4th Grade Science

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.

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.

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

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.

Name _____

Daily Science
Big Idea 1
WEEK 1

Weekly Question

Day 1

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.

Vocabulary

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

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.

Talk

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

Name _____

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

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

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

_____

Daily Science
Big Idea 1
WEEK 1

Vocabulary

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

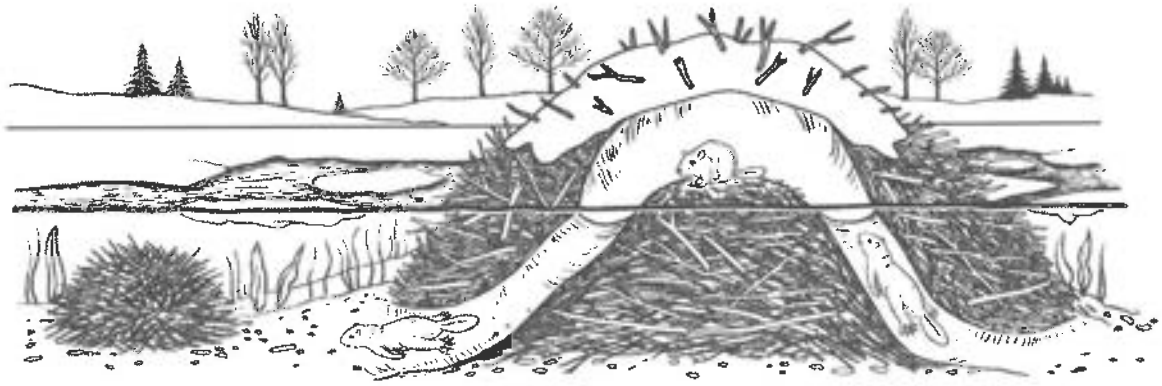
Name _____

Day 3

Weekly Question

Why do beavers build dams?

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.

_____

_____

Name _____

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.**

1. When _____ builds up, it can make streams shallower.
2. _____ is a problem for farmers because water carries away the soil they need to grow crops.
3. 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

Name _____

Day 5

Weekly Question

Why do beavers build dams?

A. Write the word that answers each clue.

lodge **habitat** **erosion** **wetland** **silt**

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. _____

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.

Name _____

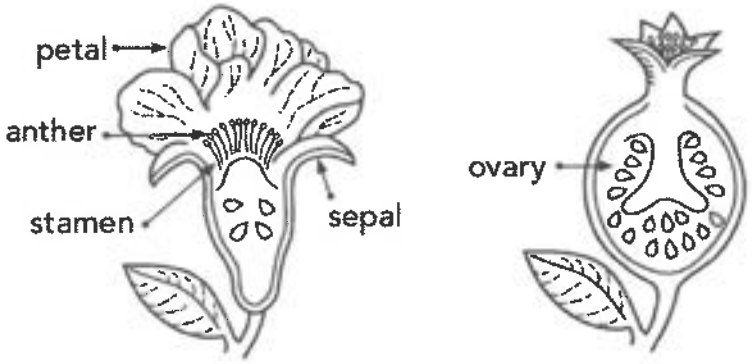
Daily Science
Big Idea 1
WEEK 2

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.

_____

_____

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 males 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

Name _____

Daily Science
Big Idea 1
WEEK 2

Weekly Question

Day 2

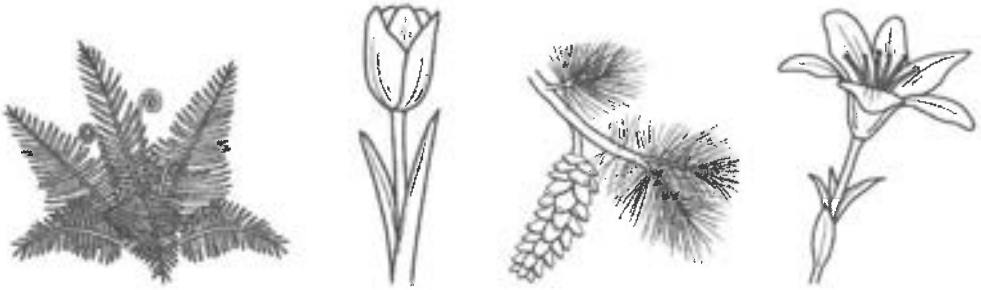
Why do some plants have fruit?

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.

Vocabulary

angiosperms
AN-jee-oh-SPERMS
plants that produce flowers

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.

_____

_____

Name _____

Daily Science
Big Idea 1
WEEK 2

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.

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.

_____

_____

Name _____

Daily Science
Big Idea 1
WEEK 2

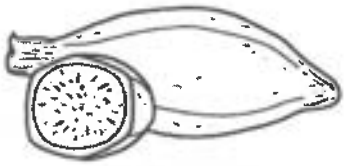
Day 4

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**

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.

_____

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.

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.

Name _____

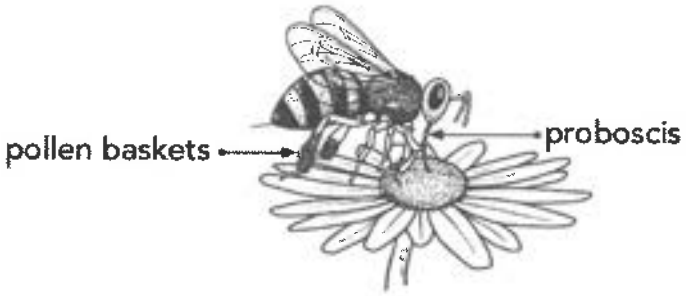
Day 1

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.



Daily Science
Big Idea 1
WEEK 3

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 help a bee survive.

1. long tongue _____

2. fuzzy body _____

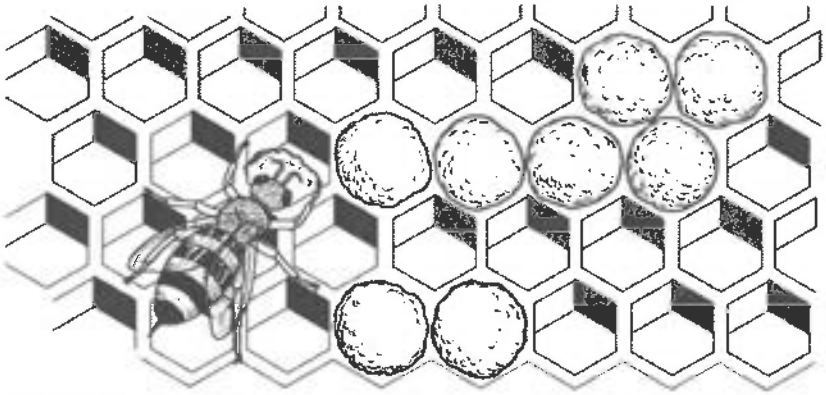
Name _____

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.

Daily Science Big Idea 1 WEEK 3

Vocabulary

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

Name _____

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.

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

honeybee

bumblebee

_____

_____

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		

Name _____

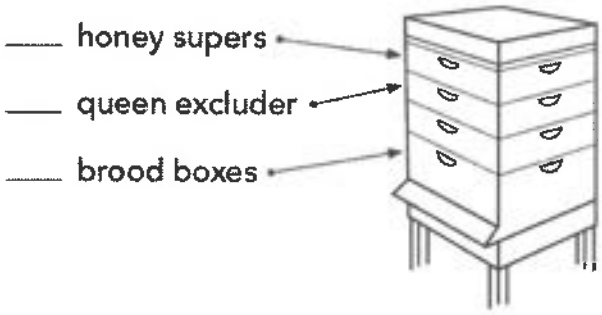
Day 4

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?

Name _____

Day 5

Weekly Question

Do all bees make honey?

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?

_____

_____

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.

Answer Key

Big Idea 1: Week 1 • Day 1

A. 1. true 3. false
2. false 4. true
B. 1. dams 3. safety/shelter/a hiding place
2. deep
TALK: Answers will vary.

Big Idea 1: Week 1 • Day 2

A. 

Answers will vary—e.g., The lodge walls are thick and are made from mud, sticks, and logs.
B. 1. lodge 3. entrance; underwater
2. pond
C. Answers will vary—e.g., Because those animals can't or won't hunt in the water.

Big Idea 1: Week 1 • Day 3

A. Beavers use logs they gather in the summer as food during the winter.
B. Beavers eat trees and use them to build their lodges and dams.

Big Idea 1: Week 1 • Day 4

A. Answers will vary.

Positive Effects	Negative Effects
create new wetland habitats	destroy trees
slow soil erosion provide homes for beavers	cause silt to build up flood the land behind them

B. 1. silt 3. wetland
2. Erosion

Big Idea 1: Week 1 • Day 5

A. 1. silt 4. wetland
2. habitat 5. erosion
3. lodge
B. Dams create ponds that are deep enough not to freeze solid in winter.
Dams create ponds that beavers can hide in.
C. 1. false 3. true 5. false
2. false 4. true

Big Idea 1: Week 2 • Day 1

A. 3, 1, 4, 2
B. It would hurt the plant's ability to spread because the plant could not make seeds.

Big Idea 1: Week 2 • Day 2

A. 
These plants are angiosperms because they have flowers.
B. 1. angiosperms
2. pollinate
3. pollinators/bees/insects
C. Flowers attract pollinators. When flowers are pollinated, they produce fruit and seeds to make new angiosperms.

Big Idea 1: Week 2 • Day 3

A. 1. seeds 3. scatter
2. digestive 4. fruit
B. 1. true 2. false 3. false
C. Answers will vary—e.g., People plant seeds. People feed seeds to animals. People throw seeds on the ground when they finish eating.

Big Idea 1: Week 2 • Day 4

A. 1. sterile 2. mutation
B. Answers will vary.

Seedless fruit that you like to eat	Fruit that you wish didn't have seeds
Answers will vary—grapes, blueberries, watermelons, oranges, pineapple	Answers will vary—cherries, raspberries, apples, mangoes, strawberries

Big Idea 1: Week 2 • Day 5

A. 1. mutation 4. sterile
2. pollination 5. Pollen, ovary
3. angiosperms
B. 4, 1, 5, 2, 3
C. Answers will vary—e.g., Angiosperms have flowers and make seeds.

Big Idea 1: Week 3 • Day 1

A. proboscis, nectar
B. 1. allows the bee to get nectar that is hard to reach
2. allows the bee to collect pollen easily

Big Idea 1: Week 3 • Day 2

A. Answers will vary—e.g., Worker bees build the honeycomb with wax from their glands. Worker bees mold the honeycomb with their mouths and feet.
B. 3, 1, 4, 2

Big Idea 1: Week 3 • Day 3

A. Answers will vary—e.g., The honeybee is smaller. The bumblebee is larger. Both have wings and six legs. The bumblebee has a fatter back end. The bumblebee has more hair.
B.

	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 its food	✓	✓

Big Idea 1: Week 3 • Day 4

A. b, a, c
TALK: Answers will vary.

Big Idea 1: Week 3 • Day 5

A. a, c, b
B. 4, 1, 5, 2, 6, 3
C. 1. Bees pollinate flowers.
2. Bees pollinate crops.
3. Bees make honey.
D. Answers will vary—e.g., Only some bees make honey. Honeybees make a lot of honey.

Big Idea 1: Week 4 • Day 1

A. 4, 1, 3, 2
B. Birds would hoard sunflower seeds because seeds last longer than worms do.
C. Animals in tropical places wouldn't need to hoard food because the plants grow all year-round.

Big Idea 1: Week 4 • Day 2

A. Fat provides energy.
Body fat can be stored for later use.
B. winter, food, fat, more, energy

Big Idea 1: Week 4 • Day 3

1. dormant 3. dormant
2. hibernating 4. hibernating

Big Idea 1: Week 4 • Day 4

A. 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.
B. The wolves migrate, too.

Week 4

Where do animals get food in the winter?

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

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, hibernate*

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.

Name _____

Daily Science
Big Idea 1
WEEK 4

Day 1

Weekly Question

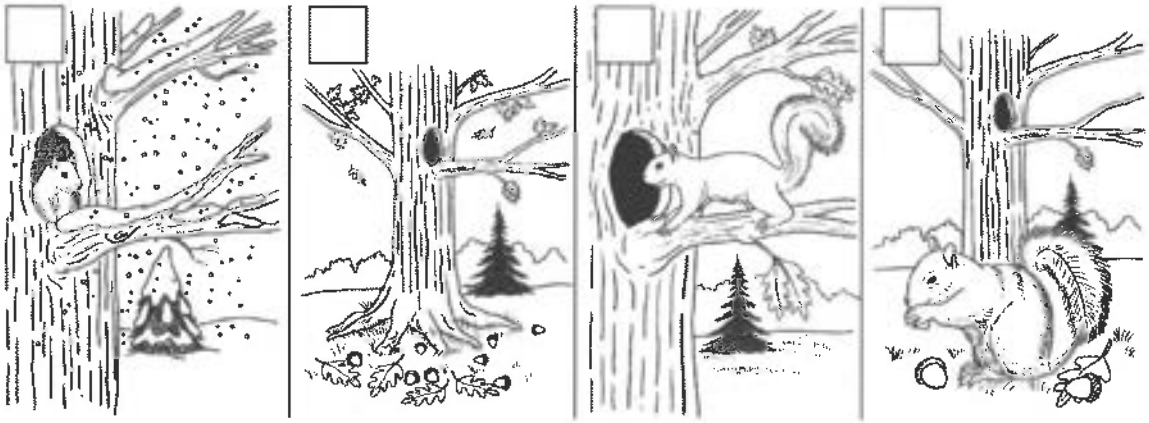
Where do animals get food in the winter?

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.

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?

_____

Name _____

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.

Name _____

Daily Science
Big Idea 1
WEEK 4

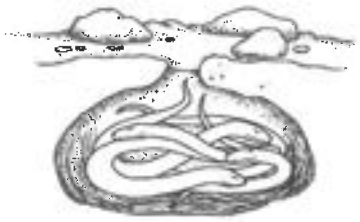
Day 3

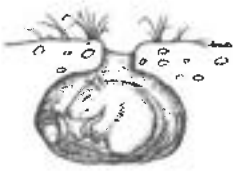
Weekly Question

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.





Vocabulary

dormant
DOR-munt
inactive in order to save energy

hibernate
HI-bur-nayt
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. _____

Name _____

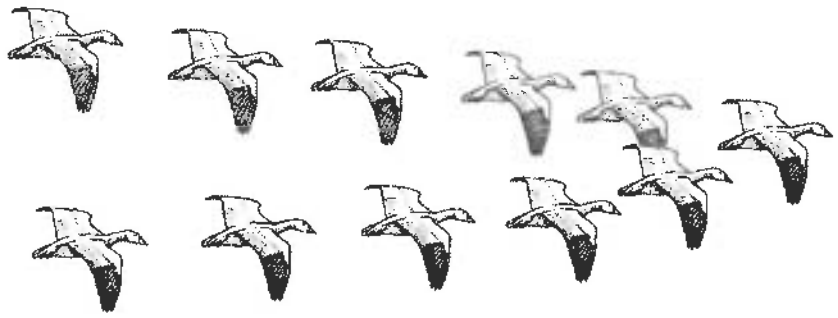
Daily Science Big Idea 1 WEEK 4

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.

Vocabulary

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

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?

_____

Name _____

Daily Science
Big Idea 1
WEEK 4

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

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

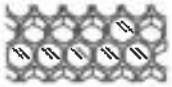

wolf


squirrel


honeybee


acorns


branches


honey


caribou