

Unit 2

Biological Sciences

Earth is home to many different living things. In this unit, you will learn ways living things are alike and different. You will also learn how different organisms interact. Finally, you will learn what can happen when their environments change.

There are seven lessons in this unit:

- 1 Similarities Between Plants and Animals** Plants and animals are living things. So, they have things in common. In this lesson, you will learn what plants and animals need to stay alive. You will also learn how they meet their needs in similar ways.
- 2 Differences Between Plants and Animals** In most cases, you can easily tell a plant from an animal. They differ in several important ways. In this lesson, you will learn how plants and animals use different kinds of body structures to meet their needs.
- 3 Adaptations** Plants and animals live in many different places. They have characteristics that help them survive in those places. In this lesson, you will learn why plants and animals that live in one place may look very different from those in another place.
- 4 Inherited Characteristics** Many living things look like their parents. This is because parents pass many of their characteristics to their offspring. In this lesson, you will learn what kinds of characteristics a living thing gets from its parents.
- 5 Ecosystems** All of the living and nonliving things in an area make up the parts of an ecosystem. The organisms there play various roles. In this lesson, you will learn about those roles. You will also learn how the parts of an ecosystem interact.
- 6 Natural and Human Changes to Ecosystems** Like all systems, an ecosystem is made of many parts. If one part changes, it can affect the other parts. In this lesson, you will learn about changes that happen naturally. You will also learn about changes that human activities can cause.
- 7 Agriculture** Many things people use every day come from plants and animals. These plants and animals are often raised on farms. In this lesson, you will learn how humans use farming to meet their needs. You will also learn how farming affects the environment.

Similarities Between Plants and Animals

Anchor and Eligible Content S4.B.1.1.1–5

Think about the things that live on Earth. Living things can look and act very differently. You know that a maple tree is different from a rabbit. However, like all living things, a maple tree and a rabbit also have similarities.

What Is an Organism?

Scientists call all living things **organisms**. Organisms can look very different from one another. However, all organisms have certain characteristics. They all use food for energy. They all can grow. Every kind of living thing can reproduce. Living things **reproduce** to make more of their kind. Living things can also respond to their environment. For example, a sunflower can turn to face the sun. A squirrel can go into a burrow to get out of the rain.

Organism is another word for *living thing*.

When organisms reproduce, they make offspring that are like themselves.

Needs of Plants and Animals

Plants and animals have the same basic needs. They need water, food, air, and a place to live. Like all living things, plants and animals need energy. They use energy to grow, reproduce, and stay alive. They get energy from their environment. Plants and animals must live in places that have enough water, food, and air to meet their needs.

Plants and animals are not the only kinds of living things. Mushrooms are living things called *fungi*. Germs are living things called *bacteria*.



All plants and animals need water.

Plants and animals need water to survive. They need water to help move materials inside their bodies. Most animals take in water through their mouths. Most plants take in water through their roots.

Organisms get energy from food.

All plants and animals also need food. **Food** is anything that gives an organism energy. Plants and animals need energy to carry out their functions. For example, animals need energy to breathe and move. Plants need energy to grow and make seeds. Plants and animals cannot stay alive without energy from food. However, they must break down food into tiny pieces before they can get energy.

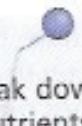
from it. In animals, the process of breaking down food is called **digestion**.

Plants and animals need oxygen to live. They also need to get rid of gases their bodies produce that they do not need. They have special structures to help them do this. Plants have tiny holes in their leaves through which gases move in and out. Animals have lungs or gills to take in and get rid of gases. This process is called **respiration**.

Which of these is the source of energy for a living thing?

- A oxygen
- B air
- C food
- D water

All living things need air and water. However, oxygen, air, and water are not the source of energy for an organism. So choices A, B, and D are incorrect. Living things get energy from food. The correct choice is C.



Animals break down food into nutrients in a process called **digestion**.

Respiration is the exchange of gases between organisms and their environments.

Plants do not get oxygen only from the air. They also produce oxygen from processes inside their bodies.

Structure and Function in Plants and Animals

Each plant and animal is a system. Like all systems, plants and animals are made up of different **structures**, or parts. An organism's body structures carry out different functions for the organism. A structure's **function** is the job it does. An organism's structures work together to help the organism get the things it needs.

Plants have structures called roots, stems, and leaves. Roots help plants take in water. Stems provide support for plants. Leaves help plants take in gases and collect sunlight. Plants use water, air, and sunlight to make food in their leaves.

Animals have structures that help them move. Animals need to move to find food and water. Some animals have wings for flying or fins for swimming. Many animals have legs for walking, running, or hopping over land.

Plants and animals need to protect themselves from heat and cold. They also need to protect themselves from organisms that want to eat them. Both plants and animals have **body coverings** for protection.

Many trees have a hard covering called bark. Bark protects trees from damage. It protects them from losing too much water. A cactus has thin, sharp leaves that cover its body. The sharp leaves help keep animals from eating it.

Animals have many different coverings on their bodies. Birds have feathers to keep them warm and help them fly. Fish and

An organism's **structures** are the parts that make up the organism's body.

The **function** of a structure is the job that it performs.

You can learn more about systems in Unit 1, Lesson 5.

The roots of many plants also help to keep the plants in the ground. The roots grow under the soil and help hold the plants in place.

A **body covering** is the material on the outside of a plant or animal that helps protect the organism.

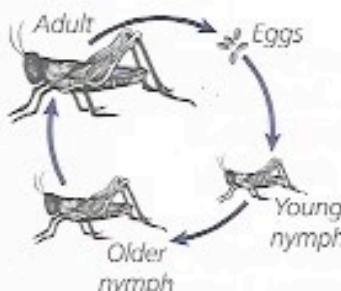
reptiles have hard scales to protect their skin. Many animals have fur to keep them warm. A porcupine is covered in sharp spines. The spines protect the porcupine from other animals.



Both plants and animals have body parts for protection.

All living things grow during some part of their lives. The way plants and animals grow is part of their life cycle. A **life cycle** is a pattern of changes that happens during an organism's life. When an organism reproduces, the life cycle repeats.

All plants and animals have life cycles. For example, a bean plant grows from a seed to a seedling to an adult. As it grows, it develops roots, stems, and leaves. A grasshopper grows from an egg to a nymph to an adult. As it grows, it gets bigger and develops legs, wings, and other body parts.



All plants and animals have life cycles.

Deserts get very little rain. Many plants that live in the desert have long roots that spread out under the soil.

- A Identify a need of living things that would be hard for plants and animals to meet in a desert.
- B How can the roots of some desert plants help them meet their needs?

First read the whole question to see if you can find any information. The question tells you that the desert doesn't get much rain. So it's probably hard for plants and animals to find water in the desert. For part B, you should think about how long roots would help a plant get water in a very dry place. Long roots that spread out can help desert plants find and take in the small amounts of water in the soil.

Some animals, such as turtles and hermit crabs, have shells as body coverings. Hard shells protect the animals' soft bodies. When they are in danger, many turtles and hermit crabs can pull their whole bodies into their shells.

A pattern of changes that happen during an organism's life is the organism's **life cycle**.

Life cycles are patterns because they follow a certain order and repeat over time. For example, after a grasshopper becomes an adult, it lays eggs. The eggs grow into nymphs that become adults. Eventually, these adults lay eggs and the life cycle repeats.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

- 1 A fish has special structures called gills that let it take oxygen from water instead of air. Which process do gills help a fish carry out?
- A growth
 - B respiration
 - C reproduction
 - D digestion

Use the pictures below to answer questions 2 and 3.



- 2 What do these living things have in common?

- A They both have roots.
- B They both move to find food.
- C They both have body coverings.
- D They both take in air through leaves.

- 3 What would most likely happen if the tree did not have roots?

- A It would have too much oxygen.
- B It would not get enough air.
- C It would have too much food.
- D It would not get enough water.

4 Which of these statements is true?

- A Animals need food, but plants do not.
- B Plants need water, but animals do not.
- C Animals and plants both need carbon dioxide.
- D Plants and animals both need gases from air.

This is a short open-ended question. Write your answers on the lines.

5 A student is observing different kinds of seeds in a forest. He sees an acorn that has begun to sprout. He is interested in how the acorn grows during the rest of its life cycle. He makes a drawing of the acorn below.



- A Describe how the acorn will change in the next stage of its life cycle.

- B Describe how these changes help the plant meet its needs throughout its life cycle.

Differences Between Plants and Animals

Anchor and Eligible Content S4.B.1.1.1, 4

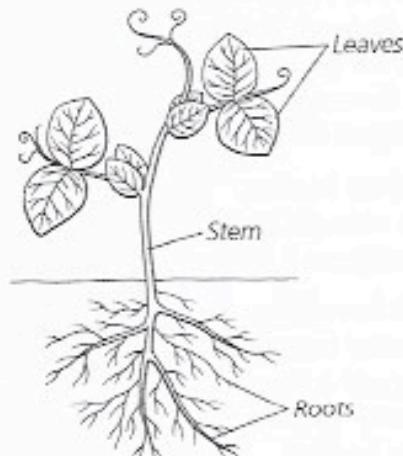
Plants and animals have many similar needs, but they meet these needs in different ways. They have different kinds of body structures that help them meet their needs.

Characteristics of Plants

Unlike animals, plants cannot move from place to place. They must get all the things they need in the places they grow. A plant has structures that help it take in what it needs from the environment.

Most plants have roots, stems, and leaves. A pea plant stem holds the plant up. Its roots spread out under the soil to take in water. The water moves up the stems to the leaves. The leaves have tiny holes that take in air. The leaves also soak up sunlight.

Plants can make their own food. They use the energy in sunlight to make food from water and carbon dioxide. Most plants make food in their leaves. The food moves through the plant's body from the leaves to the stem and roots.



Like animals, plants use oxygen to get energy from their food. Plants can get oxygen from the air through the holes in their leaves. However, they also produce some oxygen when they make food.

Like all living things, plants grow and change during their lives. Most plants grow from seeds. Under the right conditions, a young plant called a **seedling** will sprout from a seed. Then the seedling can grow into an adult plant.

When scientists put organisms into different groups, they *classify* them. To do this, they use a classification system. Plants and animals are two main groups in the system. Each of these groups is made of many smaller groups. For example, ladybugs are in the insect group within the animal group.

The roots of a plant are a system. The root system is made up of many small roots that connect to larger roots. These roots work together to take in water for the plant.

A **seedling** is a young plant that grows out from a seed.

A stem holds a plant up. Some stems are hard and woody. Some stems are soft and fleshy.

- A Give an example of a plant with a woody stem and an example of a plant with a fleshy stem.
- B Explain why most tall plants, such as trees, have woody stems.

There are many possible correct answers to part A, but you need to choose only two plants. So, think of plants with woody stems, like trees and bushes. A pine tree is a plant with a woody stem. Think of plants with soft stems, like grasses and flowers. A tomato plant is a plant with a fleshy stem. For part B, you need to apply the information in the question and what you already know about plants. A woody stem would give a plant more support than a fleshy one. Tall plants, such as trees, need more support to hold them up than short plants do.

The eastern hemlock is Pennsylvania's state tree. It has a woody stem.

Characteristics of Animals

All animals can move from place to place at some point in their lives. They move around to find what they need to survive. Many animals that live on land, such as deer and birds, move using legs or wings. Other land animals, such as snakes, move by crawling on their bellies. Some animals that live in water swim using fins.

Unlike plants, animals cannot make their own food. They must eat other organisms. After an animal eats, it digests its food. That is, its body breaks down the food into substances that the body can use. Most animals have special structures that help them digest food. Your stomach and intestines help your body digest food.

Like plants, animals need structures to support their bodies. However, animals do not have stems. Instead, many animals have skeletons. A **skeleton** supports an animal's body and gives it shape.

Insects, such as fireflies, and some other animals have their skeletons on the outside of their bodies. This hard outer covering protects a firefly's soft body. As the firefly grows, it needs a new skeleton. It sheds its old skeleton and grows a new one. Spiders and crabs also have skeletons on the outside of their bodies.

A **skeleton** is a hard structure that supports an animal's body and gives it shape.

The firefly is Pennsylvania's state insect.



Cicadas are insects that shed their skeletons as they grow.

Many animals, such as people, cats, birds, and fish, have skeletons inside their bodies. Most of these animals have skeletons made of bones. The animals do not need new skeletons as they grow. Their bones grow as the animals get bigger. Animals with skeletons on the inside do not shed their skeletons as they grow.

When they breathe, animals take in oxygen and release carbon dioxide. Animals use oxygen to get energy from food. In the process, they make carbon dioxide waste. Animals cannot use carbon dioxide like plants do. They get rid of carbon dioxide before it harms their bodies.

Most land animals use lungs for respiration. **Lungs** help an animal take in air. People, wolves, reptiles, and birds have lungs. Most animals that live in water have gills. **Gills** help animals take in oxygen from water. A few animals can take in and release gases through their skin.

Which animal structure has a function most similar to the function of tiny holes in leaves?

- A lungs
- B skeleton
- C stomach
- D wings

First think of the function of the tiny holes in leaves. The holes take in air. Look for an answer choice that has a similar function in animals. A skeleton does not take in air, so choice B is incorrect. A stomach helps an animal digest food, so choice C is incorrect. Wings help an animal move, so choice D is incorrect. Many animals use lungs to take in air, so the correct choice is A.


Breathing is another word for respiration.

Lungs are structures that help animals get oxygen from air.

Gills are structures that let an animal get oxygen from water.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

- 1 Seahorses are creatures that live in saltwater sea grass beds and coral reefs. What structure does this seahorse most likely use during respiration?



- A stomach
 - B leaves
 - C lungs
 - D gills

- ## 2 How do leaves help plants make food?

- A They take in water.
 - B They develop seeds.
 - C They soak up sunlight.
 - D They release carbon dioxide.

- 3 This baby deer will grow a lot during its first year of life. What will most likely happen to its skeleton as it grows?



- A It will fall off.
 - B It will get bigger.
 - C It will take in air.
 - D It will break down.

Adaptations

Anchor and Eligible Content S4.B.2.1.1, 2

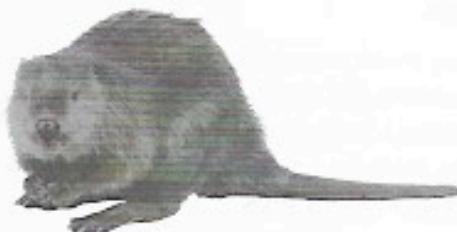
Different environments are homes to different kinds of organisms. An **environment** is everything that is around an organism. It includes living things, such as plants and animals, and nonliving things, such as rocks and water. A feature of an organism that helps it live in its environment is called an **adaptation**. Some adaptations are part of a plant's or animal's body. Others are behaviors, or ways a plant or animal acts. Plants and animals in different environments need different adaptations to help them survive.

Adaptations for Living in Water

Swamps and marshes are examples of wetlands. The soil in a wetland is covered by water for most or all of the year. Most animals that live in wetlands have adaptations that help them swim or get things from the water that they need to survive.

Frogs are common animals in wetlands. Young frogs are called tadpoles. Like many animals that live in water, tadpoles have gills. Gills are organs that let an animal get oxygen from water.

Beavers do not have gills, but they have other adaptations for living in a wetland. A beaver has webbed back feet and a large, flat tail. The webbed feet help the beaver paddle through the water. Its flat tail helps it steer. A beaver can close its nostrils and ears when it swims so that water does not get into them.



A beaver's body has adaptations that help it live in a wetland.

Like animals that live in wetlands, animals that live in lakes, rivers, and oceans have adaptations that help them survive in water. The state fish of Pennsylvania is the brook trout. Like a tadpole, a brook trout uses gills to take oxygen from water. A brook trout's tail and fins help it move. Its smooth scales help it slide easily through water.



An **environment** is the total of all the things that surround an organism.

An **adaptation** is a characteristic of an organism that helps it survive in its environment.

Plants that live in water need sunlight to make food, just like all plants do. Most water plants, such as cattails, live on the surface of water or in shallow water so that they can get enough sunlight.

Organisms that live in salty ocean water have adaptations, too. Some plants have structures that get rid of extra salt from inside the plant. Animals that live on land cannot survive if they drink salt water. However, many animals that live in oceans, such as fish, have only salt water to drink. These animals have structures that let them send extra salt out of their bodies.

Adaptations for Living in Deserts

Very little rain falls in desert environments. Most deserts are hot. You might think of deserts as harsh places to live. However, some organisms, such as the jackrabbit and the saguaro cactus, are adapted to live in deserts.



All of the organisms that live in the desert have adapted to hot, dry conditions.

A saguaro cactus is a large desert plant that can store water in its thick stem. The needles that cover a saguaro are actually its leaves. Like the saguaro, most plants that live in deserts have very small or narrow leaves. Small leaves lose less water than large leaves do. The size of the plant's leaves is an adaptation that helps the plant survive in a dry environment.

Desert animals have adaptations that help them stay cool and keep from losing water. Most small animals that live in deserts, such as jackrabbits, stay underground or hide in shade during the day. This behavior is an adaptation that helps the small animals stay cool when temperatures are very high. A jackrabbit's large ears also help it stay cool. Blood flowing through the rabbit's ears releases extra heat to the air.

Most plants use their leaves to make food. However, because a cactus has such tiny leaves, it uses its thick stem to make food.



A jackrabbit has adaptations for living in the desert.

Which of these adaptations would best help an animal survive in the desert?

- A hunting in water
- B sitting in the sun
- C having a thick fur coat
- D getting water from food

Most deserts are dry and hot. So, desert animals need adaptations that help them stay cool and conserve water. Thick fur and sitting in the sun do not help an animal stay cool. There is very little water in the desert, so an animal that hunts in the water cannot find food in the desert. Being able to get water from the food it eats can help an animal live in the desert. The correct choice is D.



A kangaroo rat can go its entire life without drinking water. It gets all the water it needs from the seeds it eats.

Adaptations for Living in the Tundra

A jackrabbit is adapted to live in the desert. In the same way, an arctic hare is adapted to live in its environment, the tundra.



An arctic hare looks different from a jackrabbit.

The tundra is a very cold environment found in the far north. It is so cold that the ground is frozen for most of the year. Conditions in the tundra can be harsh, but many animals are well adapted for survival there. For example, an arctic fox has thick fur to keep it warm. A seal has a thick layer of fat under its skin that helps it stay warm in icy waters.

Little snow or rain falls in the tundra. When snow does fall, the low temperatures keep it from melting for most of the year.

Many tundra animals **migrate** to avoid the coldest parts of the year. During winter on the tundra, there is little food. Birds that can live on the tundra in summer must migrate during the winter. They fly south to warmer places where they can find food.

Some tundra animals, such as the arctic ground squirrel and the grizzly bear, **hibernate** in winter. Hibernation looks much like sleep, but they are not the same thing. When an animal hibernates, its heart beats more slowly, and it breathes more slowly. This helps its body use less energy. The animal does not need to eat or drink. Hibernation lets these animals survive in the coldest months when there is little food.

Trees do not grow in the tundra. The plants that do grow there are all low to the ground. This characteristic keeps the plants out of strong winds and helps them trap warm air near the ground.

Adaptations for Living in Grasslands

More rain falls in grasslands than in deserts. However, grasslands are still dry places. Because grasslands are dry, fires burn easily there. Grasslands in North America are called prairies. Some plants that live on prairies have adaptations that help them survive fires. Prairie grasses have parts of their stems below ground. This is an adaptation for surviving fires. When a fire burns through the prairie, all the plants can burn down to the ground. However, the stems below ground keep the grass alive. After the fire, the grass can start to grow again.

Adaptations for Living in Forests

Plants that live in forests have adaptations that help them get sunlight or survive with little sunlight. Oak trees need more sunlight than some other plants. Growing very tall is an adaptation that helps an oak tree hold its leaves above those of other plants. Some plants, such as mountain laurel, can grow in shady areas. Being able to grow in shade is an adaptation. It helps mountain laurels survive in forests in which many other plants block sunlight.

Many animals that live in forests have adaptations that help them blend in with leaves, twigs, or tree bark. Blending in can help an animal hide from **predators**. Blending in can also help a predator sneak up on its **prey**.



Predators have a hard time seeing this walking stick insect. Looking like a stick is an adaptation that helps these insects survive.

When an animal **migrates**, it travels long distances during certain seasons.

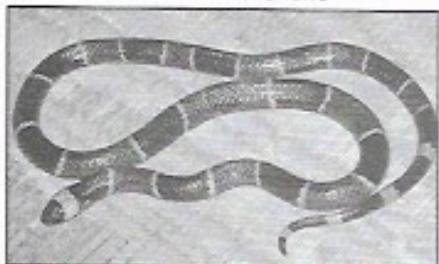
When an animal **hibernates**, its body functions slow down, and the animal uses less energy.

Grassland plants are not the only plants adapted to fire. The seeds of some forest trees can start to grow only after a forest fire.

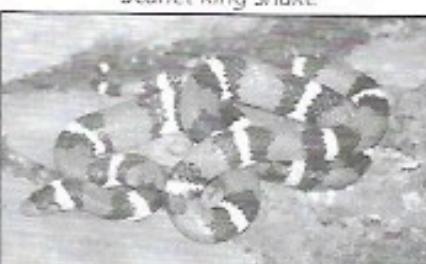
A **predator** hunts and eats another organism. The organism a predator eats is its **prey**.

Other animals have adaptations to help them stand out rather than blend in. In many cases, bright colors and patterns are warnings that an animal is dangerous. It may be poisonous or venomous. Some animals have bright colors and patterns even though they are not poisonous or venomous. Predators think these animals are dangerous and avoid them. Bright colors and patterns are adaptations that help keep predators away.

Eastern coral snake



Scarlet king snake



These two snakes have similar bright color patterns. The coral snake is venomous. The king snake is not.

Monarch butterflies and viceroy butterflies have similar color patterns. Monarch butterflies are poisonous to predators. Viceroy butterflies are not.



Monarch



Viceroy

- A Explain how being poisonous is an adaptation for a monarch butterfly.
- B Explain how the viceroy butterfly's color patterns could be an adaptation.

An adaptation helps an organism survive. Predators will not want to eat something that is poisonous. Because the two butterflies look similar, predators avoid both the monarch and the viceroy. Looking like a monarch is an adaptation that helps a viceroy butterfly survive.

Tiny poison-arrow frogs live in Central and South America. These brightly colored frogs are very poisonous. A small amount of poison from one frog's skin can kill a much larger animal.

A *poisonous* organism has poisons on or in its body that can harm an animal that eats or tries to eat it.

A *venomous* organism injects its poison into another organism.

Blending in is not just a forest adaptation. Almost every environment has some organisms that avoid predators or sneak up on prey by blending into the environment.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

Use the picture below to answer question 4.



- 4 A scientist is studying the plant shown in the picture above. What can you conclude about the environment this plant lives in?

 - A It is hot and dry.
 - B It is cold and windy.
 - C It is warm and rainy.
 - D It is cold and dry.

Inherited Characteristics

Anchor and Eligible Content S4.B.2.2.1

Most living things look and act a lot like their parents. In other words, they have similar *characteristics*, or features. For example, puppies look and act a lot like adult dogs.

Some characteristics are part of an organism's body. They make up how the organism looks. These are called *physical characteristics*. Other characteristics are not part of an organism's body. They make up the way the organism acts.

Inherited Characteristics

Inherited characteristics are characteristics that parents pass to their offspring. They are characteristics that a living thing is born with. If the environment changes, most inherited characteristics do not change.

An **individual** is a single living thing. Most individuals look like their parents. This is because individuals inherit many characteristics from their parents. For example, a girl may have blue eyes like her mother. Most tall people have tall parents. A puppy has four feet, like its parents do. Eye color, height, and number of feet are inherited characteristics.



When puppies are born, they look like their parents.

Plants also inherit characteristics from their parents. For example, most plants have the same shape of leaves as their parents. The shape of a plant's leaves is an example of an inherited characteristic.

Individuals can also inherit behaviors from their parents. An inherited behavior is called an **instinct**. Instincts are behaviors that organisms are born knowing how to do. For example, many birds build nests. They do not have to learn how to build nests. They are born knowing how to do it. Nest building is an instinct.

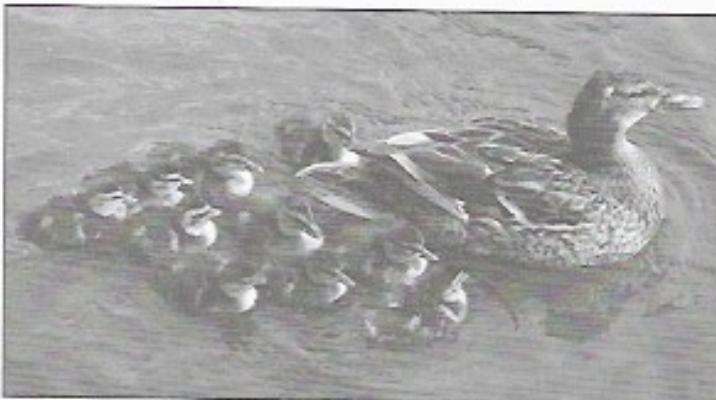
Parents pass on inherited characteristics to their offspring.

An individual is a single living thing.

You cannot see all inherited characteristics easily. Some inherited characteristics affect how an organism looks on the inside.

An instinct is a behavior that an organism can do without being taught.

Instincts help individuals survive. For example, ducklings have an instinct to stay near their mother after they hatch. Young ducklings are safer near their mother. Their instincts help them stay safe.



Ducklings do not need to learn to follow their mother. Following their mother is an instinct. This instinct helps the ducklings stay safe.

Why does a young giraffe have a long neck?

- A It grew a long neck from stretching.
- B It inherited instincts from its mother.
- C It learned to have a long neck to get more food.
- D It inherited physical characteristics from its parents.

A long neck is not a behavior, so it cannot be an instinct. Choice B is incorrect. A giraffe is born with a long neck. It does not get one from stretching. It does not learn how to have a long neck.

Choice A and choice C are incorrect. A long neck is an inherited physical characteristic. The correct choice is D.

The instinct for ducklings to follow their mother is strong. If their mother is not close by, they may follow any moving thing they see. This instinct is an adaptation. You can learn more about adaptations in Unit 2, Lesson 3.

Many multiple-choice questions have choices that are true statements but do not answer the question. Be sure to read *all* the choices before you decide which choice is best.

Other Characteristics

Some characteristics are not inherited. An individual is not born with them. Instead, the organism gets these characteristics over time. These characteristics can change as the environment changes.

Some non-inherited characteristics affect part of an organism's body. For example, a person may have a scar, pierced ears, or short hair. A child does not inherit any of these characteristics from his parents. A child will not be born with the same scars or haircut as his parents. The picture on the next page shows another example of a characteristic that is not inherited.



The damage on this leaf is one of this plant's characteristics. However, the plant did not inherit the characteristic from its parents. It will not pass it on to its offspring.

A student's parents are both tall and have dark brown eyes. Her mother has long fingernails that are painted red. Her father has short hair and likes to sing.

- A Name two inherited characteristics that the person probably has.
- B Name two characteristics the person may have that she did not inherit from her parents.

The parents can pass only inherited characteristics to their child. The girl is probably tall and has dark brown eyes. She may have long fingernails or short hair, but she did not inherit these characteristics from her parents.

Many open-ended questions can have more than one correct answer. You do not need to include every possible answer. Make sure you read the question carefully so you know how much you need to write in your answer.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

- 1 Which of the following is an example of an inherited physical characteristic?**

- A A child reads a book.
B A robin lays blue eggs.
C A dog has a collar.
D A man has short hair.

Use the picture below to answer question 2.



- 2 Which of this girl's characteristics do her parents least likely have?**

- A haircut
B eye color
C skin color
D face shape

Use the paragraph below to answer questions 3 and 4.

PLANT CHARACTERISTICS

Different kinds of plants have different characteristics. Some plants, such as pine trees and oak trees, have hard stems. Other plants, such as grasses and sunflowers, have soft stems. Pine trees have sharp, needle-like leaves. Oak trees, grasses, and sunflowers have soft, green leaves.

- 3 Which of these characteristics would the offspring of a pine tree most likely have?**

- A hard stem, soft green leaves
B soft stem, needle-like leaves
C hard stem, needle-like leaves
D soft stem, soft green leaves

- 4 What kind of characteristics does the paragraph describe?**

- A inherited behaviors
B inherited physical characteristics
C non-inherited behaviors
D non-inherited physical characteristics

Earth is a large system made up of many smaller systems. Some of the systems that make up Earth are **ecosystems**. An ecosystem is all the living and nonliving things in an area. As in all systems, each part of an ecosystem plays a role. Wetlands, forests, ponds, grasslands, and deserts are all examples of ecosystems. Even playgrounds and city parks are ecosystems.

The Parts of an Ecosystem

A stream is another example of an ecosystem. Like all ecosystems, streams have both living and nonliving parts. The picture below shows some of the parts of a stream ecosystem.

An **ecosystem** is all the living and nonliving things that interact in an area.

Ecosystems can have human-made parts. For example, the neighborhood you live in is an ecosystem.



Which of these is a nonliving part of a stream ecosystem?

- A fish
- B insects
- C plants
- D water

Fish, insects, and plants are all living things. Choices A, B, and C are incorrect. Water is not a living thing. Choice D is correct.

How the Parts of an Ecosystem Interact

Remember that the parts of a system interact with one another. The parts of an ecosystem also interact with one another. The living things depend on both living and nonliving things to survive. For

example, the plants in a meadow use energy from sunlight to make food from water and gases in the air. The plants use the energy in the food to survive. Rabbits get food by eating the plants. They take in the energy stored in the plants. They use the energy to move and keep warm.

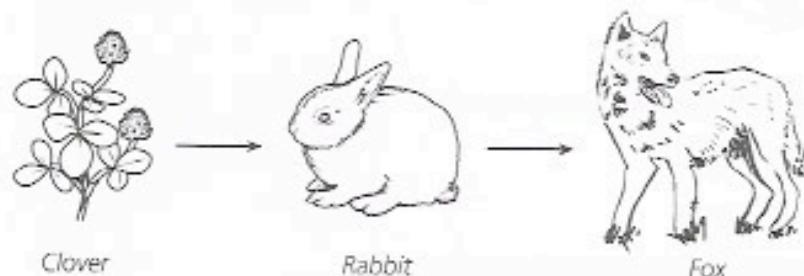


Like all living things, rabbits depend on the living and nonliving parts of ecosystems.

- A Describe two ways rabbits depend on the living parts of a meadow ecosystem.
- B Describe two ways rabbits depend on the nonliving parts of a meadow ecosystem.

The question has many possible answers, but you only need to identify two things for each part. Grass is a living part of a meadow ecosystem. Rabbits eat grass for food. They also hide in grass so that other living things, such as foxes, cannot see them. Air and water are both nonliving parts of a meadow ecosystem. Rabbits breathe air and drink water.

Energy flows through an ecosystem when organisms eat one another. Scientists use models called **food chains** to show how energy flows from one organism to another.



A food chain is a model that shows how energy flows through an ecosystem.

The food chain in the diagram shows that a rabbit eats a plant and a fox eats a rabbit. Energy moves from the plant to the rabbit and from the rabbit to the fox. The arrows in a food chain show the direction that energy flows.

All food chains start with producers. Producers use energy from sunlight to make their food. Therefore, the sun is the source of energy for most food chains on Earth.

The Roles of Organisms in Ecosystems

Each of the living things in an ecosystem has a different role. Some living things are producers. Some are consumers.

Plants and other living things that use energy from sunlight to make their own food are called **producers**. Producers are very important in ecosystems. Without producers, none of the other living things in an ecosystem would have food.

Remember that animals cannot make their own food. Instead, animals get food by eating other living things. Organisms that eat, or *consume*, other organisms are called **consumers**. All animals are consumers.

Some consumers are **scavengers**. Scavengers do not usually capture living organisms. Instead, they feed on the bodies of organisms that are already dead. Many insects are scavengers.

Some consumers are **decomposers**. Decomposers break down the remains of organisms into nutrients. They also break down animal wastes. Decomposers return nutrients to the soil. Plants need these nutrients to grow. Mushrooms and tiny organisms called bacteria are examples of decomposers.

A scientist is studying the consumers in a cornfield ecosystem. Which of these is the scientist not studying?

- A beetles
- B corn
- C mushrooms
- D raccoons

The question is asking which of the choices is not a consumer. Beetles, mushrooms, and raccoons all consume other organisms. They are all consumers. Choices B, C, and D are incorrect. Corn is a plant. It is the only organism in this group that uses sunlight to make its food. Corn is a producer, not a consumer. Choice B is correct.



A **producer** is an organism that makes its own food. A tree is a producer.

A **consumer** is an organism that gets food by eating other organisms. A bird is a consumer.

A **scavenger** is an organism that eats dead organisms. A vulture is a scavenger.

A **decomposer** is an organism that breaks down the remains or wastes of organisms. A fungus is a decomposer.

You might have used the words *consumer* and *producer* before in a different way. In social studies, a producer is someone who makes a product. A consumer is someone who buys or uses the product.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

- 1 Which of these most likely describes the relationship between an insect and a rock in a playground ecosystem?**
 - A The insect gets food by eating the rock.
 - B The rock makes air for the insect to breathe.
 - C The rock makes water for the insect to drink.
 - D The insect gets shelter by living under the rock.

- 2 A student is making a list of all the nonliving things in the park near his school. Which two things should the student include in his list?**
 - A rain and trees
 - B people and insects
 - C rock and swing set
 - D grass and park bench

- 3 Which of these describes an interaction between a living thing and a nonliving thing in a forest ecosystem?**
 - A A mouse eats leaves.
 - B Rain washes dirt off a rock.
 - C A tree gets water from the soil.
 - D Sunlight makes the air warmer.

This is a short open-ended question. Write your answers on the lines.

Use the picture below to answer question 4.



4 The picture shows part of a forest ecosystem.

A Identify two living things and two nonliving things in this ecosystem.

B Describe an interaction between two living things and an interaction between a living thing and a nonliving thing in this ecosystem.

Natural and Human Changes to Ecosystems

Anchors and Eligible Content S4.B.3.2.1–3; S4.B.3.3.3, 5

Ecosystems do not always stay the same. They can change for many reasons. Some changes are natural. Some changes are caused by people. These changes can affect both the living and nonliving parts of ecosystems. They can be harmful or helpful.

Changes to ecosystems affect the habitats of organisms. An organism's **habitat** is the place where it lives. Changes in habitats can affect organisms in different ways. The organisms may move to another place. They may change their behavior. They may die.

Changes to ecosystems can cause groups of organisms to become extinct. A group of organisms is **extinct** when no more members of that group are alive. Dinosaurs, dodo birds, and woolly mammoths are examples of animals that are extinct. There are no dinosaurs, dodos, or woolly mammoths alive today.



There are no dinosaurs, dodo birds, or woolly mammoths alive today. They are all extinct.

A living thing's **habitat** is where it lives.

A group of organisms is **extinct** if there are no living members of the group.

Natural ecosystem changes caused dinosaurs and woolly mammoths to become extinct. Human actions caused dodo birds to become extinct.

Natural Changes to Ecosystems

Many changes to ecosystems happen naturally. Fires, floods, earthquakes, volcanoes, seasons, and even living things can change ecosystems.

Lightning can start fires when it hits the ground. Most fires happen in forests and grasslands. Most of them happen when the weather is hot and dry.

Fires can spread quickly and kill trees and other plants. Many animals get food and shelter from the plants. When a fire burns plants, the animals may have no food or shelter. Some of the animals may move to another place. Many of them die.

Fires can also harm the nonliving parts of an ecosystem. Ashes from the fire can float in the air for a long time. They can blow far from the fire. They block the sunlight. Plants may not have enough light. They may die. Then, the animals that eat the plants may die, too.

Ashes in the air also cause air pollution. **Pollution** is something that makes air, water, or soil harmful for living things. Ashes in the air make it hard for animals to breathe.

Fires can burn away the plants that cover the soil. The plant roots normally hold the soil in place. When the plants die, rain can wash away the soil. Without soil, new plants cannot grow.

Fires are not always harmful. They can also be helpful. For example, some plants have seeds that do not burn easily. Some plants even have seeds that cannot grow unless a fire frees them from a pod. After a fire, the seeds grow into new plants.

Forest fires can also be helpful for animals. As new plants grow after a fire, new animals move into the ecosystem. These animals may not have been able to live in the ecosystem before the fire. The fire produces new habitats for the animals and plants to live in.



After a forest fire, new kinds of plants and animals can move into an ecosystem.

Like fires, floods are natural events that affect ecosystems. A flood happens when there is too much water in a river or stream. The extra water flows over the sides of the river or stream. Heavy rain and melting snow cause most floods.

Floods can harm ecosystems. They can destroy habitats and kill plants and animals. They can wash away soil.

Floods can also be helpful. They can carry soil to new places and lay it down on the land. Plants grow better in the new soil. Floods can also wash dead trees and bushes into the water. Fish and other animals can use the wood for shelter or food.

Earthquakes and volcanoes can also change ecosystems. An earthquake happens when huge pieces of rock below Earth's surface move. Earthquakes make the ground shake.

Earthquakes can make the land change. They can make some areas of land rise. They can make other areas sink. The movement of the land can change how rivers and streams flow. It can change or destroy habitats.

Volcanoes can also change ecosystems. They can make ash and dust when they erupt. The ash and dust rise into the air. They cause air pollution. They can also block sunlight in places far from the volcano.

Pollution is something that makes air, water, or soil harmful for living things.

In 2005, Hurricane Katrina hit parts of the southern United States. The hurricane caused serious floods. They damaged buildings and roads. They also destroyed many farms.

volcano. With less sunlight, plants may die. Without plants, animals will die.

It can be hard to know when a fire, flood, earthquake, or volcano will happen. However, the seasons change regularly. That is one natural change that happens every year.

When it gets cold in the winter, some animals move to warmer places. Some animals hibernate all winter. Some animals grow thick layers of fur, fat, or feathers to keep warm.

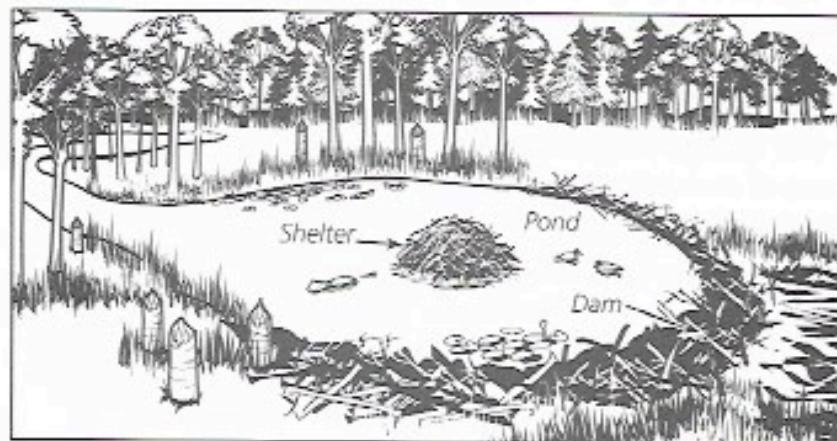
Summers in Pennsylvania can be very hot. Animals that live in Pennsylvania in the summer have to be adapted to the heat.

- A Name two ways an animal might be adapted to hot weather.
- B Describe how the adaptations you named in part A could help the animal survive in the summer.

Think of ways an animal can keep cool. It might spend more time in the shade in the summer. It might sleep during the day and move around more at night. Part B should state how the adaptations are helpful. It is cooler in the shade. Staying in the shade helps the animal stay cool. It is also cooler at night than it is during the day. Moving around mainly at night would help the animal stay cool.

Living things can also change ecosystems. For example, beavers use their teeth to cut down trees. They use the wood to build dams along rivers and streams. The dams block the flow of the rivers and streams. Ponds form behind the dams.

Beaver ponds can flood the land and harm plants and animals that live there. However, over time, they can become habitats for many living things. Plants, fishes, frogs, and birds may live in beaver ponds.



Beavers change their habitat by building dams.

In 1815, a huge volcano called Tambora erupted in the Indian Ocean. It sent large amounts of ash and dust into the air. The ash and dust blocked sunlight all around the world. In 1816, it was so cold in the northeastern United States that it snowed in some areas in June.

Changes Caused by People

People cause many changes to ecosystems. People can cause fires, floods, and pollution. They can destroy habitats and cause organisms to become extinct.

Many people like to walk and camp in the woods. They may build small fires when they camp. If the people are not careful when they make fires, the fires can spread. They can burn down a whole forest. People can also cause fires when they throw burning cigarettes on the ground.

People's actions can also cause floods. People build dams. The dams block the flow of rivers and streams. The water builds up behind the dam and floods the land around it. The flooding destroys habitats.

People can also cause floods by building roads and parking lots. Normally, soil soaks up rainwater. When people cover the soil with roads or parking lots, the soil can't soak up the rain. The water runs off the roads and parking lots. It flows into rivers and causes floods.

When people do not recycle or throw trash away properly, the trash can build up in the environment. Trash in the environment is called **litter**. Litter such as plastic bags can choke animals. If animals eat litter, they can become sick or die.

When rain falls on the land, it can wash litter into streams and rivers. It can also wash harmful chemicals into streams and rivers. The chemicals come from farms, factories, and even people's homes. Some of these chemicals cause water pollution.

Much of the rain that falls on an area of land eventually flows into a river. The land from which water drains into a river is called the river's watershed. Water can carry pollution from one part of a watershed to the rest of the watershed. Polluted water in a river eventually reaches the ocean.



The chemicals farmers spray on fields can wash into streams and rivers.

In 1988, forest fires burned parts of Yellowstone National Park. The fires burned an area of land almost ten times the size of Philadelphia. Lightning started most of the fires. People started the rest. The fires killed many plants and animals. After the fire, new plants and animals began to live in the burned areas.

Trash and chemicals are not the only things that can be pollution. Even light and sound can be pollution if they make it hard for living things to survive.

Litter is trash in the environment.

You can learn more about watersheds in Unit 4, Lesson 4.

Chemicals from the farm flow into the stream. The stream flows to the ocean. What will most likely happen when the chemicals get to the ocean?

- A People will use them to run large ships.
- B They will make the ocean water cleaner.
- C They will kill plants and animals in the ocean.
- D Animals in the ocean will learn to use them for food.

The chemicals in the water are water pollution. People cannot use water pollution to run large ships. Choice A is incorrect. Pollution makes water dirty, not clean. Choice B is incorrect. Animals cannot use pollution for food. Choice D is incorrect. Pollution can kill plants and animals. Choice C is correct.

Chemicals from farms, factories, and homes can also cause soil pollution. They can kill organisms that live in the soil. They can make it hard for plants to grow in the soil.

People also cause air pollution. Many people drive cars and trucks. Cars and trucks burn gasoline. When gasoline burns, it produces air pollution. People burn coal, oil, and natural gas to produce electricity. People also burn these fuels to heat their homes. When these fuels burn, they produce air pollution.

Another way people change ecosystems is by bringing new plants and animals into an ecosystem. The new plants and animals may bring diseases with them. The diseases may kill the plants and animals that normally live in the ecosystem. The new plants and animals might also use food and water that other organisms need to survive.

In an ecosystem, a native organism has predators that keep its population from growing too large. Most plants and animals that people move to new areas do not have natural predators in the new environment. Without predators, a population of organisms can spread out of control.

Purple loosestrife is a plant that people brought to the United States. It has taken over many wetlands. The plant uses resources that native wetland plants need to survive. This can keep native plants from growing. Purple loosestrife also affects animals. It is less nutritious for animals than native plants.



A **native** organism is one that belongs in an area. An **introduced** organism is one which people bring to an ecosystem where it does not belong. People introduced some organisms, such as zebra mussels, by accident. They introduced other organisms, such as starlings, on purpose.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

Use the picture below to answer question 1.



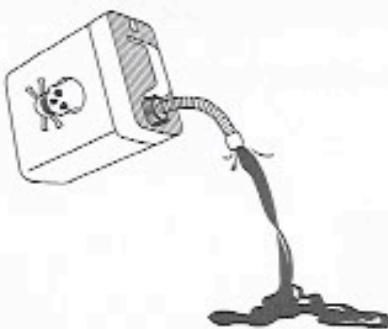
1 How will the object the beavers are building most likely affect the ecosystem?

- A It will form a pond of still water.
- B It will stop floods from happening.
- C It will make the number of trees go up.
- D It will make the stream run more quickly.

2 It is cold and snowy in many parts of Pennsylvania in the winter. How would the cold and snow most likely affect an animal that eats mostly grass?

- A It will have less food.
- B It will have less water.
- C It will not be able to find shelter.
- D It will not be able to find a mate.

Use the picture below to answer question 3.



3 A person pours gasoline onto the ground. What will most likely happen if the gasoline gets into the water?

- A The water will flow more quickly.
- B Trees that use the water will grow taller.
- C More fish will be able to live in the water.
- D People will get sick from drinking the water.

Use the information below to answer question 4.

WATER MILFOIL

People brought a water plant called Eurasian water milfoil from Asia to the United States. Many people use the plants in aquariums. When people clean their aquariums, they wash the plants down the drain. If even part of one of the plants survives, it can grow and reproduce in the environment.

4 What is the most likely effect of Eurasian water milfoil in the natural environment?

- A It competes with animals for food.
- B It uses resources that native plants need.
- C It provides more resources for humans.
- D It helps plants in the environment grow.

This is a short open-ended question. Write your answers on the lines.

Use the picture below to answer question 5.



- 5 A thunderstorm causes a lot of water to enter a river. The extra water makes the river flood.

- A. What are two ways a flood can be harmful to the plants that live near the river?

- B. What is one way a flood can be helpful to the plants that live near the river?

Agriculture

Anchor and Eligible Content S4.B.3.3.1–5

Most of the things we use every day come from plants and animals. We get food from plants and animals. We also use them to make clothes and other products.

Plants and animals are examples of natural resources. Land is another important natural resource. We use land for many different things. We build homes and other buildings on land. We build roads on land so we can move around easily. We also use land for fun activities, such as hiking, camping, and playing sports.

Most people live in cities. A city has many buildings, people, stores, and streets. Cities are known as urban areas. Many people live in areas around cities. The area around a city is called a suburban area. A suburban area has fewer buildings, people, and streets than an urban area. Few people live on most of the rest of the land. An area where fewer people live is known as a rural area. People use most of the land in a rural area for farming.



People use land in different ways in urban, suburban, and rural areas.

Agriculture

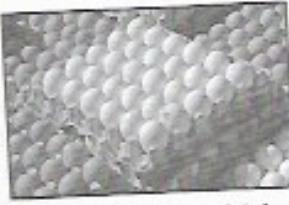
Most of our food, fibers for clothing, and many other products come from plants and animals that people raise on farms. The science of growing plants and animals on farms is called **agriculture**. People all over the world rely on agriculture for food, clothing, and other products.

You probably know that people grow corn to eat and to feed to animals. However, people can use corn in other ways as well. They use some corn to make ethanol. Ethanol can be used as a fuel to replace gasoline in some cars and trucks. People also use corn to make sweeteners, cosmetics, and cleansers. They can even use corn to make some new kinds of plastics.

You can learn more about natural resources in Unit 4, Lesson 2.

Agriculture is the science of growing plants and animals on farms.

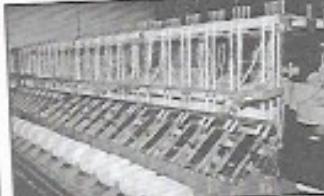
Some farmers raise mostly animals, such as cows and chickens. They may raise hundreds or thousands of animals on each farm. People use the meat from the animals for food. They can also use products from animals, such as eggs and milk, for food.



The eggs you eat come from chickens on a farm.

People also get food from plants that grow on farms. Farms can cover huge areas of land. Farmers divide the land into many smaller fields. They generally grow one kind of crop in each field. A **crop** is a plant that the farmer grows on his or her farm.

Not all farmers grow food. Many farmers grow plants or raise animals for fibers. **Fibers** are materials that people use to make clothing. Wool and cotton are examples of fibers.



People shear the wool from sheep and use the wool fibers to make products such as sweaters.

What would most likely happen to people if there were no farms?

- A People would not have enough air.
- B People would not have enough food.
- C There would be less water for people to drink.
- D There would be fewer places for people to live.

Farms do not make air, so choice A is incorrect. Farms do not make water, so choice C is incorrect. If people put houses on farmland, there would be more places to live. So choice D is incorrect. People get most of their food from farms. The correct choice is B.

A **crop** is a plant that people grow on farms.

Fibers are parts of plants or animals that people use to make cloth.

The Food and Fiber System

Many things you buy at the supermarket come from a farm. Even products that come in plastic or boxes were probably made from parts of plants or animals. Many foods in a supermarket have been **processed**. In many cases, processing changes the way a food looks. Breakfast cereal may look nothing like a plant, but it was made from plants. People grind up grains such as wheat, oats, and corn and form flakes or other shapes to make cereal.

In some cases, a food looks much the same way before and after it is processed. Most people know that the milk in the supermarket comes from cows. However, people process milk before they deliver it to stores. The milk looks very similar before and after it is processed.

When people process raw foods, they change them in some way. Some of these changes help the food last longer. Other changes let people use the original food in different ways.



Pests

All farmers have to deal with pests. **Pests** are organisms that harm the plants and animals that people use for food or to make products. Pests harm crops in many different ways.

Some pests eat crops. Aphids are tiny insects that eat the stems and leaves of many kinds of plants. When aphids eat the stems and leaves of crops, the crops may die.

Some pests harm crops by using up nutrients in the soil. Weeds can grow between corn plants on farms. The weeds use water and other nutrients that the corn plants need. The corn plants may make less corn. They may even die.

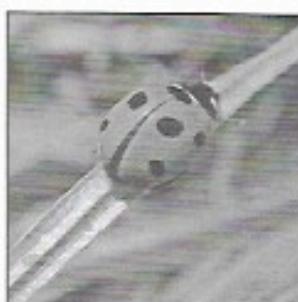
Some pests make plants and animals unsafe for people to eat. For example, many kinds of mold grow on crops. The mold can make people sick if they eat it. If mold grows on a crop, farmers cannot sell the crop for people to eat.

Farmers use different technologies to get rid of pests. They may use chemicals or special traps to kill the pests. They may use a science called genetic engineering to make plants and animals that do not get sick as easily.

Pests are organisms that compete with humans for resources.

Using chemicals is the most common way farmers control pests. However, chemicals can harm other living things as well, including humans. Today, scientists and farmers are trying to find ways to use fewer chemicals to control pests.

Some farmers use other living things to control pests. Ladybugs eat aphids. Some farmers release ladybugs on their farms. The ladybugs eat the aphids. That stops the aphids from eating the crops.



Some farmers use ladybugs to kill aphids.

Today, some farmers are using a technology called *integrated pest management* to control pests. *Integrated* means "having parts that work together." In integrated pest management, farmers use several different methods to control pests. They may use chemicals to kill some pests. They may use living things to kill other pests.

Which of these is most likely a pest?

- A an animal that eats crop roots
- B a plant that people use for food
- C an animal that lives in the water in a wetland
- D a plant that grows between trees in a forest

A pest is an organism that competes with humans for resources. Plants that people use for food are not pests, so choice B is incorrect. Most farms are not in wetlands or forests. Choices C and D are incorrect. An animal that eats crop roots is a pest. Choice A is correct.

The Effects of Agriculture on the Environment

Agriculture is very important. It gives us the food and fibers we use every day. However, agriculture can harm the environment if farmers are not careful in how they farm. Farming can harm ecosystems in many ways.

Some farmers use chemicals called **fertilizers** to make soil more fertile. In order to grow, plants need the nutrients found in **fertile** soil. Fertilizers replace some of the soil nutrients that crops have used up. They help plants grow in the soil. The fertilizers and other chemicals that farmers use can get into the water and soil. They can cause pollution. The pollution can harm living things.



Fertilizers are chemicals that farmers use to help their crops grow.

You can learn more about pollution in Unit 2, Lesson 6.

Fertile soil has the nutrients plants need.

Fossil fuels form over millions of years from the remains of plants and animals. You can learn more about fossil fuels in Unit 4, Lesson 2.

Agriculture can also cause air pollution. Most farmers today use tractors, trucks, and other machines to help them farm. People also use trucks to carry products from farms to other places. These machines all burn fossil fuels, such as gasoline. When fossil fuels burn, they make air pollution.



The machines people use on farms can cause air pollution.

Farming can harm ecosystems in other ways. Farmers may cut down trees or drain wetlands so they can use the land for farms. They destroy habitats of plants and animals.

Some farmers grow crops that need a lot of water. The farmers use **irrigation** to help their crops grow. When farmers irrigate, they bring extra water to farms.

Irrigation can help crops grow. However, farmers have to get the water for irrigation from somewhere. They may get the water from rivers and wells. If the farms use too much water, the rivers and wells could become dry. Other people that use water from these sources would not have enough. Many plants and animals might also be left without the water they need.

Irrigation is the process in which farmers bring extra water to their farms.

A farmer travels to another country and brings back seeds for an unusual crop. The seeds sprout, but the plants do not grow very large. To help the plants grow, the farmer uses large amounts of fertilizer. He irrigates with water from nearby wells.

- A Describe some ways the farmer's practices may harm the ecosystem.
- B Explain how using crops that are native to the area might be less harmful to the environment.

When farmers use a lot of fertilizer on their crops, much of it can run off the land and into streams and rivers. Fertilizers pollute the water and can harm many of the organisms that live in it. Using too much water for irrigation can leave less water for people and other organisms. Plants that are native to an area will be adapted to the conditions in that area. If a farmer plants native crops, he probably will not need to use as much extra fertilizer or water.

It's Your Turn

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

- 1 Which of these statements about humans' relationship to the environment is true?

- A Driving does not affect the environment.
- B Only farmers can change the environment.
- C People depend on the environment only for water.
- D People get everything they use from the environment.

- 2 Mice on farms eat corn seeds. Which statement best describes the mice?

- A They are pests.
- B They help crops grow.
- C They cause water pollution.
- D They make soil more fertile.

- 3 Which of these would you most likely find in a rural area?

- A crowded streets
- B farm fields
- C many stores
- D tall buildings

- 4 A farmer's tractor spills diesel fuel onto the soil. What will most likely happen to the crops growing in the soil?

- A They will die.
- B They will grow taller.
- C They will make more food.
- D They will move to another place.

This is a short open-ended question. Write your answers on the lines.

Use the picture below to answer question 5.



- 5 Cheese is a dairy product. Dairy products are foods that people make from milk.

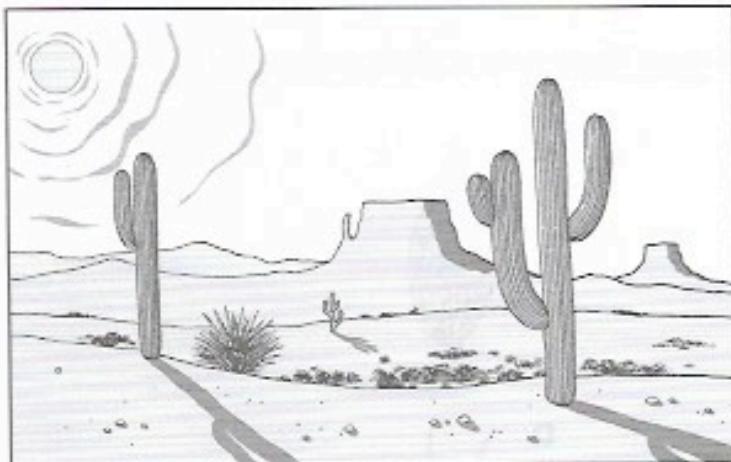
- A Cheese is not made from plants, but people could not have cheese without plants. Explain why.

- B Describe the process needed for cheese to get from a farm field to your plate.

Biological Sciences Review

Please read each question carefully. To answer each multiple-choice question, circle the correct response.

Use the picture below to answer question 1.



- 1 Which adaptation would help an animal survive in this environment?**
 - A blending in with trees
 - B hunting for food at night
 - C swimming in fresh water
 - D growing a thick layer of fat

- 2 Which of the following animal features has a function, or job, most similar to the job of tree bark?**
 - A the wings of an insect
 - B the stomach of a deer
 - C the scales of a fish
 - D the tail of a beaver

3 Insects sometimes shed their hard coverings in a process called *molting*. Some insects molt one or two times, and some molt many times. Why is molting necessary for insects?

- A So they can eat.
- B So they can grow.
- C So they can move.
- D So they can breathe.

4 Which of these leaves would most likely help a plant survive in a forest that is dry?

A



C



B



D



5 Plants need food for all of the following things except

- A growth.
- B energy.
- C movement.
- D reproduction.

Use the picture below to answer question 6.



- 6 The T-shirt shown above is made of cotton. Which statement best describes how people rely on agriculture for shirts just like this one?

- A People make T-shirts on farms.
- B People wear T-shirts to work on farms.
- C People prefer cotton clothing to wool clothing.
- D People use fibers from plants to make cotton cloth.

- 7 A scientist records the number of birds in a park in Pennsylvania each season for two years.



Which statement best explains the data in the graph?

- A Many birds come to the park for food in the winter.
- B Many birds eat earthworms when the seasons change.
- C Many birds leave the park to find mates in the summer.
- D Many birds change their habitat when the seasons change.

- 8 People use land for many things. Which of the following land uses helps people move products to new places?
- A farming
 - B building roads
 - C camping
 - D building homes

Use the information below to answer question 9.

EARLOBES

From the time humans are born, their earlobes are either attached or unattached. Unattached earlobes hang freely from the ear. Attached earlobes connect to the side of the face. Some people pierce their earlobes so they can wear earrings.



Unattached



Attached

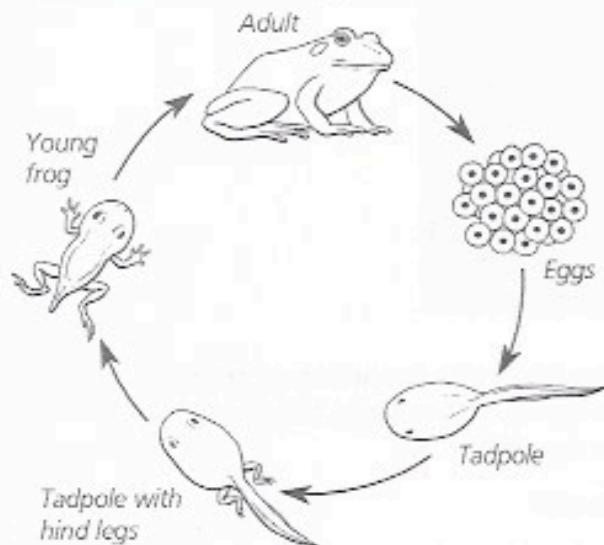
- 9 Suppose a child's mother has unattached earlobes that are pierced. The child's father has unattached earlobes that are not pierced. What kind of earlobes did the child most likely have when he or she was born?

- A unattached, not pierced
- B unattached, pierced
- C attached, not pierced
- D attached, pierced

10 A student goes to the city park to observe animals. He records his observations. Which of the student's observations describes a living thing interacting with a nonliving thing?

- A A grey squirrel eats berries from a bush.
- B A field mouse hides in the tall grass.
- C A songbird sips water from a puddle.
- D A dog comes when its owner calls.

Use the diagram below to answer question 11.



11 Tadpoles live in the water, and adult frogs live on land. What process must tadpoles go through to become adult frogs?

- A loss of fur
- B shedding of skin
- C growth of lungs
- D hardening of skeleton

12 Which of the following describes a pest?

- A a hawk eating mice
- B a worm eating apples
- C a goose eating weeds
- D a ladybug eating aphids

Use the picture below to answer question 13.



13 Spanish moss is a plant that grows from the branches of trees. It can block sunlight from a tree's leaves. How does the moss prevent the tree from meeting its needs?

- A It keeps the tree from taking in water.
- B It prevents the tree from moving to a new place.
- C It keeps the tree from supporting itself.
- D It prevents the plant from making enough food.

14 What nonliving thing do trees in a forest ecosystem need in order to make food?

- A earthworms
- B consumers
- C oxygen
- D water

15 Suppose a builder drains the water from a wetland so that he can build houses on the land. What will most likely happen to a plant growing there that needs the wet conditions in the wetland?

- A It will die.
- B It will hibernate.
- C It will grow new adaptations.
- D It will move to another wetland.

16 A fire kills many trees in a forest. Which of these will most likely happen without the trees?

- A Rain will wash away the soil.
- B Birds will have more shelter.
- C Deer will find more food.
- D Ashes will clean the air.

17 Some people dumped old tires, plastic bags, and plastic bottles into a river. What will be the most likely effect of this litter on animals in the river?

- A The animals will have more food.
- B The animals will move to a different river.
- C Many animals will die or become sick.
- D Many animals will learn to eat the litter.

This is a short open-ended question. Write your answers on the lines.

- 18** For several years, little rain has fallen in a community. The community has several farms. The people in the community are worried that they may run out of water.

- A Identify some activities that people will be unable to do if the community runs out of water.

- B Describe what will happen to the farms in the community and the people who depend on them if there is no more water.
