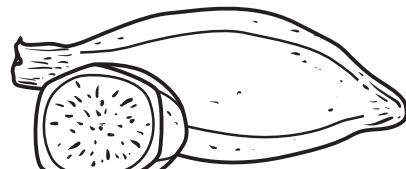
C. Describe some of the ways humans help distribute seeds, either accidentally or on purpose.

Day 4**Weekly Question****Why do some plants have fruit?**

In nature, every fruit has seeds. So how is it that some fruits we get from the store, such as bananas and some grapes and oranges, don't have seeds? The first seedless fruits were probably caused by a natural **mutation**. Seedless bananas, for example, appeared about 8,000 years ago. Humans learned to grow the mutant banana plants by planting shoots that grow from the roots of a mature plant. All the bananas grown today are **sterile**. Without humans growing them, the seedless bananas we eat would disappear.



store-bought bananas



wild bananas

Vocabulary**mutation**

myoo-TAY-shun
a *change in a trait of an organism that is passed down to its offspring*

sterile

STER-ul
unable to produce seeds that can grow into new plants

A. Use the vocabulary words to complete the sentences.

1. All bananas grown today are _____ and don't have seeds.
2. Scientists think a _____ caused the first seedless fruit.

B. Bananas are an example of a seedless fruit that couldn't exist without humans. Make a list of other seedless fruit you like to eat. Then list fruit that you wish didn't have seeds.

Seedless fruit that you like to eat	Fruit that you wish didn't have seeds

Name _____

**Day
5**

Weekly Question

**Why do some plants
have fruit?**

- A. Use the words in the box to complete the sentences.

ovary pollination sterile
pollen angiosperms mutation

WEEK 2

**Big
Idea 1**



1. Seedless bananas were probably first caused by a _____.
2. Fruit is produced by a flower after _____.
3. Flowering plants are called _____.
4. If plants are _____, that means they can't produce seeds.
5. _____ grains combine with cells in the female plant's _____.

- B. Coconuts are the giant seeds of coconut trees. Coconuts float in water, which allows the trees to spread to places where they have not grown before. Number the events below in the correct order to show how this happens.

- ____ The coconut lands on the shore of a new island.
- ____ The coconut falls from the tree.
- ____ The coconut sprouts into a new coconut tree.
- ____ Waves carry the coconut out to sea.
- ____ Ocean currents carry the coconut for miles and miles.

- C. Write at least one thing you have learned about plants and fruit that you didn't know before.
-

Big Idea 1



Plants and animals depend on each other and on their environment for survival.

Week 3

Do all bees make honey?

Nowhere is the interdependence of animals and plants clearer than in the partnership between flowers and bees. Many flowering plants require bees for pollination and attract them to their reproductive structures with scented and sugary nectar. Bees have special body parts for drinking and collecting nectar and pollen from flowers.

Not all bees produce abundant honey. In fact, certain species of bees produce no honey at all. However, all bees depend on flowers for food, and flowering plants depend on bees for pollination.

Day One

Vocabulary: *nectar, proboscis*

Materials: page 21

Invite students to share what they know about bees and any observations they've made about bees in nature. Before students read the passage and complete the activities, review or introduce the concept of *adaptation*—a change in a living thing that better enables it to survive in its environment.

Day Two

Vocabulary: *honeycomb*

Materials: page 22; honey from different sources; real honeycomb (available at natural food stores) or photos of honeycomb

Introduce the vocabulary word by passing around the honeycomb (or photos of honeycomb) for students to view. Elicit descriptions of the shape and, if using real honeycomb, the texture. Inform students that they will learn about honeycomb in today's reading. After students read the passage, look at the illustration and read the caption together. You may wish to do activity A as a group. Then direct students to do activity B independently.

Day Three

Materials: page 23

Before reading, have students guess the answer to the weekly question. Guide students' observations on activity A. (honeybee: smaller, less hair; bumblebee: larger, round, more hair) Then have students complete activity B independently.

Day Four

Materials: page 24; honeycomb (optional)

Before students do the first activity, examine the illustration of the beehive and read the labels. Explain the words *brood* (a group of young animals hatched at the same time) and *exclude* (to keep out). For the oral activity, you may wish to explain that there is concern about CCD because 90% of commercially grown crops in the U.S. depend on bees for pollination. Students may wish to research this further.

Day Five

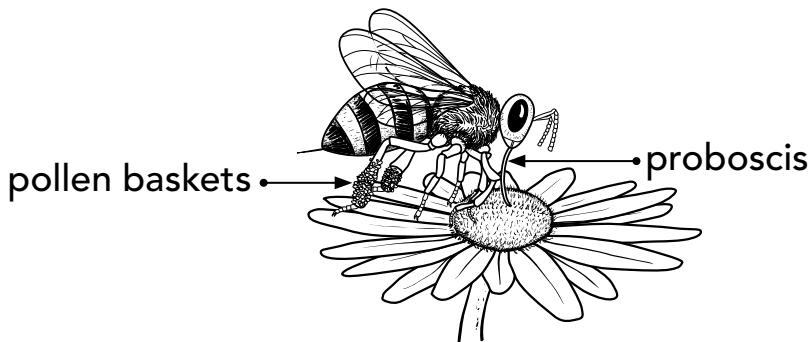
Materials: page 25

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****Do all bees make honey?**

If you look at the body of a bee, you'll notice some special features. One is the bee's long tongue, called a **proboscis**. A bee's proboscis works like a straw to suck up liquids. This is ideal for reaching **nectar** deep inside a flower.

You'll also notice that a bee is fuzzy. The fine hairs on a bee's body become covered in pollen when a bee visits flowers. The bee uses brushlike hairs on its hind legs to pack the pollen into compact bundles called pollen baskets. This is how honeybees get the nectar they need to make honey and gather the pollen used to feed the hive. In return, flowers are pollinated.

**Vocabulary****nectar**

NEK-ter
a sugary liquid produced by flowers

proboscis

pro-BAH-siss
the long, tube-like tongue of some insects

A. Use the vocabulary words to complete the sentence.

A bee's _____ works like a straw to
suck up _____ found inside flowers.

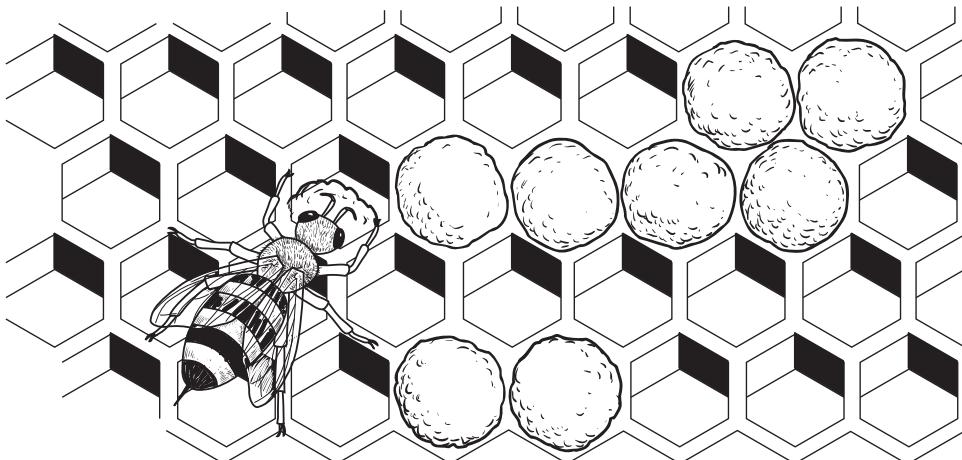
B. Explain how each of these adaptations helps a bee survive.

1. long tongue _____

2. fuzzy body _____

**Day
2****Weekly Question****Do all bees make honey?**

A honeybee carries nectar back to the hive in a special sack in its body called a honey stomach. Back in the hive, the bee squirts the nectar from its honey stomach into waxy chambers called a **honeycomb**. Other bees then help dry out the nectar by fanning their wings over the honeycomb. Over time, the liquid becomes thicker and sweeter. It turns into honey, which provides food for honeybees all year long.



Worker bees build the honeycomb by using wax from glands on their bodies. They mold the wax with their mouths and feet.

- A.** Write one thing you learned from the caption above that you did not learn from the passage.
-

- B.** Number the steps in the correct order to show how bees make honey.

- ____ Water evaporates from the nectar.
- ____ A bee carries nectar in its honey stomach back to the hive.
- ____ The nectar thickens into honey.
- ____ The bee squirts the nectar into a chamber of the honeycomb.

Vocabulary**honeycomb**

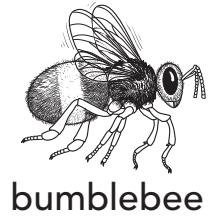
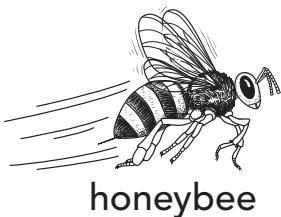
HUN-ee-kohm
six-sided waxy chambers built by bees for storing honey and raising young

**Day
3****Weekly Question****Do all bees make honey?**

Not all bees make honey. In fact, the word *honeybee* is used only for the type of bee that makes lots of honey. Bumblebees, for example, are different from honeybees. While bumblebees pollinate flowers and drink nectar like honeybees, they don't keep large hives with a honeycomb full of honey the way that honeybees do. Without a large supply of honey in storage for the winter months, most bumblebees die.


**Big
Idea 1**
WEEK 3

- A.** Look at the drawings of a honeybee and a bumblebee. On the lines below, compare and contrast the features of the bees.



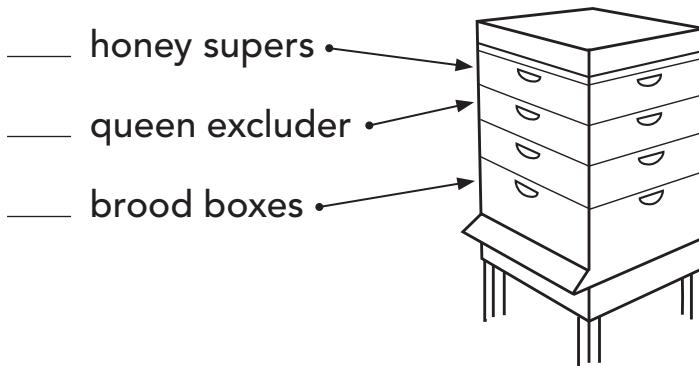
-
-
- B.** Check the characteristics that apply to each kind of bee.

	Honeybee	Bumblebee
Pollinates flowers		
Drinks nectar from flowers		
Produces large amounts of honey		
Creates honeycomb filled with honey		
Often dies in the winter		
Depends on flowers for survival		

**Day
4****Weekly Question****Do all bees make honey?**

Although not all bees make honey, all bees pollinate flowers. The pollination of flowers by bees is very important to farming. Farmers will even hire beekeepers to bring beehives to the fields when it is time for the crops to be pollinated. For example, beekeepers bring hives to orchards when fruit trees are in blossom. Once the flowers are pollinated, fruit will grow on the trees. Then the bees can be moved to other crops.

This is a drawing of a beehive that many beekeepers use. Read the labels that name each part of the hive. Then, using the clues in the names, find the description below for each part. Write the letter of the description on the line.



- a. The spaces in this grid are too small for the queen bee to get through. It keeps the queen from laying eggs in the honeycomb.
- b. Inside these boxes are hanging frames where the bees can build honeycomb and make honey.
- c. This is where the queen lays eggs and the larval bees are fed by worker bees.

**Talk**

Since 2006, beekeepers are reporting that a larger than usual number of bees are disappearing. This problem is called Colony Collapse Disorder (CCD). Why do you think CCD has scientists and farmers concerned?

**Day
5****Weekly Question****Do all bees make honey?****WEEK 3****A.** Next to each word, write the letter of the correct definition.

- | | |
|-------------------|--------------------------------------|
| ____ 1. nectar | a. sweet liquid in flowers |
| ____ 2. honeycomb | b. tube-like tongue |
| ____ 3. proboscis | c. chambers bees make to store honey |

B. Number the steps in the correct order to describe how bees collect pollen and nectar to feed the hive and, in the process, help plants to reproduce.

- ____ The bee returns to the hive and squirts nectar into the honeycomb.
- ____ A bee leaves the hive in search of nectar and pollen.
- ____ Bees in the hive turn the nectar into honey.
- ____ As the bee collects nectar from flowers, its fuzzy body picks up pollen.
- ____ The bees use the honey for food during the winter.
- ____ The bee moves from flower to flower, leaving behind pollen that pollinates the flower.

C. List three things that bees do to help people and plants.

1. _____
2. _____
3. _____

D. What would you tell someone who claimed that all bees make honey?

Big Idea 1



Plants and animals depend on each other and on their environment for survival.

Week 4

Where do animals get food in the winter?

The coming of winter brings changes that include shorter days and colder temperatures. Less food is available for both plants and animals. One way organisms respond is by eating less and using less energy. In anticipation of winter, many animals also begin to store food. Animals store food in their bodies as fat, or by hoarding plant material such as nuts, roots, or branches. Animals also migrate to places where food is more plentiful. Plants ultimately benefit from animals surviving the winter because animals help plants reproduce and scatter their seeds.

Day One

Vocabulary: hoard

Materials: page 27

Discuss with students what winter is like where you live and what challenges that brings to people. Ask students to name the wild animals they see in winter in your area. Inform students that they are going to read about ways in which animals survive in winter. After students complete the activities, have them share their responses to activities B and C.

Day Two

Materials: page 28

Briefly discuss the reason we need to eat food. (provides energy needed for the proper functioning of body systems) Prior to reading the text and completing the activities, ask students to speculate what might happen if a person or an animal eats more food than its body can use. (will gain weight) Then have students complete the activities.

Day Three

Vocabulary: dormant, hibernation

Materials: page 29

After students read the passage, confirm that they understand the difference between becoming dormant and hibernating. You may wish to explain that hibernation is a dramatic form of dormancy. True hibernators can't be awakened easily and are unresponsive to external stimuli. Their body temperatures drop to a few degrees above their surroundings. Bears do not hibernate, although this continues to be argued. Their temperatures drop only a few degrees, and females can give birth during winter, something that would not be possible for a true hibernator. Then have students complete the activity.

Day Four

Vocabulary: migrate

Materials: page 30

Ask students to speculate how an animal that can't store enough food or body fat might survive winter. After students read the passage, have them look at the illustration and read the caption together. Before students complete the activities, read the prompt for activity B, making sure that they understand that *prey on* means "to hunt and eat." When students have completed the activities, have volunteers share their responses and explain their thinking.

Day Five

Materials: page 31

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****Where do animals get food in the winter?**

In most places, winter brings shorter days and colder temperatures. There is usually less food available for animals. Animals deal with the food shortage in a number of ways. Some animals **hoard** food so that it will be available in the winter. Squirrels and some birds, such as blue jays and woodpeckers, store nuts and seeds in trees and other hiding places. Beavers stash tree branches underwater near their lodges. Honeybees make enough honey to last the hive throughout the winter.

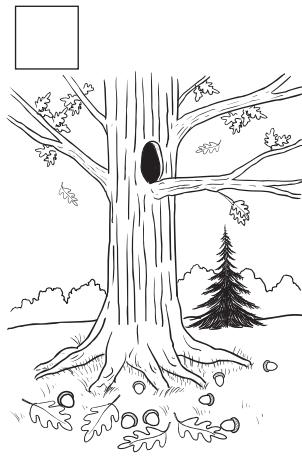
WEEK 4**Vocabulary****hoard**

hord

to gather things and then store or hide them

A. Number the events in the correct order.

In winter, squirrels eat stored acorns.



In autumn, acorns fall to the ground from oak trees.



Squirrels hoard the acorns in trees.



Squirrels gather fallen acorns.

B. Which of these foods are birds likely to hoard: worms or sunflower seeds? Why?**C. Do you think animals that live in tropical places hoard food? Why or why not?**

**Day
2****Weekly Question****Where do animals get food in the winter?**

To prepare for winter, many animals eat more food during the warm months than they actually need. The extra food is stored in their bodies in the form of fat. During winter, when food is less available, the animals' bodies absorb the fat to provide energy.

Beavers store body fat in their tails. Queen bumblebees drink lots of nectar to fatten up their bodies and fill their honey stomachs. Bears eat enough during summer and fall to survive without eating all winter, while they are in a deep sleep.

A. Check the box next to each statement that is true.

- Fat provides energy.
- Fat becomes food.
- All animals store fat in their tails.
- Body fat can be stored for later use.

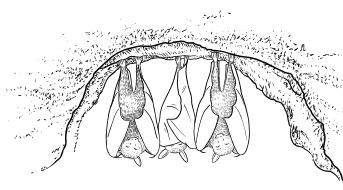
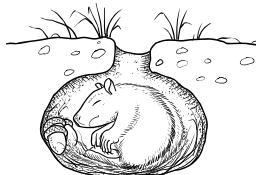
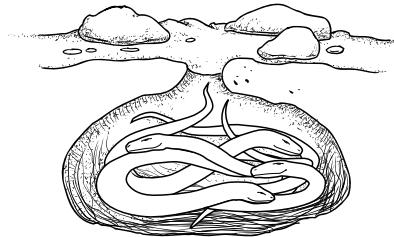
B. Use information from the passage to complete the paragraph.

Many animals get ready for _____ by taking in more _____ than their bodies need. The unused food is stored as _____. At the beginning of winter, these animals weigh _____ than they will in the spring. Their bodies use the fat to provide _____ during the cold months.

**Day
3****Weekly Question****Where do animals get food in the winter?**

One way animals adapt to winter is by becoming **dormant**. A dormant animal may look like it is sleeping, but it is really conserving energy by keeping still. For example, chipmunks are dormant during the winter and become active only once in a while to eat food stored in their dens.

Other animals, such as bats and snakes, shut down so completely in winter that their body temperatures drop and their breathing and heart rates slow. This is called **hibernation**. Bears do something similar to hibernating, but their body temperature doesn't drop as much. Still, bears are able to go for months without eating.

**WEEK 4****Vocabulary****dormant**

DOR-munt

*inactive in order to save energy***hibernation**

HI-bur-NAY-shun
a special kind of dormancy where body processes slow down enormously

Write whether each clue describes an animal that is **dormant** or one that is **hibernating**.

- 1.** This animal's body temperature dropped only a few degrees. _____

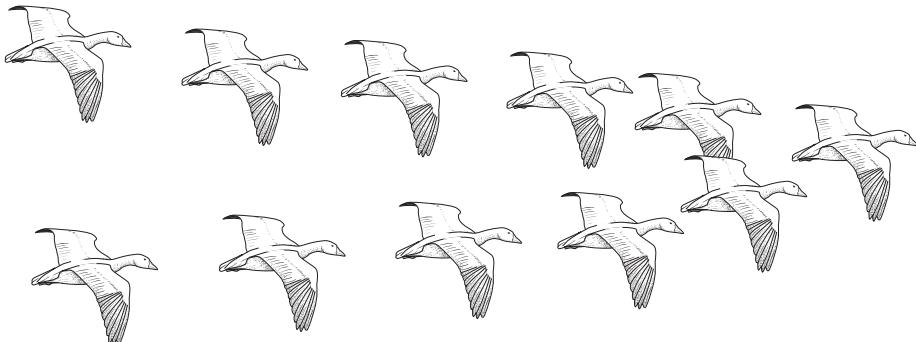
- 2.** This animal's body temperature dropped from 100°F (38°C) to 39°F (4°C). _____

- 3.** This animal could be easily awakened. _____

- 4.** This animal did not move from December to April. _____

**Day
4****Weekly Question****Where do animals get food in the winter?**

Some animals deal with winter by **migrating**, or moving to warmer places where food is still plentiful. Ducks and geese, for example, fly hundreds or even thousands of miles south from their summer feeding grounds. During winter in the Arctic, a type of reindeer called caribou (KAIR-ih-boo) will travel hundreds of miles to find food. Even insects migrate to find better climates. For example, monarch butterflies fly all the way from Canada and the northern United States to spend the winter in Mexico.



Snow geese make a round trip of more than 5,000 miles, flying at speeds of 50 miles per hour or more.

- A.** Check all the statements that help explain why some animals migrate to warmer climates in the winter.

- Plants are still growing and producing food in warmer places.
- Animals are not hibernating and so are easier to find and eat.
- Water is available to drink because lakes and ponds are not frozen.
- Fewer people live in warm climates.

- B.** Gray wolves prey on caribou. What do you think gray wolves do when the caribou herds migrate?

Vocabulary**migrate**

MY-grait
to move from one location to another in search of food and shelter

**Day
5****Weekly Question****Where do animals get food in the winter?****WEEK 4**

- A.** Use the words in the box to complete the sentences.

..... hibernate migrate dormant hoard

1. In the fall, some animals _____ to warmer places.
2. Some bees become _____ when temperatures drop.
3. Squirrels gather and _____ acorns for the winter.
4. When bats _____, they don't need to eat.

- B.** Write *true* or *false*.

1. Migrating butterflies fly south in the winter. _____
2. The body temperatures of hibernating animals rise. _____
3. Honeybees eat honey during the winter. _____
4. Blue jays hoard food for the winter. _____

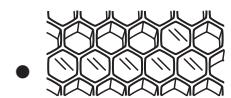
- C.** Draw a line between the animal and the food it eats in winter.

**beaver**

acorns



branches

**wolf****squirrel**

honey

**honeybee**

caribou

**Unit
Review**

Comprehension

Helping Each Other Out

A. Fill in the bubble next to the correct answer.

1. Honeybees _____ plants.
Ⓐ pollinate Ⓑ live inside Ⓒ eat the flowers of Ⓓ destroy
 2. Beavers, squirrels, and blue jays all _____ for the winter.
Ⓐ go south Ⓑ hoard food Ⓒ live in dens Ⓓ hibernate
 3. Trees provide beavers with _____.
Ⓐ seeds Ⓑ hibernation Ⓒ pollen Ⓓ shelter
 4. Animals help plants distribute their _____.
Ⓐ seeds Ⓑ flowers Ⓒ leaves Ⓓ roots
 5. To find food in winter, some animals will _____.
Ⓐ hibernate Ⓑ plant seeds Ⓒ pollinate Ⓓ migrate

B. List three ways that plants and animals help each other.

1. _____
 2. _____
 3. _____

**Unit
Review****Vocabulary****Meaning Match****Daily Science****Big
Idea 1****WEEK 5**

A. Next to each word, write the letter of the correct definition.

- | | |
|---------------------|---|
| ___ 1. angiosperms | a. inactive |
| ___ 2. proboscis | b. flowering plants |
| ___ 3. wetland | c. moving of rocks and soil by water |
| ___ 4. migrate | d. a state of deep sleep |
| ___ 5. dormant | e. to move to find food and shelter |
| ___ 6. mutation | f. unable to reproduce |
| ___ 7. erosion | g. a shallow-water habitat |
| ___ 8. sterile | h. pollen grains fertilizing a flower ovary |
| ___ 9. pollination | i. a long, tube-like tongue |
| ___ 10. hibernation | j. a trait change passed down to offspring |

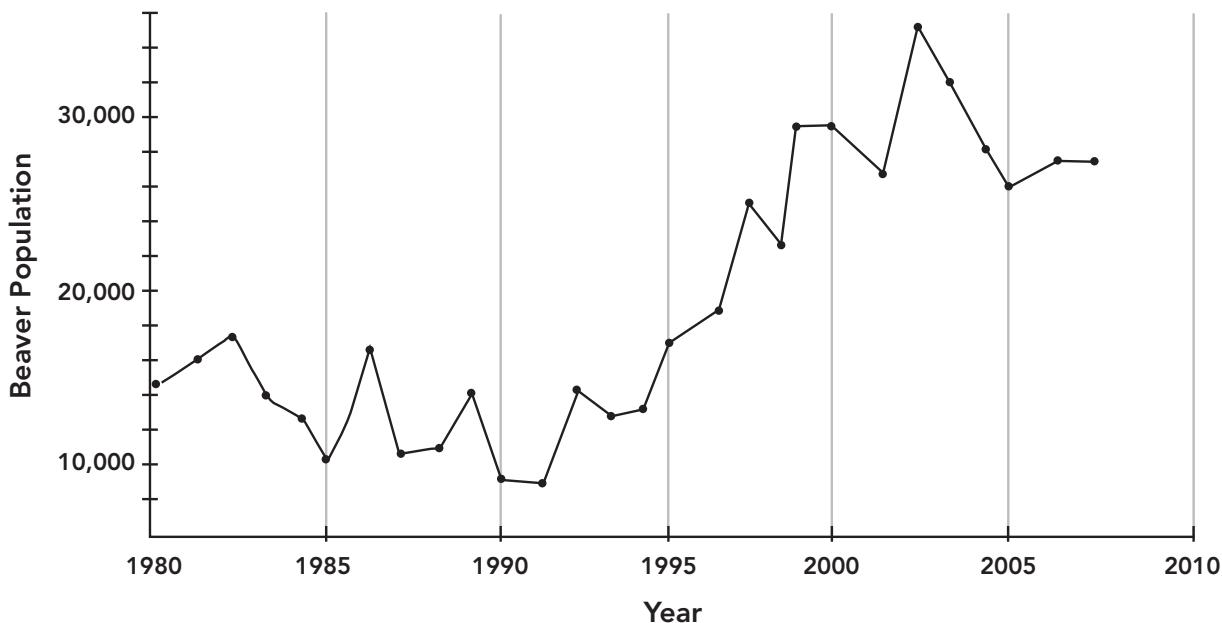
B. Write the words from the box that complete the paragraph.

silt nectar pollen habitat honeycomb
 ovary hoard lodge pollinate

Plants and animals that share a _____ often help each other survive. Plants provide food and shelter for animals. In turn, animals help plants reproduce. When bees and other insects gather _____, they also carry _____ from flower to flower. This helps to _____ the flowers. The _____ of each flower then produces seeds and grows into a fruit. Other animals scatter the seeds.

**Unit
Review****Visual Literacy****Tracking Beavers****Daily Science****Big
Idea 1****WEEK 5**

Beavers were once very plentiful. By the early 1900s, 99% of beavers were gone. Beavers are now protected. The graph below shows the number of beavers in Ohio from 1980 to 2007. Use the graph to complete the sentences.



1. In 2005, there were _____ beavers compared with 1985.
 - (A) more than twice as many
 - (B) the same number of
 - (C) half the number of
 - (D) fewer

2. Overall, you can say that the number of beavers _____ year to year.
 - (A) always increases
 - (B) stays the same
 - (C) never decreases
 - (D) changes

3. The biggest increase in the beaver population occurred _____.
 - (A) between 1990 and 1995
 - (B) between 1995 and 2000
 - (C) between 1985 and 1990
 - (D) since 2005

Name _____

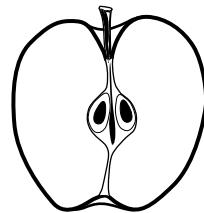
**Unit
Review****Hands-on Activity**
Seed Catalog**WEEK 5**

Almost all fruit has seeds, but the number of seeds and what they look like can be very different. Discover just how different they can be!

What You Need

- 3 different types of fruit, cut open to reveal the seeds
- plastic knife
- centimeter ruler
- pencil
- paper to cover the work surface
- paper towels (for cleanup)

1. Cover your work space with paper.
2. Use your fingers or have an adult help you use the knife to remove the seeds from each fruit.
3. Fill in the chart.
4. Compare your results for each fruit.

**What Did You Discover?**

	Fruit 1	Fruit 2	Fruit 3
Name of fruit			
Number of seeds in fruit			
Size of seed, in centimeters			
Color of seed			
Special characteristics (shape, texture, etc.)			

Big Idea 2



Most microorganisms do not cause disease, and many are beneficial.

Key Concepts

Bacteria, mold, and fungi

National Standard

All organisms cause changes in the environment where they live. Some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.

By fourth grade, students know that bacteria and fungi are important decomposers.

These microorganisms are responsible for recycling nutrients from dead plants and animals. In this unit, students will learn the following:

- some bacteria are harmful to humans, many are helpful, and almost all are essential for life on Earth;
- fungi, such as mold and yeast, are other microorganisms that can have both helpful and harmful effects;
- as decomposers, bacteria can cause tooth decay; and
- bacteria and molds in food play a role in the environment.

Teacher Background

Microorganisms are part of our everyday life. Some students may believe that all so-called “germs” are bad, when, in fact, the effects of microorganisms can be beneficial as well as harmful. Humans harbor many different microorganisms in their bodies that help them absorb nutrients from food. Certain bacteria, molds, and yeasts enhance our food and health.

Microorganisms are also decomposers, which means they break down dead plant matter and waste, converting them into nutrients that are useful to plants and animals. Without decomposers, organic material would not be properly recycled, and the world would be overrun with the remains of plants and animals.

For specific background information on each week's concepts, refer to the notes on pp. 38, 44, 50, and 56.

Unit Overview

WEEK 1: Why does garbage smell?

Connection to the Big Idea:

Microorganisms known as decomposers break down garbage and other raw organic material. This week, students are introduced to bacteria and fungi and learn how these microorganisms break down food.

Content Vocabulary: *absorb, bacteria, decomposers, fungus, mold*

WEEK 2: How do bacteria create cavities?

Connection to the Big Idea: In the process of decomposing, bacteria produce acids. This week, students learn that some bacteria in their mouths act on food left in the teeth. Students learn about the different parts of a tooth and how the acid from bacteria can destroy enamel and cause tooth decay.

Content Vocabulary: *acid, cavity, dentin, dissolve, enamel, fluoride, plaque, pulp*

WEEK 3: Are all germs bad?

Connection to the Big Idea: Infectious diseases can be caused by bacteria or viruses. Our immune system produces antibodies in response to infections. This week, students learn about viruses and bacteria and how they can be spread. They also learn that bacteria in our intestines are necessary for proper digestion and that scientists are discovering many new environmental uses for microorganisms.

Content Vocabulary: *antibodies, immune system, infectious, intestines, microscopic, viruses*

WEEK 4: Is it safe to eat moldy food?

Connection to the Big Idea: Some molds and another type of fungus, yeast, play an important role in food production. In addition, they are important in the creation of antibiotics. This week, students learn about other fungi and how these fungi can be used to create food and medicine.

Content Vocabulary: *antibiotic, microorganisms, nutritious, penicillin, yeast*

WEEK 5: Unit Review

You may choose to do these activities to review concepts of microorganisms.

p. 62: Comprehension Students answer multiple-choice questions about the key concepts of the unit.

p. 63: Vocabulary Students complete a matching activity to show that they understand unit vocabulary.

p. 64: Visual Literacy Students answer questions about information presented on a bar graph that shows tooth decay statistics.

p. 65: Hands-on Activity Students grow mold on four kinds of food and record their observations. Instructions and materials needed for the activity are listed on the student page.

Big Idea 2



Most microorganisms do not cause disease, and many are beneficial.

Week 1

Why does garbage smell?

Most students know that garbage—especially garbage that has been sitting around for a few days—smells! In this unit, students learn that the smell is caused by microorganisms decomposing waste. Bacteria and fungi are two common decomposers that consume waste. In the process, they break down large molecules into smaller molecules, some of which escape into the air. We notice these breakdown products as odors. Moisture and heat are factors that speed up the process of decomposition.

Day One

Vocabulary: decomposers

Materials: page 39

Introduce the week's question by asking students what they notice when they pass by a dumpster or a garbage can with the lid open. (bad smells) Tell students that they are going to learn about some organisms that are very important to our planet and, in the process, they will find out the reason that garbage smells. After students have read the passage and completed the activities, discuss their responses to activity C.

Day Two

Vocabulary: absorb, bacteria

Materials: page 40

After introducing the vocabulary words, activate students' prior knowledge by asking them what they know about bacteria. Take time to look at the illustrations showing the different kinds of bacteria. Then direct students to read the passage. Instruct students to complete the activities, and then discuss their answers to activity B.

Day Three

Vocabulary: fungus, mold

Materials: page 41

Introduce the vocabulary words. Point out that the plural of *fungus* is *fungi*. Then ask students to describe experiences with mold—where they have seen it, what it looked like, etc. After students read the passage, make sure they understand that fungi are not animals or plants but a separate classification of life. Point out the illustration and tell students that we see molds on the surface of things, such as this orange, but that the mold is spreading through this food to help break it down. Then instruct students to complete the activities. If students have not had much experience with analogies, you may want to do activity C together.

Day Four

Materials: page 42

Tell students that today they will find out the answer to the week's question. Direct students to read the passage and then, as a class, discuss why garbage smells. Next, instruct students to complete the activities. For the oral activity, you may wish to pair students or discuss the activity as a group.

Day Five

Materials: page 43

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****Why does garbage smell?**

Everyone recognizes the smell of rotten garbage. It stinks! But that smell tells you that **decomposers** are at work. Decomposers are organisms that break down waste and dead matter, such as banana peels or wilted lettuce leaves. Decomposers are found everywhere, not just in trash cans. This is important because decomposers play a vital role in recycling nutrients and enriching the soil. If we didn't have decomposers, nutrients would never be reused, and the world would be filled with garbage!

**Big
Idea 2****WEEK 1****Vocabulary****decomposers**

DEE-kum-POH-zerz
organisms that
break down and
feed on waste
and the remains of
plants and animals

- A.** Name three effects that decomposers have when they break down waste.

1. _____
2. _____
3. _____

- B.** Write true or false.

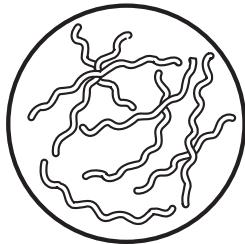
1. Decomposers are important to the environment. _____
2. Decomposers are living creatures. _____
3. All decomposers live in trash cans and landfills. _____

- C.** Besides garbage cans, where else might you find decomposers?
-

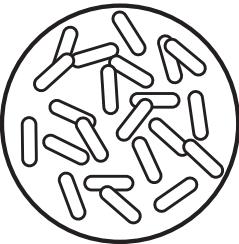
**Day
2****Weekly Question****Why does garbage smell?**

Bacteria are the smallest decomposers, too small to see without a microscope, but they are the most numerous. There are many kinds of bacteria, and they live in every ecosystem on the planet, from oceans to deserts to your trash can.

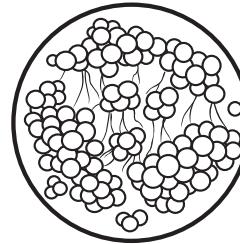
Because bacteria are so small and simple, they don't have mouths with which to eat. Instead, bacteria release chemicals that break down matter into small parts that they can **absorb**.



spirilla
(spy-RIL-uh)



bacilli
(buh-SIL-eye)



cocci
(KOK-sy)

Vocabulary

absorb
ab-SORB
to take in

bacteria
back-TEER-ee-uh
tiny one-celled organisms

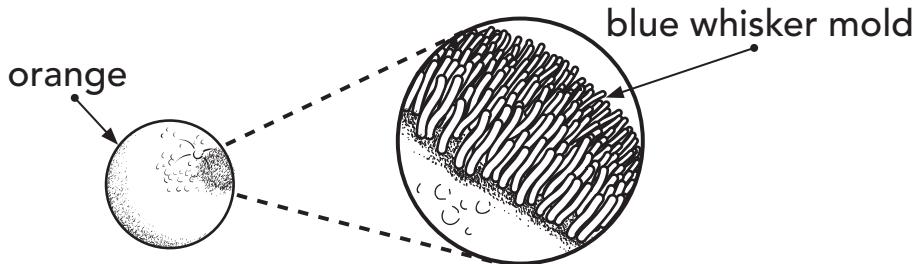
A. Fill in the chart with facts about bacteria.

Size of bacteria	
Where bacteria live	
How bacteria eat	

B. More bacteria live in your trash can than in your refrigerator. More bacteria live in a rainforest than on an iceberg. Write a sentence that explains how you think the cold affects bacteria.

**Day
3****Weekly Question****Why does garbage smell?**

You can't see bacteria without a microscope, but you've probably seen a **fungus**, which is also an important decomposer. Mushrooms are a fungus, and so are molds. **Mold** appears as the patches of green, blue, or brown "fuzz" that you see on some rotting foods. You might think fungi are plants, but they are not. Plants make their own food, but fungi, like bacteria, can't make their own food. Instead, fungi absorb the food they need from whatever they are growing on.



A. Use words from the passage to complete the sentences.

1. One type of _____ is mushrooms.
2. _____ can be green, blue, or brown.
3. Both fungi and bacteria _____ the food they need.

B. A mushroom looks like a plant, but it isn't. What makes a mushroom different?

C. Complete the analogy.

Mold is to fungus as _____.

- | | |
|--------------------------|-----------------------|
| Ⓐ dog is to cat | Ⓒ tree is to plant |
| Ⓑ bacteria is to garbage | Ⓓ mushroom is to mold |

**WEEK 1****Vocabulary****fungus**

FUN-gus
an organism
that absorbs
nutrients from
plants and dead
plant material

mold

mold
a type of fungus

**Day
4****Weekly Question****Why does garbage smell?**

Garbage cans are ideal places to find decomposers because they are warm, wet, and full of food. The decomposers have everything they need to eat and grow. And unlike dishes and kitchen counters, garbage cans aren't cleaned with soap and water, so the decomposers aren't in danger of being killed.

When decomposers break down garbage into food for themselves, they produce substances that escape into the air as gas. We notice this gas as unpleasant odors. So keep the lid on your trash can. This will be better not only for you, but for the decomposers! It keeps their environment warm and wet.

**A. Write true or false.**

1. Odors are produced when food decomposes. _____
2. Decomposers grow best in cool, dry places. _____
3. Decomposers turn garbage into larger particles. _____

B. Write whether each action described would make garbage smell better or worse.

1. rinsing out food containers _____
2. sealing rotting food in plastic bags _____
3. putting the garbage in a warm place _____

 **Talk**

Some people mix leaves, grass clippings, and leftover food to make a mixture that decomposes. This mixture, called compost, is used to enrich garden soil. Discuss with a partner some things gardeners can do to help the decomposers work.

Name _____

**Day
5**

Weekly Question

Why does garbage smell?

- A. Use the words in the box to complete the paragraph.

fungus absorb mold bacteria decomposers

Decomposers such as _____ and _____, which is a type of _____, can be found everywhere, especially in your garbage can. When garbage begins to smell, it means that _____ are breaking down large pieces of food into smaller particles. The organisms can then _____ them as food.

B. Write true or false.

1. Bacteria are a kind of fungus. _____
2. You would probably find more mold in a rainforest than in a desert. _____
3. The world would be better off without decomposers. _____

C. In your own words, explain why garbage smells.



WEEK 1

Big Idea 2



Most microorganisms do not cause disease, and many are beneficial.

Week 2

How do bacteria create cavities?

Bacteria exist not only in the air, soil, and water, but also in our mouths. Students may be surprised to learn that there are 600 or more varieties of mouth bacteria! While most are either helpful or harmless, a strain of *Streptococcus*, called *S. mutans*, converts sucrose to lactic acid, which can erode tooth enamel. If unchecked, the growth of these plaque-forming bacteria in our mouths can cause tooth decay.

Day One

Vocabulary: *plaque*

Materials: page 45

Review the information that students have learned previously about bacteria. (e.g., they are microscopic, single-celled organisms; they are decomposers; they prefer warm, wet places to live) Introduce the lesson by asking students why someone's mouth is a good place for bacteria to live. (A mouth is warm, wet, and a place where food matter goes.) Introduce the vocabulary and then direct students to read the passage and complete the activities. Go over the answers together, recording responses to activity C so that students can check their predictions on Day 2.

Day Two

Vocabulary: *acid, dissolve*

Materials: page 46

Tell students that they will find out if their predictions about how bacteria cause decay are correct. After reading the passage, compare the information with what students predicted on Day 1. Then have students complete the activities and share their responses.

Day Three

Vocabulary: *cavity, dentin, enamel, pulp*

Materials: page 47

Ask students if they have ever had to see the dentist to have a cavity filled. As you introduce the vocabulary words for the parts of a tooth, instruct students to locate and label each part on the diagram in activity A. Then, while reading the passage, have students confirm each part on the diagram as they read about it. After students have completed the page, review the answers together.

Day Four

Vocabulary: *fluoride*

Materials: page 48

Introduce the vocabulary word and allow students to share what they already know about good dental care. After students have read the passage, complete the first activity together. For the oral activity, have students first share ideas with a partner, and then ask several students to report their ideas.

Day Five

Materials: page 49

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****How do bacteria
create cavities?**

Bacteria are everywhere. In fact, you have about 10 times as many bacteria in your body as you have cells. And your mouth contains more bacteria than the human population of the world! Of the 600 or more types of bacteria in your mouth, most are helpful or at least harmless. One type of mouth bacteria, however, can damage your teeth if it grows out of control.

Bacteria are always multiplying on your teeth. Communities of bacteria combine with food debris to form a sticky, colorless coating called **plaque**. Dental plaque can contain billions of bacteria, and it is the first step in the process of tooth decay.


**Big
Idea 2**
WEEK 2**Vocabulary****plaque**

plack
a sticky coating created by bacteria growing on teeth

A. Write true or false.

1. Bacteria in your body outnumber your cells 10 to one.

2. All the bacteria in our mouths are harmful.

3. A layer of plaque protects our teeth from tooth decay.

4. Plaque contains billions of bacteria.

5. Tooth decay causes plaque to form on your teeth.

B. How do you think bacteria cause tooth decay? Make a prediction.


Big Idea 2
WEEK 2**Day 2****Weekly Question****How do bacteria create cavities?**

Since bacteria eat the same food you do, you end up feeding mouth bacteria every time you eat and drink. Bacteria in our mouths thrive on sweet or starchy foods, such as soda, cookies, and potatoes.

As decomposers, bacteria work to break down the sugars in food into smaller substances that they can absorb. As bacteria break down and eat sugars, one of the substances they produce is **acid**. This acid can **dissolve** your teeth.

A. Use the words in the box to complete the paragraph.


acid bacteria dissolve
Vocabulary**acid**

AS-id

*a substance produced by mouth bacteria***dissolve**

dih-ZOLV

to break apart

Because _____ are living things, they break down and consume food for energy. One thing that bacteria produce during the process is _____. It isn't as strong as other kinds of acid, but it can slowly _____ your teeth if it isn't removed regularly.

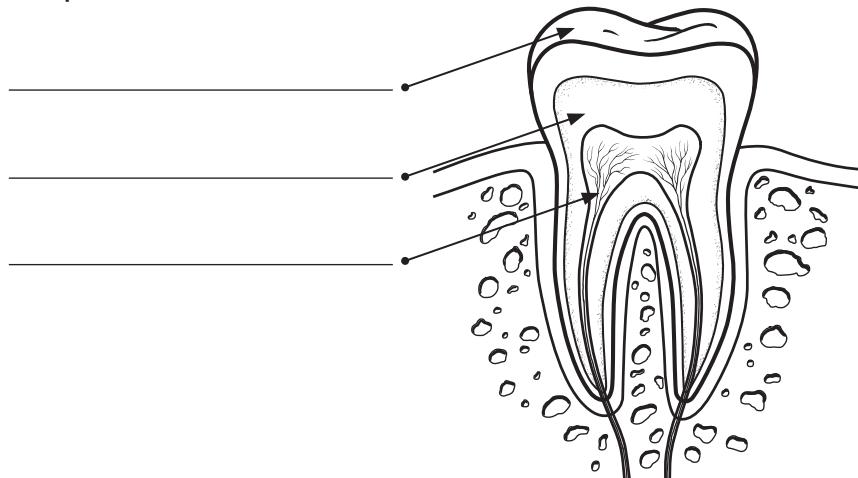
B. Fill in the missing steps that explain how bacteria cause tooth decay.



**Day
3****Weekly Question****How do bacteria
create cavities?**

The outer layer of your teeth is made of **enamel**, which is pretty strong. But when your teeth are coated with plaque, the acid made by bacteria stays in contact with the enamel. Over time, it can dissolve the enamel. The result is a **cavity**. But tooth decay doesn't stop there. The next layer of a tooth is the **dentin**. If acid starts to dissolve the dentin, your tooth will start to hurt because the tooth **pulp** will be exposed. This is the part of the tooth that is alive and has the most feeling. If you don't stop tooth decay, you might get a serious bacterial infection!

- A.** Use information from the passage to label the parts of the tooth.



- B.** Number the steps to show the order of the process of tooth decay.

- ___ The tooth enamel begins to dissolve.
- ___ Plaque traps the acid on your tooth.
- ___ If the cavity dissolves the dentin, you will get a toothache.
- ___ Bacteria produce acid when they eat sugars in your mouth.
- ___ A hole, called a cavity, develops on the tooth.

**WEEK 2****Vocabulary****cavity**KAV-ih-tee
*a hole in a tooth***dentin**DEN-tin
*the bony material that makes up most of the hard part of a tooth***enamel**ee-NAM-ul
*a tooth's hard outer coating***pulp**pulp
the soft, living part of a tooth

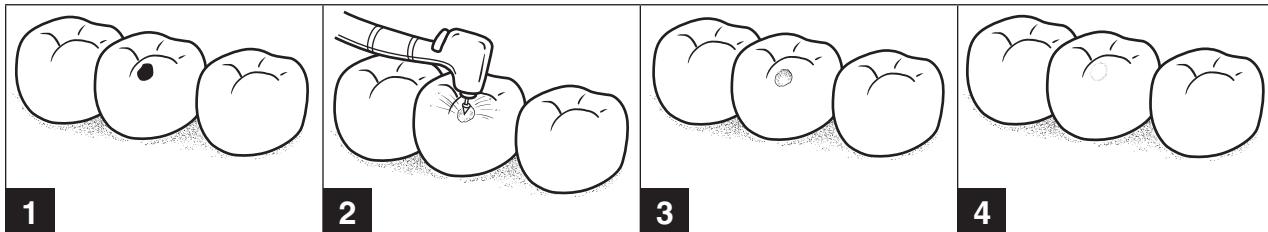
**Day
4****Weekly Question****How do bacteria create cavities?**

When we brush and floss our teeth, we remove the food that bacteria eat. We also remove some of the plaque where bacteria grow. In addition, we make our teeth stronger, because most toothpastes contain **fluoride**, a substance that strengthens enamel.

The best way to prevent cavities is to see a dentist regularly. A dentist removes hard-to-reach plaque on your teeth before a cavity gets started. If you do get a cavity, the dentist will drill out the decayed part of the tooth and then replace the cavity with a filling that is hard. The filling protects the tooth.

The pictures show what happens when a cavity is filled.

Write the letter of the correct caption for each picture.



- A dentist uses a tool to scrape away the enamel that has decayed.
- The hole is filled with a material that becomes hard.
- This is a tooth with a cavity.
- Once the decay is removed, the hole in the tooth needs to be filled.



Why is flossing so important in caring for your teeth?

Discuss this question with a partner.

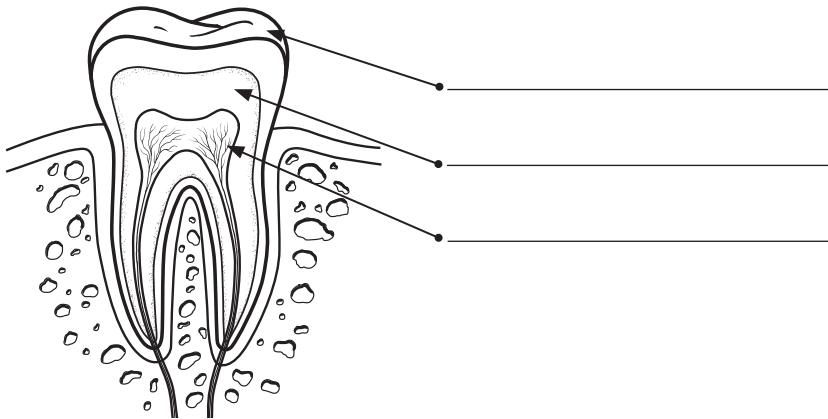
**Day
5****Weekly Question** —**How do bacteria
create cavities?**

- A. Use the words in the box to complete the paragraph.

cavity acid dissolve plaque

If you don't brush and floss after eating, bacteria in your mouth form a film called _____ and release small amounts of _____. If the plaque is not removed, the acid can _____ your teeth's enamel. Then you have a _____.

- B. Label the *dentin*, *enamel*, and *pulp*. Then complete the sentence.



The _____ is the part of the tooth that can become infected.

- C. Write true or false.

1. Enamel is the living part of a tooth. _____
2. Brushing kills bacteria in the mouth. _____
3. Bacteria make acid that causes cavities. _____
4. If you have plaque, you could get tooth decay. _____

**WEEK 2**

Big Idea 2



Most microorganisms do not cause disease, and many are beneficial.

Week 3

Are all germs bad?

Students should be familiar with the notion that germs cause illnesses such as colds or flu. This week, students learn that the germs that make us sick are comprised of bacteria and viruses. Our immune system creates antibodies that prevent viruses and harmful bacteria from reproducing. However, most bacteria are harmless, and some are necessary for our health. Our digestive system would not function properly without bacteria to decompose the food we eat. Bacteria are also helpful in many other ways, from creating energy to decomposing pollution. In fact, bacteria are so helpful that very few “germs” are actually bad.

Day One

Vocabulary: *infectious, microscopic, viruses*

Materials: page 51

Prior to the lesson, draw a chart on the board with these headings: *Types of Germs, Diseases, and Prevention*. Activate prior knowledge by asking students to share what they know about germs. After students have read the passage, help them complete the table by identifying bacteria and viruses as germs, colds and flu as diseases caused by germs, and hand-washing and covering sneezes as ways to prevent the spread of germs. After students complete the page, go over their answers together.

Day Two

Vocabulary: *antibodies, immune system*

Materials: page 52

Ask students if they have ever been around someone with a cold or the flu but didn't catch the person's illness. Tell students that they are going to read about how our bodies protect us from disease. Introduce the vocabulary; then direct students to read the passage and complete the activities. Go over the answers together to confirm students' understanding of the information.

Day Three

Vocabulary: *intestines*

Materials: page 53

After introducing the vocabulary and reading the passage, ask students if they were surprised to find out that their intestines contain bacteria. Then direct students to complete the activities.

Day Four

Materials: page 54

Tell students that they are going to learn about ways that bacteria are beneficial to the environment. If needed, explain what toxic means, as well as what sewage and water treatment plants are. After students read the passage, have them complete the activities. You may wish to have students work in small groups to complete activity B. Then have students share their descriptions of the experiment.

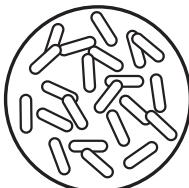
Day Five

Materials: page 55

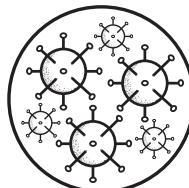
Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****Are all germs bad?**

Have you ever had a cold or the flu? The “germs” that make you sick are usually bacteria or **viruses**. Bacteria and viruses are **microscopic**. Many germs can move easily from person to person. Germs on your hands can stay on the things you touch, such as doorknobs or keyboards. Germs can enter the air when you cough or sneeze. If a healthy person comes into contact with these germs, the germs can enter his or her body and make that person sick. Viruses and bacteria that cause disease are called **infectious** microorganisms.



bacteria



virus

- A.** Write the letter to match each vocabulary word with its definition.

- | | |
|---------------------|-----------------------------------|
| 1. ____ infectious | a. invisible to the naked eye |
| 2. ____ viruses | b. causing disease |
| 3. ____ microscopic | c. tiny disease-causing organisms |

- B.** Number the steps in the correct order to show how the flu might spread from one person to another.

- ____ The person who breathes in the particles becomes sick with the flu.
- ____ A second person breathes in the virus particles through the nose.
- ____ Someone sneezes and spreads flu viruses into the air.

- C.** Write two characteristics that bacteria and viruses share.

1. _____
2. _____

**WEEK 3****Vocabulary****infectious**

in-FEK-shus
able to cause or transmit disease

microscopic

MY-kro-SKAHP-ik
too small to be seen without a microscope

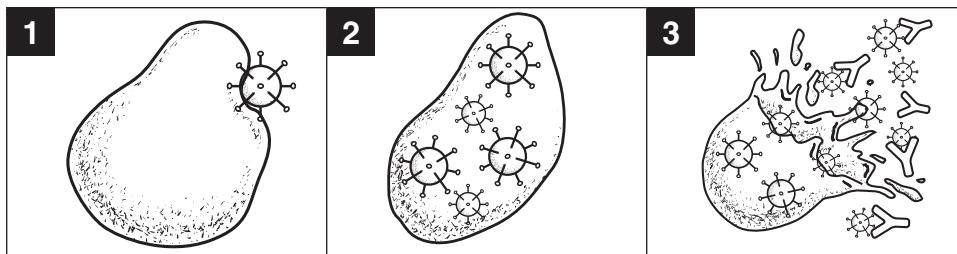
viruses

VI-russ-ehz
extremely tiny, infectious organisms

**Day
2****Weekly Question****Are all germs bad?**

Remember that viruses are tiny, infectious particles that cause disease. A virus must enter a plant cell or an animal cell to reproduce. When it enters the cell, it is infecting the plant or animal. Some viruses even infect bacteria cells! After a virus reproduces, the infected cell breaks open and the new viruses are released. These new viruses can infect more cells.

Luckily, our bodies have an **immune system** to protect us from viruses. The immune system makes **antibodies** that attach to viruses and keep them from entering our cells. Antibodies even keep some harmful bacteria from reproducing.

A. Write the letter of the caption that describes each picture.

- a. The virus reproduces inside the cell.
- b. A virus enters a cell in the body.
- c. When the viruses leave the cell, they are attacked by antibodies.

B. Use words from the passage to complete the sentences.

If it weren't for _____ created by our _____, we would get sick more often. We would be unprotected from harmful _____ that enter the cells of our bodies and _____.

Vocabulary**antibodies**

AN-tih-BOD-eez substances produced by the immune system that stick to and destroy germs

immune system

ih-MYOON SIS-tum a system in the body that defends against disease

**Day
3****Weekly Question****Are all germs bad?**

Not all bacteria cause disease. Some bacteria in air, water, and soil are important decomposers. They get their food by breaking down large particles of dead matter into nutrients that they can absorb.

You might be surprised to learn that bacteria do the same thing in our **intestines**! Our intestines contain billions of bacteria. These bacteria break down the food we eat, and cells in our body absorb the nutrients. In fact, without these bacteria, it would be very difficult for us to digest our food and get the nutrition we need to stay healthy.

Use information from the passage to answer the questions.

1. What part do bacteria play in helping you stay healthy?

2. Antibiotics are medicines that kill bacteria. They are used to treat certain diseases, such as pneumonia and strep throat. How might taking antibiotics also have a negative effect on your body?

3. Yogurt is a food that is made by adding live bacteria to milk. Why might some people like to eat yogurt when they are taking antibiotics for an infection?

**WEEK 3****Vocabulary****intestines**

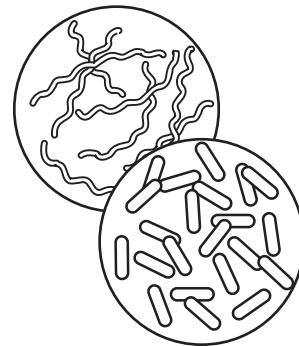
in-TES-tins
the part of the digestive system that absorbs nutrients from the food we eat

**Day
4****Weekly Question****Are all germs bad?**

Scientists are finding many uses for bacteria. Since bacteria are such good decomposers, they can be used to clean up waste. One type of bacteria digests oil. People use it to repair damage from oil spills, both in the ocean and on roads. Other bacteria are good at breaking down toxic substances in sewage, so these bacteria are used in water treatment plants.

Scientists are also exploring ways to get bacteria to produce energy. Scientists have created simple fuel cells, which are like batteries, that use bacteria to convert garbage into electricity. These fuel cells may someday recycle waste into electricity during space flights.

So are all germs bad? Not at all. In fact, tiny bacteria may soon provide the solutions to some of Earth's biggest problems.

**A. Use information from the passage to answer each question.**

1. How do bacteria clean up pollution? _____

2. How might bacteria help provide energy in the future? _____

B. Suppose a scientist was studying bacteria in her lab to find out what the bacteria could help clean up. What do you think the scientist could do to learn what the bacteria were good for? How might the scientist set up her experiment?

**Day
5****Weekly Question****Are all germs bad?****A.** Next to each clue, write the letter of the word it describes.

- | | |
|---|---|
| <input type="text"/> 1. These attack germs.
<input type="text"/> 2. Food is digested here.
<input type="text"/> 3. You can get a cold from these.
<input type="text"/> 4. able to cause disease
<input type="text"/> 5. When this is working well,
you don't get sick. | a. infectious
b. viruses
c. intestines
d. antibodies
e. immune system |
|---|---|

B. Write true or false.

1. Viruses infect cells and reproduce inside them. _____
2. There are bacteria in your intestines. _____
3. Viruses make antibodies. _____
4. Bacteria can help with digestion. _____
5. Germs block decomposers. _____
6. Germs can be passed through the air. _____

C. Describe how someone who is sick can spread his or her illness.

**WEEK 3**

Big Idea 2



Most microorganisms do not cause disease, and many are beneficial.

Week 4

Is it safe to eat moldy food?

Students may not be familiar with the biology of mold, but they have likely seen mold's effects: mildew in carpets, mold on bathroom tiles, and moldy bread and cheese. These examples are likely to reinforce the idea that all molds are bad. In this week's activities, the benefits and uses of molds are explored. Molds are not only important decomposers, but they are also used in food preparation and in the creation of antibiotics.

Day One

Vocabulary:
microorganisms,
nutritious

Materials: page 57;
water, slice of whole
wheat bread, self-
closing plastic bag

Before introducing the vocabulary words and reading the passage, lightly sprinkle water on the piece of bread and seal it inside the plastic bag. Ask students what they think the bread will look like at the end of the week. Pose the following question: *Would you get sick if you ate the bread?* Record students' responses. Then have students read and complete the activities.

Day Two

Materials: page 58

After students have read the passage and completed the activities, go over the answers together, allowing students to share past experiences with moldy foods.

Day Three

Vocabulary: yeast

Materials: page 59;
packet of dry yeast,
glass of warm water,
spoonful of sugar

Ask students if any of them have ever made or helped make bread. Explain that a necessary ingredient for making bread is yeast. Then dissolve the yeast and sugar in the warm water and tell students that the results will be examined at the end of the lesson. After completing the passage and the activities, show students the foam created by the multiplying yeast and ask them to explain what is happening based on the passage.

Day Four

Vocabulary: antibiotic,
penicillin

Materials: page 60

Ask students if any of them have ever taken antibiotics when they were sick. Tell them they are going to read about the discovery of the first antibiotic medicine and learn what mold had to do with it. Introduce the vocabulary words, and then direct students to read the passage and complete the activities.

Day Five

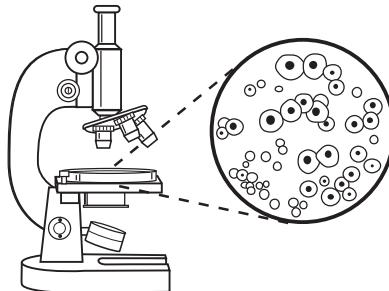
Materials: page 61;
bread from the
beginning of the week

Have students complete the page independently. Then review the answers together. Invite students to examine the bread you stored in the bag on Day 1 and discuss the mold growing on it.

**Day
1****Weekly Question****Is it safe to eat moldy food?**

Have you ever been about to eat a slice of bread or cheese when you noticed fuzzy green spots all over it? Yuck!

You can find mold almost anywhere, from spoiled food to bathroom walls. A patch of mold contains millions of **microorganisms**. These microorganisms are all around us, and when they come into contact with wet surfaces, they start to reproduce. Like all fungi, mold is a decomposer that breaks down substances in order to get nutrients. Sometimes, mold finds sources of nutrients that are surprising. You might not think your shower curtain is nutritious, but to mold it is good food!



A patch of mold contains millions of microorganisms.

A. Use information from the passage to complete the sentences.

1. The _____ that create mold reproduce when they come into contact with water.
2. Mold can decompose many things, as long as there is water and a source of _____.

B. Make a check next to all the places where mold can grow.

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> clean, dry towel | <input type="checkbox"/> locker room |
| <input type="checkbox"/> leaking water pipe | <input type="checkbox"/> hot oven |
| <input type="checkbox"/> sealed jar of mayonnaise | <input type="checkbox"/> garbage can |

**Vocabulary****microorganisms**

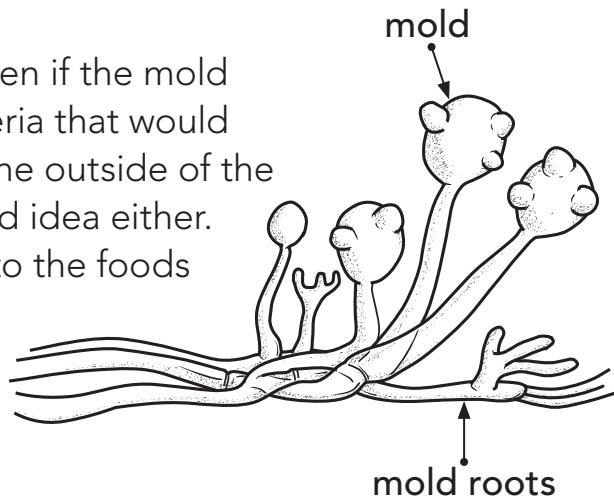
MY-kro-OR-guh-niz-emz

*living organisms
that are visible
only through
a microscope***nutritious**new-TRISH-us
full of nutrients

**Day
2****Weekly Question****Is it safe to eat moldy food?**

Certain molds are used to make some kinds of cheese. If you've ever eaten bleu cheese, you ate one of the *Penicillium* molds. The blue or green color inside the cheese is from mold! During the cheese-making process, either the mold is added to the milk, or the cheese is ripened in an area where there is a lot of the right kind of mold in the air.

Not all molds should be eaten, however. Even if the mold itself might not be harmful, it can contain bacteria that would make you sick. Some people cut the mold off the outside of the food and then eat the food, but this isn't a good idea either. Mold sends out threadlike roots that burrow into the foods they grow on, so mold you can't see may be inside the food. If your fruit or bread has mold on it, throw it out!

**A. Write true or false.**

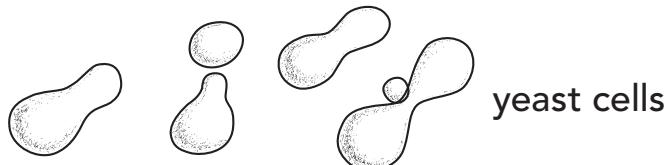
1. You can't always see mold inside food. _____
2. Mold is allowed to grow in some cheeses on purpose. _____
3. All kinds of mold are all right to eat. _____

B. Answer the questions.

1. When is it safe to eat food that has mold? _____
2. What is dangerous about moldy food, even if you remove the spots of mold? _____

**Day
3****Weekly Question****Is it safe to eat moldy food?**

Yeast is a common fungus that is used to make bread. Like most fungi, yeast grows best in warm, moist places. When yeast is added to flour and water, the tiny organisms start to grow and divide. Yeast gets food and water from the bread dough, and as the yeast organisms multiply, they produce carbon dioxide as waste. This gas makes the bread dough get puffy and rise. Bread dough can expand to twice its size in just over an hour. When the loaves of dough are baked in a hot oven, the yeast is killed, and the bread stops rising.



Big Idea 2

WEEK 4**Vocabulary****yeast**

yeest

a microscopic fungus used to make bread and other foods

A. Number the sentences in the correct order to explain how yeast is used in bread making.

- ___ The gas bubbles are trapped in the dough, making it expand.
- ___ Yeast feeds on the dough and multiplies.
- ___ When the bread dough is baked, the yeast stops growing and the bread stops rising.
- ___ As yeast feeds, it produces carbon dioxide gas.

B. Complete the sentences.

1. Bread dough will not rise properly in a cold room because _____.

2. Bread is light and fluffy because _____.

3. Bread does not keep rising while it is being baked because _____.

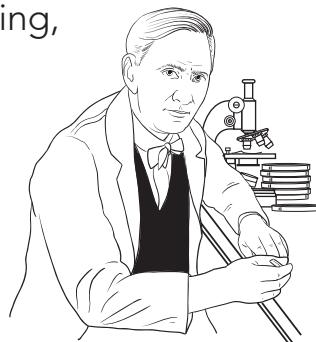
Day 4

Weekly Question

Is it safe to eat moldy food?

Do you know the story of Alexander Fleming, the scientist who discovered **penicillin**?

Dr. Fleming returned from a trip to find that a kind of mold had destroyed the bacteria he was using in an experiment. Dr. Fleming thought that maybe a chemical from the mold could destroy bacteria in people, too. In this way, he discovered the first **antibiotic** medicine. Today, molds are the source for antibiotics used to treat infections.



**Alexander Fleming,
Scottish biologist
1881–1955**

Vocabulary

antibiotic

AN-tih-by-AH-tick
*a medicine that
stops bacteria
from growing
in the body*

penicillin

PEN-ih-SILL-in
*an antibiotic
produced by
mold*

- A. Write the vocabulary word that is described by each clue.

1. medicine that kills bacteria _____
 2. the first antibiotic _____
 3. penicillin is an example _____
 4. made from a kind of mold _____

- B.** Fill in the bubble next to the answer that best completes each sentence.

1. Dr. Fleming had the idea for penicillin when _____.
Ⓐ he left for a trip Ⓑ bacteria destroyed his lab Ⓒ he wanted to treat an infection Ⓓ the bacteria he was studying died
 2. Dr. Fleming was a good scientist because he _____.
Ⓐ took many trips Ⓑ realized the importance of the mold killing the bacteria Ⓒ invented mold and bacteria Ⓓ wanted to change the world with his experiments

**Day
5****Weekly Question****Is it safe to eat moldy food?**

- A. Use the words in the box to complete the paragraph.

penicillin nutritious microorganisms
 yeast fungus antibiotic

WEEK 4

Mold and _____ are each a type of

_____. A patch of mold can consist of millions

of _____. Mold can grow in carpets and on walls.

All it needs is water and a source of _____ food.

Alexander Fleming discovered the first _____ medicine when he found mold growing on his samples of bacteria.

Something in the mold had killed the bacteria. The substance

Dr. Fleming identified is now called _____, and it is still used today to treat infections.

B. Write true or false.

1. Yeasts are microorganisms. _____
2. Molds grow best where it is hot and dry. _____
3. Molds are decomposers. _____
4. Molds grow only in houses. _____
5. Antibiotics kill bacteria. _____

**Unit
Review****Comprehension****Microorganisms****Big
Idea 2****WEEK 5****A.** Fill in the bubble next to the correct answer.

1. Both _____ and _____ are a type of fungus.
Ⓐ mold, viruses Ⓒ viruses, yeast
Ⓑ bacteria, mold Ⓓ mushrooms, mold

2. What is the main job of our immune system?
Ⓐ It protects us from illness. Ⓒ It makes antibiotics.
Ⓑ It helps us digest food. Ⓓ It helps repair cavities.

3. Which of these is a product of bacteria that can damage teeth?
Ⓐ pulp Ⓒ acid
Ⓑ dentin Ⓓ enamel

4. Which decomposer is used to make antibiotics such as penicillin?
Ⓐ bacteria Ⓒ yeast
Ⓑ mushroom Ⓓ mold

5. Which of these is NOT part of a tooth?
Ⓐ enamel Ⓒ dentin
Ⓑ plaque Ⓓ pulp

B. Name two useful things that bacteria and fungi do.

1. _____

2. _____

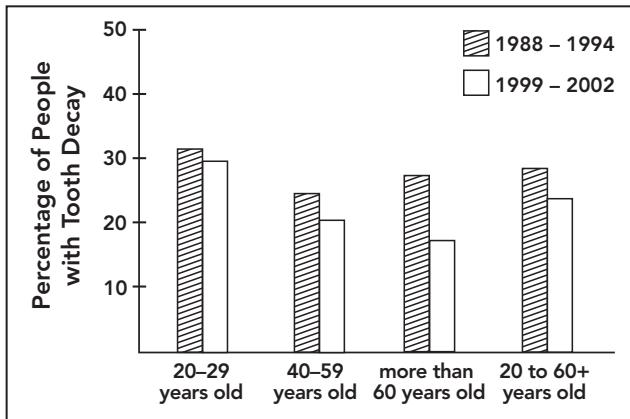
**Unit
Review****Vocabulary****Microscopic Match****Daily Science****Big
Idea 2****WEEK 5**

Next to each word, write the letter of the correct definition.

- | | |
|---|--|
| <p><input type="checkbox"/> 1. decomposers</p> <p><input type="checkbox"/> 2. absorb</p> <p><input type="checkbox"/> 3. bacteria</p> <p><input type="checkbox"/> 4. mold</p> <p><input type="checkbox"/> 5. fungi</p> <p><input type="checkbox"/> 6. plaque</p> <p><input type="checkbox"/> 7. antibiotic</p> <p><input type="checkbox"/> 8. acid</p> <p><input type="checkbox"/> 9. dissolve</p> <p><input type="checkbox"/> 10. cavity</p> <p><input type="checkbox"/> 11. dentin</p> <p><input type="checkbox"/> 12. enamel</p> <p><input type="checkbox"/> 13. pulp</p> <p><input type="checkbox"/> 14. infectious</p> <p><input type="checkbox"/> 15. microscopic</p> <p><input type="checkbox"/> 16. virus</p> <p><input type="checkbox"/> 17. antibodies</p> <p><input type="checkbox"/> 18. immune system</p> <p><input type="checkbox"/> 19. intestines</p> <p><input type="checkbox"/> 20. nutritious</p> <p><input type="checkbox"/> 21. yeast</p> <p><input type="checkbox"/> 22. microorganism</p> | <p>a. full of nutrients</p> <p>b. able to cause disease</p> <p>c. an organism that reproduces inside the cells of another life-form</p> <p>d. a “fuzzy” kind of fungus</p> <p>e. substances produced by the body to destroy germs</p> <p>f. the living tissue of a tooth</p> <p>g. a hole in a tooth caused by bacteria</p> <p>h. a substance produced by bacteria</p> <p>i. a fungus used to make bread</p> <p>j. organisms that break down things into smaller parts for food</p> <p>k. an organism, such as bacteria, that can be seen only under a microscope</p> <p>l. the body parts where digestion happens</p> <p>m. what the body uses to protect itself against illnesses</p> <p>n. mushrooms, molds, and yeast</p> <p>o. food and bacteria stuck to teeth</p> <p>p. the middle layer of a tooth</p> <p>q. single-celled decomposers</p> <p>r. to break down completely</p> <p>s. a medicine used to kill bacteria</p> <p>t. a tooth’s hard outer layer</p> <p>u. too small to see without a microscope</p> <p>v. to take in</p> |
|---|--|

**Unit
Review****Visual Literacy****Away with Decay****Daily Science****Big
Idea 2****WEEK 5**

Scientists study all kinds of things in order to better understand people's behavior and health. For example, scientists studied how many people in the United States had some sort of tooth decay between 1988 and 1994, and again between 1999 and 2002. The graph below shows the percentage of the U.S. population that had tooth decay during these two time periods.



Use the graph to answer the questions.

1. Which age group had the highest percentage of people with tooth decay?

2. Which age group had the biggest DECREASE in the percentage of people with tooth decay?

3. Which age group had the LEAST amount of change in the percentage of people with tooth decay?

4. Overall, is tooth decay becoming a bigger or a smaller problem? How can you tell?

Name _____

**Unit
Review****Hands-on Activity****Farming “Fuzz”****Big
Idea 2****WEEK 5**

Mold is everywhere. The type of mold that grows depends on what the food source is. Try this experiment to see if you can grow different types of mold.

What You Need

- 4 sealable plastic bags or clear containers
- a piece of bread, an orange peel, a piece of carrot, and a piece of cheese
- water
- damp paper towels

1. Place each piece of food in a different bag or container, add a damp paper towel, and seal the bag or container.
2. Place the bags or containers somewhere warm, but not near anything too hot (such as a heater or oven).
3. Wait a week to see what grows. BUT BE CAREFUL. Some people are very allergic to mold, so you must keep the bags or containers closed at all times.
4. Look at your mold and fill in the chart below.

What Did You Discover?

	Bread mold	Orange peel mold	Carrot mold	Cheese mold
Color				
Size of moldy area				
Texture				

Which mold was the most interesting to you? Why?

Big Idea 3



Both slow and rapid processes—from erosion to earthquakes—shape and reshape the Earth's surface.

Key Concept

Earth's surface is constantly changing.

National Standard

The surface of Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

In this unit, students learn that the Earth's surface is shaped by slow processes—such as wind, water, and ice—and rapid processes—such as volcanic eruptions and earthquakes. In this unit, students will learn the following:

- what created the Grand Canyon;
- how the movement of glaciers created different landforms;
- what happens when volcanoes erupt; and
- why earthquakes occur.

Teacher Background

Earth's surface is enormously varied and continually changing. Mountains, valleys, islands, and canyons are some of the features that make up our planet's landscape. These landforms are created and affected by earthquakes, volcanoes, wind, water, and ice.

The emergence of landforms is also related to processes occurring deep within Earth's crust. Earthquakes and volcanoes are two expressions of these processes. Active volcanoes and earthquakes are constantly at work, creating new features and destroying old ones.

Once landforms emerge, they are shaped and reshaped by forces of weather and erosion. Recognizable geographic features, such as the Grand Canyon, were created over millions of years of weathering and erosion.

For specific background information on each week's concepts, refer to the notes on pp. 68, 74, 80, and 86.

Unit Overview

WEEK 1: How was the Grand Canyon formed?

Connection to the Big Idea: Students learn how the slow processes of weathering and erosion formed Arizona's Grand Canyon over a period of five to six million years. They learn that forces are still at work today, changing the canyon's features. Students then find out how humans affected the Grand Canyon ecosystem by building the Glen Canyon Dam.

Content Vocabulary: *channels, ecosystem, erosion, expanded, uplifted, weathering*

WEEK 2: Do glaciers really move?

Connection to the Big Idea: Students learn how glaciers form and what causes these "rivers of ice" to move. They also discover that in the past, glaciers carved out familiar landforms such as Yosemite Valley and the Great Lakes. Now, however, glaciers are retreating, which will have its own effects on the land in the future.

Content Vocabulary: *basin, glacier, meltwater, moraines, retreat*

WEEK 3: What makes a volcano erupt?

Connection to the Big Idea: To understand how volcanoes erupt, students first explore Earth's structure. They learn that lava comes from hot, soft rock in Earth's mantle, which turns into liquid magma as it nears the surface. Students discover that not all volcanic eruptions are explosive, and that steady flows over a long time can create landforms such as the Hawaiian Islands.

Content Vocabulary: *chamber, core, crust, debris, lava, magma, mantle, vent*

WEEK 4: What causes earthquakes?

Connection to the Big Idea: Earth's crust is not one piece but broken up into a dozen or so plates. Students learn that the motion of these plates as they move past, into, or away from each other along plate boundaries, or faults, is what causes earthquakes. Students read about the tool scientists use to measure the intensity of earthquakes and about the effects of earthquakes of varying magnitudes.

Content Vocabulary: *boundary, fault, magnitude, plates, seismometer*

WEEK 5: Unit Review

You may choose to do these activities to review the forces that shape Earth's surface.

p. 92: Comprehension Students answer multiple-choice questions about the key concepts of the unit.

p. 93: Vocabulary Students complete a crossword puzzle to show they understand unit vocabulary.

p. 94: Visual Literacy Students use an illustrated chart to gather information about three types of volcanoes.

p. 95: Hands-on Activity Students use "sandy" ice cubes to investigate the effect that glacial movement has on landforms. Review materials and instructions on the student page ahead of time.

Big Idea 3



Both slow and rapid processes—from erosion to earthquakes—shape and reshape Earth’s surface.

Week 1

How was the Grand Canyon formed?

Plunging a mile deep into the desert landscape, Arizona’s Grand Canyon exposes one of the most studied rock sequences in the world. Students discover that this spectacular natural landform is evidence that our planet has been, and continues to be, shaped by the geological processes of weathering, erosion, deposition, and uplift. This week, students learn that the walls of the Grand Canyon preserve a record of Earth’s history going back two billion years. They also learn that in some sections of the canyon, human activity is changing geological processes at work today.

Day One

Vocabulary: erosion, weathering

Materials: page 69; pictures of the Grand Canyon, U.S. map

Show students pictures of the Grand Canyon and help students locate it on a map. Ask if anyone has visited the canyon and, if so, invite them to describe what they saw. Introduce the vocabulary and then have students read the passage. For activity B, remind students that *erosion* means rock is carried away, while *weathering* means that rock is broken down. Discuss the answers and make sure students understand each term.

Day Two

Vocabulary: channels, uplifted

Materials: page 70

When introducing the vocabulary, help students understand the meaning of *channels* by talking about what they have observed when they have seen rainwater flowing downhill. (It makes grooves, or channels, in the ground.) Then, as students read the passage, refer to each panel of the drawing that illustrates the text. You may also want to explain that the forces within Earth that caused uplifting are the same forces that cause earthquakes, which students will learn more about in Week 4 of this unit.

Day Three

Vocabulary: expanded

Materials: page 71

Review the terms *erosion* and *weathering* from Day 1. Instruct students to look for examples of these forces as they read the passage. Point out the illustrations below the passage and encourage students to refer to them as they read. During the oral activity, prompt students with examples you have seen if they are having difficulty thinking of examples on their own.

Day Four

Vocabulary: ecosystem

Materials: page 72

After introducing the vocabulary word, tell students that they will read about how humans have changed the Grand Canyon ecosystem. Have students read the passage and then read each scenario in the activity. If needed, discuss the problems as a class before students write their responses.

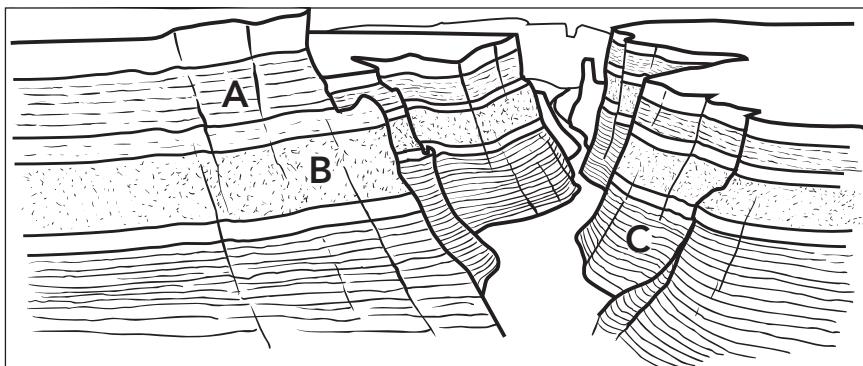
Day Five

Materials: page 73

Have students complete the page independently. Then review the answers together.

**Day
1****Weekly Question****How was the Grand Canyon formed?**

One of Earth's most spectacular natural features is the mile-deep Grand Canyon in northern Arizona. It is also one of the best examples of **erosion**, where rock or earth is carried away, and of **weathering**, where rock is worn away or broken down. Looking from the rim of the canyon to the Colorado River below, visitors can see many layers of different kinds of rock. Some of the rocks are as much as two billion years old!

**WEEK 1****Vocabulary****erosion**

ee-ROH-zhun
the moving of
rocks and soil by
water, wind, ice,
or gravity

weathering

WEETH-er-ing
the breaking
down or wearing
away of rocks by
water or wind

- A.** Look at the drawing above. Write the letter of the layer that answers each question.

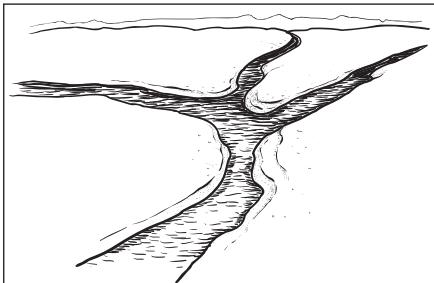
1. Which layer of rock was probably formed 2 billion years ago? _____
2. Which layer of rock was formed most recently? _____

- B.** Write whether each feature described below is due to **weathering** or **erosion**.

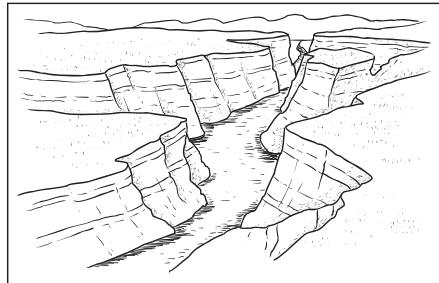
1. a river's bank becomes wider _____
2. canyon walls made wider by windblown sand _____
3. jagged rocks that have become smooth _____
4. a rock found a long way from others like it _____

Day 2**Weekly Question****How was the Grand Canyon formed?**

The Grand Canyon began forming five or six million years ago, after forces within Earth **uplifted** land and formed the Rocky Mountains. When rain fell, water ran down the sloping land and began to erode the soil, making **channels**. These channels eventually became the path for the Colorado River. Over millions of years, the Colorado River kept eroding the soil and carving out the canyon.



5 million years ago



Today

Vocabulary**channels**

CHAN-ulz

cuts in the ground made by moving water, such as a river or stream

uplifted

UP-lift-id

pushed up

A. Number in order the events that formed the Grand Canyon.

- ___ Uplift began forming mountains.
- ___ As the channels got bigger and deeper, a river formed.
- ___ Eventually, a deep canyon was formed with a river at the bottom.
- ___ Water running off the land cut channels in the ground.

B. Check the box next to the thing in each pair that formed first.

1. Rocky Mountains **or** Colorado River
2. Colorado River **or** channels in the ground

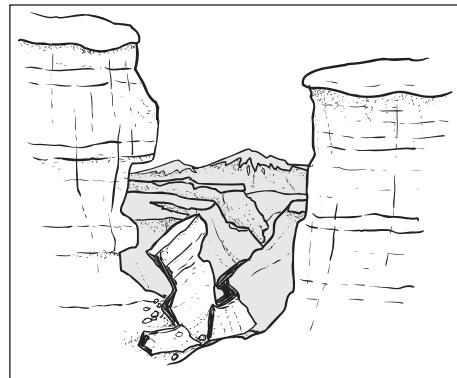
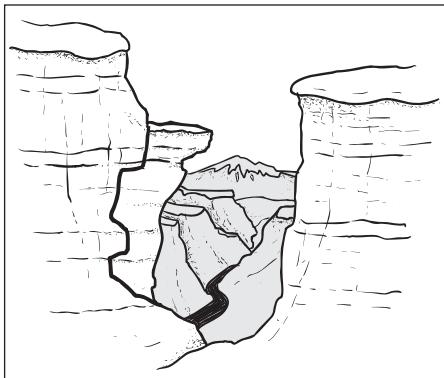
C. Use the vocabulary words to complete the sentences.

1. Mountains are formed when land is _____.
2. Canyons start out as _____ carved by water.

**Day
3****Weekly Question** —**How was the Grand Canyon formed?**

You know that erosion from the Colorado River was the major force that formed the Grand Canyon. But water also played a role in forming the canyon. Water seeped into cracks in the rocks and froze in the winter. When the water froze, it **expanded** and pushed the rocks apart. Then the pull of gravity caused sections of the canyon wall to collapse, making the canyon wider. Wind also shaped the canyon. Bits of sand, blown by wind, chipped away at the canyon walls and weathered the rock. All these forces are at work even today, continually changing the canyon.

- A.** Study the drawings. Underline the sentences in the passage that describe what the pictures show.



- B.** List the forces of erosion and weathering mentioned in the passage.

1. _____
2. _____
3. _____
4. _____



What have you seen in nature that is the result of erosion or weathering? Think about places you have been or have seen in books or on television.

**WEEK 1****Vocabulary**

expanded
ek-SPAN-ded
got larger