

Student Name: \_\_\_\_\_



# 3rd Grade Science Distance Learning Packet Week 2

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## Directions:

### **Daily Directions**

1. Read each passage.
2. Complete the following comprehension questions.
3. Students should complete approximately 5-6 pages per day.

Note- The work increases difficulty throughout the week.

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## Contact Information:

### **Teacher Contact Information**

### **School Contact Information**

# What Are Plant Life Cycles?

Plants and animals change during their lifetimes. They grow, reproduce, and die. This group of changes is called a life cycle. Plants have life cycles.

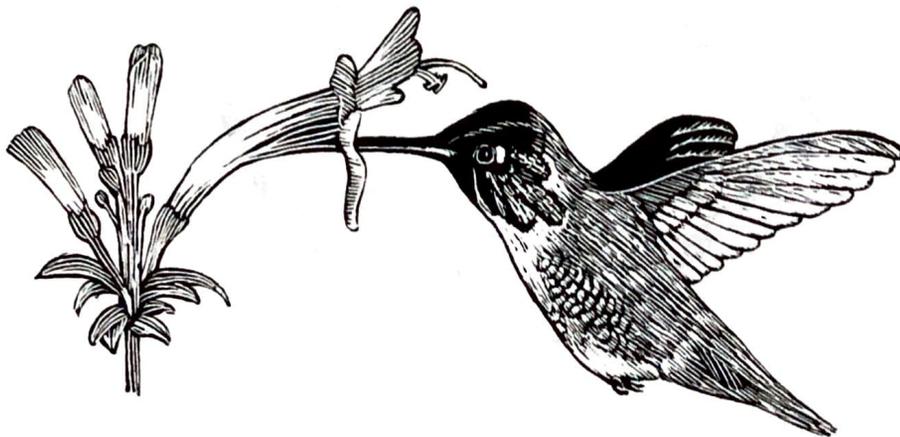
## Flowering Plants

Different living things have different life cycles. Plants with flowers have life cycles that are alike.

A flower, or blossom, makes fruit. The fruit is the part of the plant that has seeds inside. A seed is the first stage in the life cycle of most plants.

Pollen helps make seeds. Pollen looks like a powder. It is found inside flowers. The pollen must move from one part of a flower to another. Wind can move pollen. So can insects and other animals. Then seeds can form.

When a seed is planted in soil, it starts to grow. Then it is called a seedling. The seedling grows into a young tree. The young tree is called a sapling. The sapling grows into an adult tree. Then the adult tree makes seeds and the life cycle begins again. Most plants have life cycles that go on for many years. A plant's life cycle stops when the plant dies.

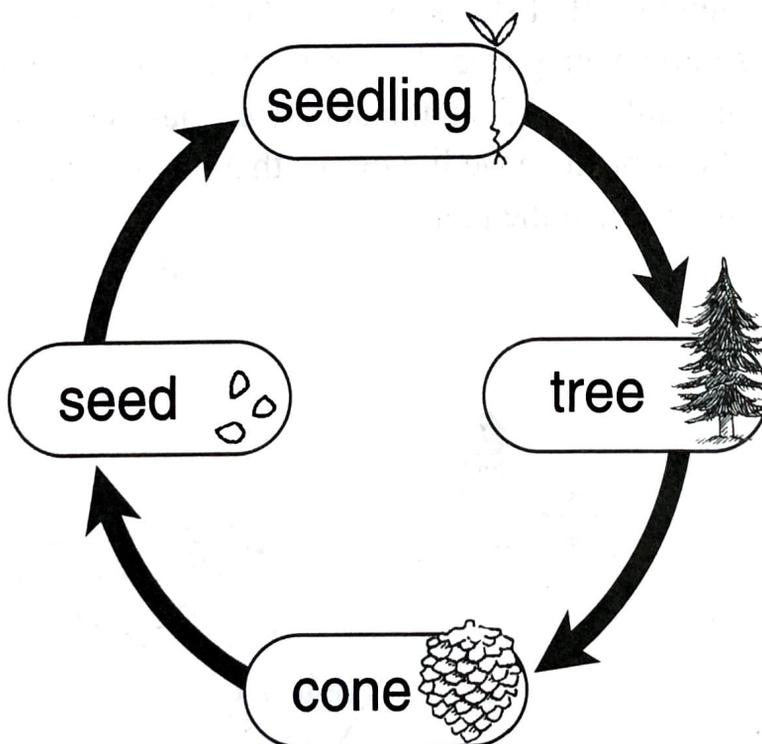


## Conifers

Not all plants have flowers. Some plants have cones instead of flowers. A conifer is a plant that has cones. Conifers make seeds inside cones. Pine trees are conifers.

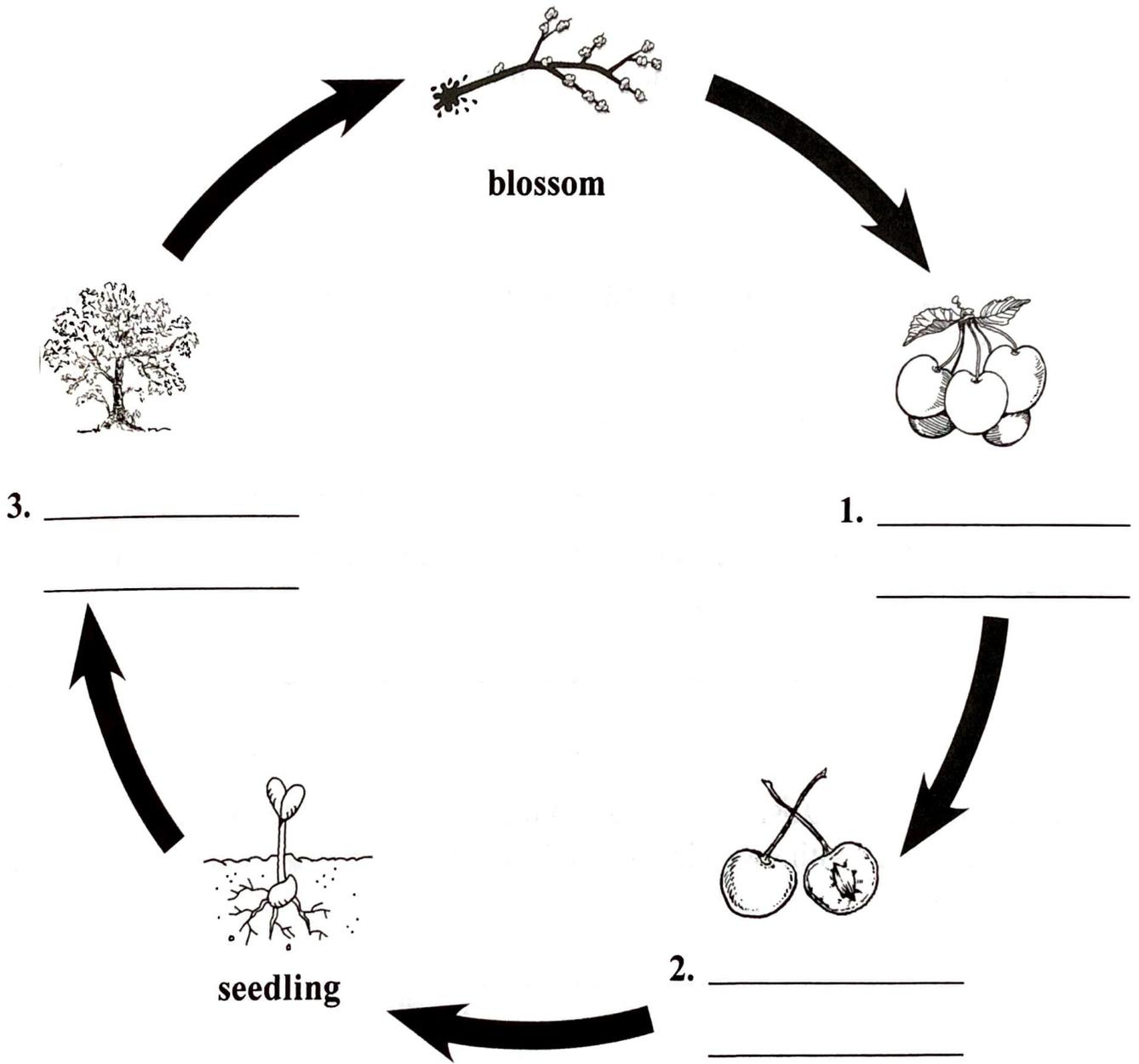
Seeds fall out of the cone to the ground. A conifer seed starts to grow. It becomes a seedling. The seedling grows into a sapling. The sapling grows into an adult tree.

Small and large cones grow on the adult tree. Pollen from the small cone falls onto the larger cone. Seeds grow inside the larger cone. Then the life cycle begins again. Conifers use their cones and seeds to reproduce, or make new plants. This diagram shows the life cycle of a conifer.



# What Are Plant Life Cycles?

Fill in the blanks to complete the life cycle of a cherry tree.



4. Define the term seedling.

\_\_\_\_\_

5. Define the term flower.

\_\_\_\_\_

**6. Main Idea** What are two things that happen during a plant's life cycle?

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**7. Vocabulary** Write a sentence using the term *life cycle*.

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**8. Reading Skill: Main Idea and Details** List three details about the life cycle of a flowering plant.

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**9. Critical Thinking: Analyze** How is the seed of a flowering plant different from the seed of a conifer?

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**10. Inquiry Skill: Observe** You see a plant that has white blossoms and small berries with seeds inside. Is the plant a flowering plant or a conifer? Explain.

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**11. Test Prep** A young tree is called a

A conifer.

B seed.

C fruit.

D sapling.

# What Are Some Animal Life Cycles?

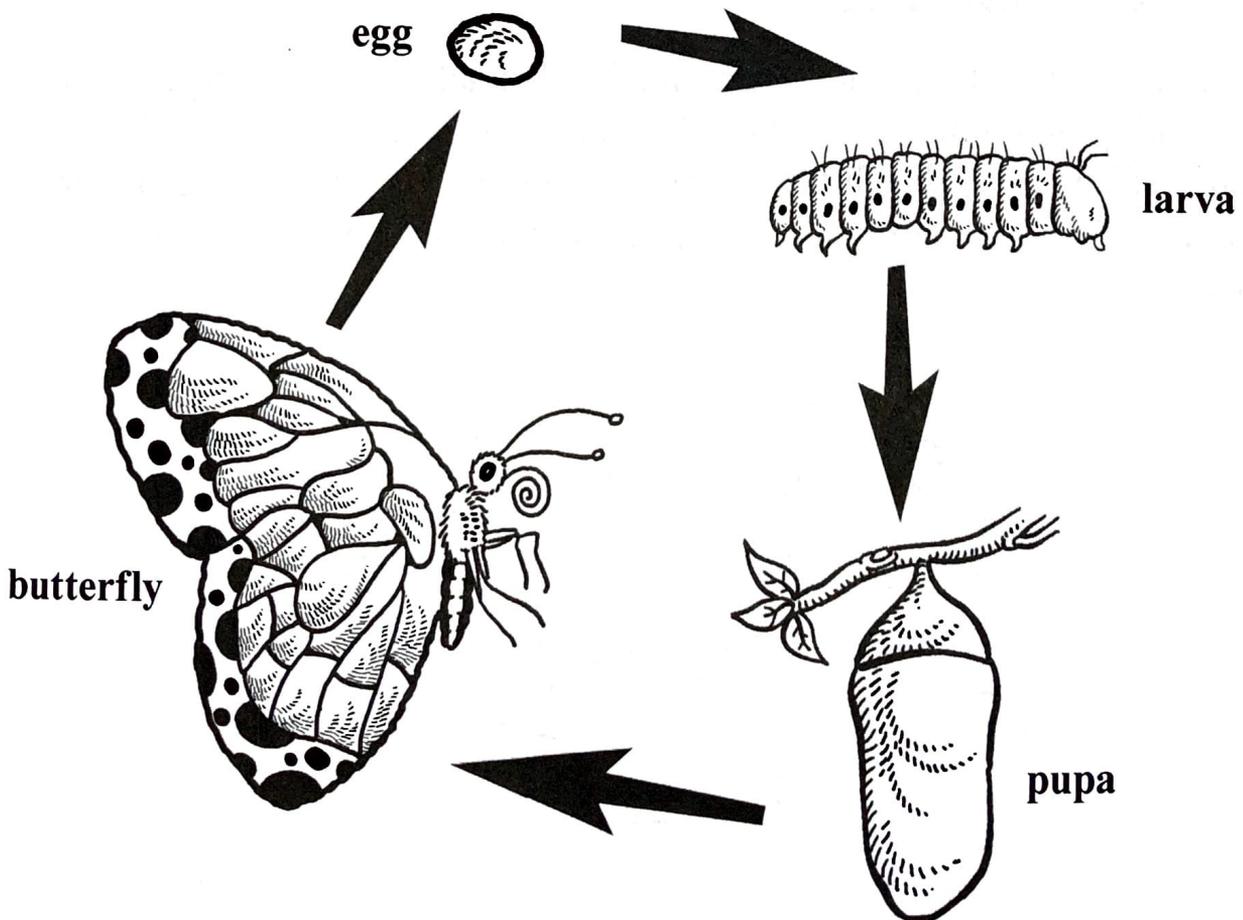
Animals have life cycles. They are born, grow, reproduce, and die. But different kinds of animals have different life cycles.

## Life Cycles of Insects

Most insects change more than other animals do. Butterflies go through four different stages. Many other insects go through this same life cycle.

The first stage in the life cycle of a butterfly is the egg. The second stage is the larva. A larva, or caterpillar, looks a lot like a worm.

The third stage is the pupa. In this stage, a butterfly makes a case called a chrysalis. In the chrysalis stage, the butterfly turns into an adult. The fourth stage is the adult stage. The adult female butterfly lays eggs. Then the life cycle starts again.



## Life Cycles of Amphibians and Reptiles

Amphibians change form during their life cycles. After a frog hatches from its egg, it is called a tadpole. A tadpole lives in water. It has a long tail, gills, and no legs. It does not look like an adult frog.



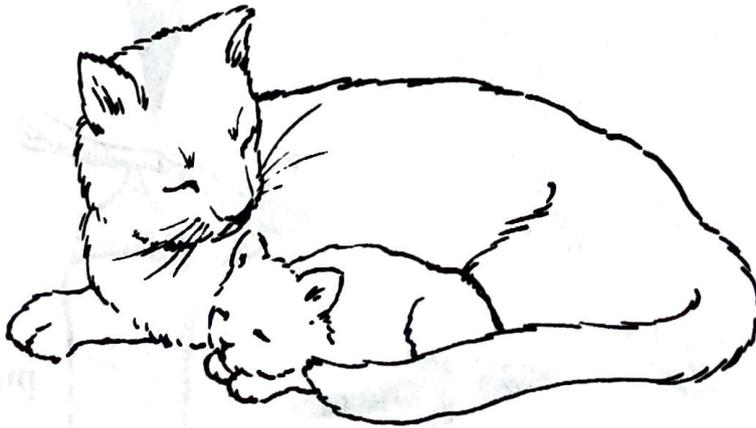
Reptiles have a different life cycle from amphibians. The adult female reptile lays eggs. The eggs are usually laid on land. Young reptiles hatch from the eggs. They get bigger and grow into adults. Reptiles do not change form as they grow. A young reptile looks like its parents.

## Life Cycles of Birds

Insects, amphibians, and reptiles lay eggs. So do birds. An adult female bird lays an egg. A small chick breaks out of the egg and begins to grow. It gets more feathers as it grows and soon becomes an adult like its parents.

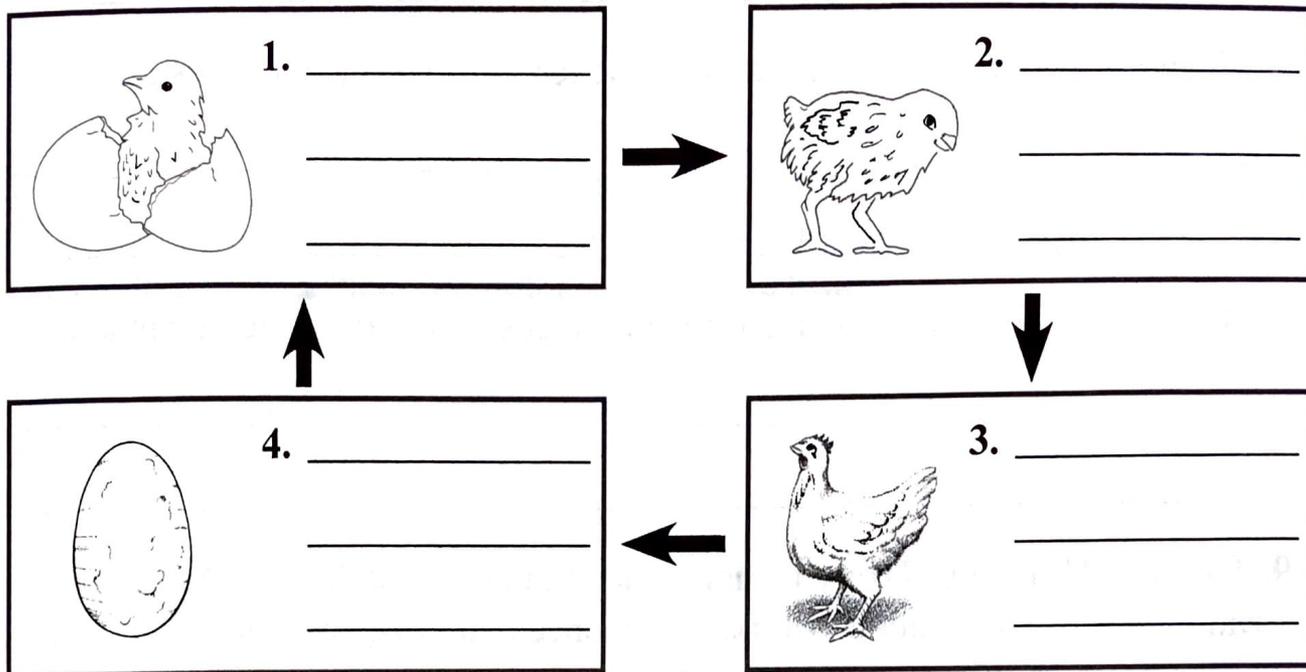
## Life Cycles of Mammals

Offspring are the young living things made when adult living things reproduce. The offspring of mammals grow inside the bodies of adult females. They are born live. They do not hatch from eggs. When they are born, young mammals look much like adult mammals. Dogs, cats, and humans grow and develop in this way.



# What Are Some Animal Life Cycles?

Fill in the blanks to complete the life cycle of a chicken.



5. Describe the four stages of the life cycle of a butterfly.

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Name \_\_\_\_\_ Date \_\_\_\_\_

**6. Main Idea** What do the life cycles of all animals have in common?

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**7. Vocabulary** Write a sentence using the terms *offspring* and *tadpole*.

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**8. Reading Skill: Sequence** Describe the stages in the life cycle of a mammal.

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**9. Critical Thinking: Draw Conclusions** Suppose that Animal A is an adult animal that hatched from an egg, once had gills, and once had a tail. What type of animal is Animal A?

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**10. Inquiry Skill: Communicate** Draw a diagram of the life cycle of a reptile.

**11. Test Prep** An example of an animal that lays eggs but does not change form as it grows is

A an insect.

C a reptile.

B an amphibian.

D a mammal.

# How Are Traits Inherited?

## Traits of Living Things

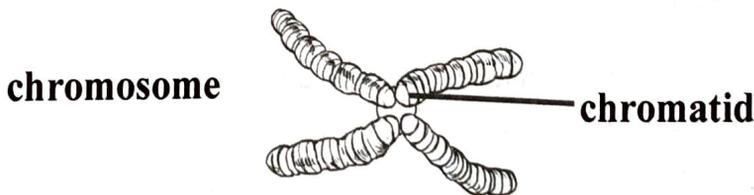
Parents pass traits, or characteristics, to their offspring. This is the process of heredity. Traits that are passed down are called inherited traits. Eye color is an inherited trait. So is the color of a flower or an animal's fur.

An acquired trait forms after a living thing is born. Acquired traits can come from the environment or can be learned. They are not passed from parents to their offspring. Flamingos' pink color is an acquired trait. It comes from the pink shrimp and algae flamingos eat in their environment. Some acquired traits, like reading, are learned. Manipulated traits are traits people change on purpose, like their hair length. Other traits, like intelligence, come from both heredity and the environment.

## DNA, Chromosomes, and Genes

Information about traits is stored in DNA. DNA is made of two long pieces called strands. The strands are side by side. They wind around each other like a twisted ladder.

Molecules, or units, of DNA are passed from a parent to a child. During reproduction, a copy of the DNA molecule is made. As cells divide, chromosomes form. Chromosomes are shorter, thicker strands of DNA. Each chromosome is made of two matching halves called chromatids.



Most living things have pairs of chromosomes. The chromosomes in each pair are similar, but not the same. The information in one chromosome affects many traits. Each trait is decided by a short piece of DNA called a gene. One chromosome can have hundreds of genes.

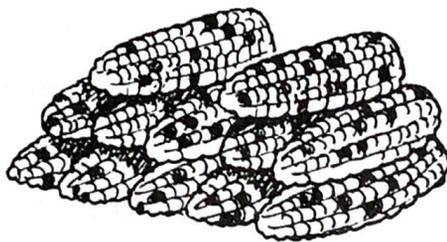
A living thing's genes are decided by the order of the units making up its DNA. The units can be arranged in many ways. This makes many different genes possible. That's why parents, children, and siblings can have both similar and different traits.

## DNA Replication

Before a cell divides, a copy of its DNA is made. This process is called DNA replication. The strands of the DNA molecule break apart and form two new strands. A new strand forms on each of the old strands. This makes two new DNA molecules that are the same as the old one.

## Mutations

Sometimes a mutation, or mistake, happens. Many mutations are harmful. They make it harder for a living thing to stay alive. But in rare cases, mutations are helpful. They cause new, welcome traits. Some mutations have no effect. They do not harm or help a living thing. For example, mutations can cause corn to have different-colored kernels.



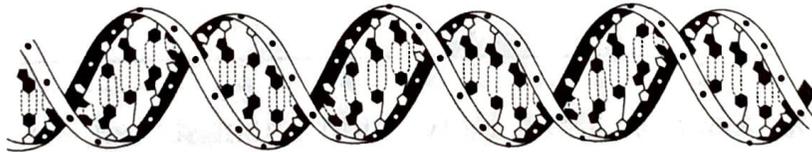
## Genes and Health

Some human diseases are inherited. They are caused by mutations in one or more genes. One example is sickle cell anemia. This disease happens when a person inherits mutated genes from his or her parents.

# How Are Traits Inherited?

Fill in the blanks.

1. In the process of \_\_\_\_\_, parents pass traits to their offspring.
2. A(n) \_\_\_\_\_ is formed after a living thing is born.
3. \_\_\_\_\_ traits are traits that people changed on purpose.
4. Information about traits is stored in two twisted strands called \_\_\_\_\_.
5. A \_\_\_\_\_ is a piece of DNA with matching halves called chromatids.
6. Inherited traits are decided by \_\_\_\_\_.



7. This drawing shows the process of \_\_\_\_\_.
8. A mistake that happens during DNA replication is called a(n) \_\_\_\_\_.

Name \_\_\_\_\_ Date \_\_\_\_\_

9. **Main Idea** What short, thick structure of DNA is formed when cells begin to divide?

\_\_\_\_\_

10. **Vocabulary** Write a sentence using the terms *genes* and *DNA*.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

11. **Reading Skill: Sequence** What steps take place during DNA replication?

\_\_\_\_\_

\_\_\_\_\_

12. **Critical Thinking: Apply** How do mutations affect a living thing? Why can some mutations have no effect?

\_\_\_\_\_

\_\_\_\_\_

13. **Inquiry Skill: Analyze Data** How could scientists tell whether a disease has been inherited or is caused by the environment?

\_\_\_\_\_

\_\_\_\_\_

14. **Test Prep** Human traits can

A only be inherited.

B only be acquired.

C be acquired and inherited.

D be inherited but not manipulated.

**Essential Questions:**

- What are the stages of life?
- How do plants and animals grow?
- When do they become adults?

**Key Term Activity at the end of the chapter.***Introduction: Organisms*

In the world, there are living and non-living things. Living things are alive. They are made from cells, basic units of life. The cells that make up our bodies are so small they cannot be seen with the eyes. But eggs that will not develop into babies can also be considered cells. Nothing grows inside the egg so it stays just one cell. An ostrich egg can weigh up to five pounds.

**Biology** is the scientific study of life. “Bio” is a prefix. It means life. When you see “bio” at the beginning of a word, the word probably has something to do with the living world. Biologists study living things, both plants and animals.

Living things are called organisms. Organisms can be as small as bacteria which have only one cell. Bacteria can only be seen with a microscope. There are 5 monillon (a million trillion trillion) bacteria on Earth. That's 5,000,000,000,000,000,000,000,000 bacteria. Most live in the **oceans** and in the soil.

Bacteria are considered a separate type of organism because they have just one cell. Organisms that we can see usually have many cells. Biologists divide organisms with many **cells** into two groups: plants and animals.

Plants are organisms that live on land or in water. They cannot move from place to place. Although plants grow toward the Sun, they cannot move quickly. Plants make their own food inside their plant bodies. They use light from the Sun to make their food. Almost all plants have roots.

There are two types of plants. Nonflowering plants do not make flowers. Flowering plants grow flowers. There are over 300,000 different types or species of plants in the world. A species is a group of plants or animals that can reproduce and have young that can reproduce. Reproduce means have **offspring**.

Animals are different from plants. Animals can move. They cannot make their own food. They must get their food from plants and other animals. Animals are better able to sense the world around them. To sense is to notice and observe in some way. Different animals use different senses, including some senses that humans do not have. For example, some animals can sense magnetism. Humans have five senses: sight, hearing, touch, smell, and taste.

Biologists divide animals into different groups based on their physical characteristics. Below is a chart of special traits of the different groups of animals.

| Type of Animal                             | Special Traits                                                                         |
|--------------------------------------------|----------------------------------------------------------------------------------------|
| Amphibians (frogs)                         | Born in water with gills and tails, but grow legs and lungs and live on land as adults |
| Arthropods (spiders, insects—and crawfish) | A body divided into segments (parts) and an exoskeleton (a skeleton outside the body)  |
| Birds (eagles, pelicans, bluebirds)        | Feathers                                                                               |
| Fish (sharks, tuna, perch)                 | Have gills and fins and live only in the water                                         |
| Mammals (bears, dogs, cats, whales)        | Have fur and drink milk made in their mother's bodies                                  |
| Reptiles (snakes, turtles, alligators)     | Covered in scales                                                                      |

Humans are mammals. Humans have fur (hair), although our bodies are not covered in fur. Human babies drink milk from their mothers.

Most mammals give birth to “live young”—babies that breathe and can move—instead of laying eggs. But five species of mammals lay eggs.



Figure 3.1  
Blue Whale

Both plants and animals can have very different sizes. The smallest plant in the world is the size of a grain of rice. The biggest tree in the world is a giant sequoia tree in California. It is 2,000 years old. Its name is General Sherman.

The biggest animal on Earth is the blue whale. It can be 100 feet long, longer than two school buses in a row. Blue whales live in the oceans of the world, including the Atlantic Ocean and the Pacific Ocean.

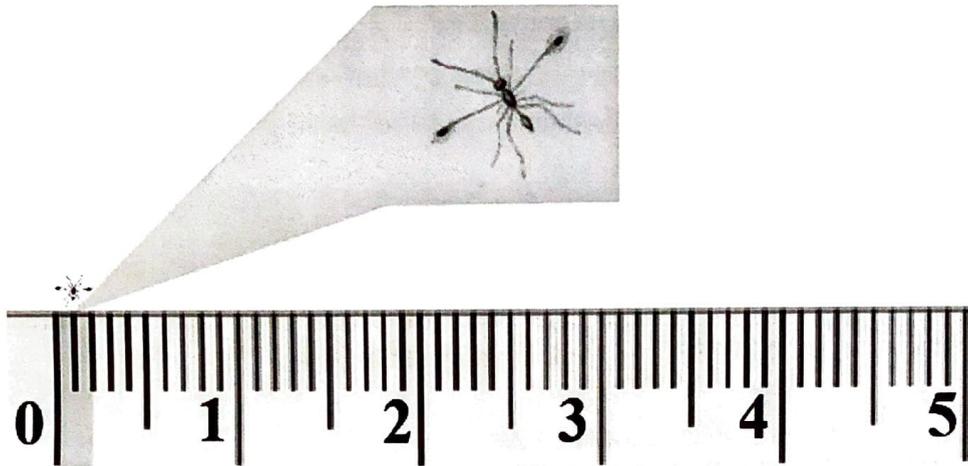


Figure 3.2  
Fairy Fly and Ruler

The smallest insect in the world is the fairy fly. At its largest, it is two-tenths of an inch long. Two mammals tie as the smallest mammals in the world. One is a bat that is as small as a bumblebee. It lives in Thailand in Asia. The other is an Etruscan shrew about one and a half inch long. It lives in Europe and Africa. A shrew looks like a mouse with a very long nose (a snout).

There are many different plants and animals in the world. There are more than 10,000 species of birds. There are about 5 million species of insects.

All living things need certain things to survive. Plants need air, water, and light. Plants use sunlight and a gas (carbon dioxide) in our air to make food.

Animals need water, food, air, light, and somewhere to live. Animals need to breathe a gas in our air called oxygen. Plants make oxygen when they make food. Animals breathe out carbon dioxide.

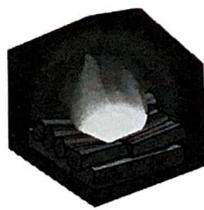
Most organisms cannot live where it is too hot or cold. But some bacteria can live in volcanoes under the sea that release hot gas and under the ice in the Antarctic. These types of bacteria have a special name: extremophiles. They are like bacteria that play extreme sports. When scientists talk about finding life on Mars, they are talking about finding extremophiles.

### Practice 3.1

- 1 Circle the pictures of organisms.



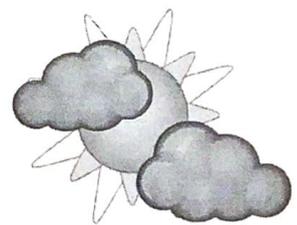
A



B



C



D

- 2 What are differences between plants and animals? Select the **two** answers that are correct.
- A Plants cannot move from place to place, but animals can.
  - B Plants can sense magnetism, but no animals can.
  - C Plants make their own food from sunlight, but animals can't.
  - D Plants eat only plants, but animals eat plants and animals.
- 3 Mammals
- A can fly.
  - B do not have fur.
  - C nurse their babies with milk.
  - D lay eggs.
- 4 What do organisms need to live?
- 

### *Part 2: The Life Cycle*

Even though they look very different, all organisms share certain experiences of life. They are born or sprout, they grow, they **reproduce** (have babies), and they die. They go through different changes or stages as they grow. This is the **life cycle**.

#### **Life Begins**

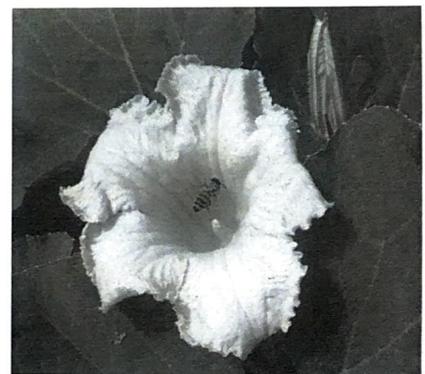
When a plant's life begins, we say it sprouts if it comes from a seed. Plants can reproduce from cuttings or shoots too. Cuttings are pieces of plants that people plant in the ground. Shoots are parts of a plant that begin to grow as new plants.

Most animals are born. But a few animals and some organisms like bacteria reproduce by splitting. A tapeworm can split off a part of its body. The split part continues to grow until it breaks off from the body of its parent.

#### **Plant Seeds**

Many plants begin from seeds. Like animals, they have two parents. Flowers make seeds. In a flower, the male part (the father) is called the stamen. The stamen makes pollen. Pollen is yellow. The female part (the mother) is called the pistil. The pistil traps pollen.

Some plants need bees to carry the pollen from one plant to another. You can see a bee in a pumpkin flower in Figure 3.3. When they bring pollen to a plant, bees are pollinators. Bees like the bright colors of flower petals. Pollen makes seeds. The seed grows inside the flower. Often, the flower makes a fruit as food and shelter for seeds.



**Figure 3.3**  
**Pumpkin Flower and Bee**

Pumpkins are fruits. Inside the pumpkin are pumpkin seeds. If the pumpkin was left on the ground, the pumpkin would rot. It would become part of the soil for the pumpkin seeds.

Seeds have hard outer coats. The seed opens and the seedling starts growing. The seed provides food for the seedling when it starts to grow roots. Examples of seeds include pine cones, the seeds inside apples, lima beans, and the seeds in a dandelion puff.



**Figure 3.4**  
Dandelion Seeds

Plants have many types of seeds. Sometimes plants use air to move their seeds to new places. The wind blows the seeds in dandelion puffs. The top, feathery part of the dandelion seed is called the parachute. The parachute can carry a dandelion seed up to five miles in the air.

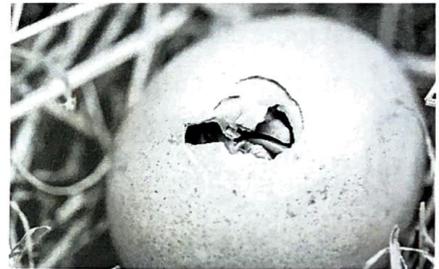
Many water plants like water lilies spread their seeds on the water so they will float away.

Many seeds grow inside fruits and nuts. Plants make fruit and nuts that animals like to eat. The hard coat of the seed protects it when it is inside the animal. The seed doesn't get digested. Animals often spread the seeds through their droppings.

Some plants do not make flowers and seeds. Instead, they make spores, which are much smaller than seeds and do not have a hard coat. Spores are the way non-flowering plants reproduce. Ferns do not make flowers.

### Animal Babies

Most fish and reptiles lay eggs. All birds lay eggs. The mother grows the eggs inside her body until she is ready to lay them. The baby continues to grow inside the egg. The hard shell of the egg protects until it is ready to hatch. Hatching animals peck with their beaks or claw their way out of eggs.



**Figure 3.5**  
Hatching Chick



**Figure 3.6**  
Mother Cat and Kittens

Mammals usually give birth to babies who are born alive. The time it takes for the baby to grow inside the mother is different for different types of animals. A mother cat grows her kittens inside her body for about two months. A newborn kitten weighs about as much as half a cup of milk. A baby elephant grows inside the mother elephant for almost two years. A newborn baby elephant weighs 200 lbs.

Some animals are born able to take care of themselves. Others will need care and attention.

Human babies need the most attention because we are the animals who have to learn the most.

**Practice 3.2**

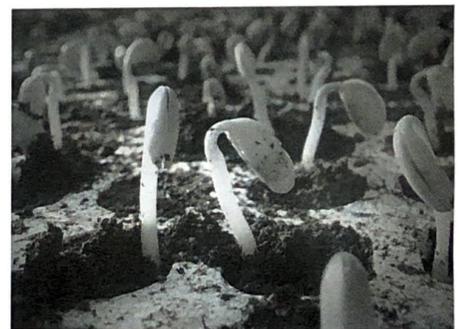
- 1 All \_\_\_\_\_ lay eggs.
  - A fish
  - B mammals
  - C reptiles
  - D birds
  
- 2 The female part of the flower is the
  - A pistil.
  - B stamen.
  - C leaf.
  - D seeds and fruits.
  
- 3 What animals usually give birth to animals who are born alive?
  - A fish
  - B mammals
  - C reptiles
  - D birds
  
- 4 What is the purpose of fruit?
  - A to provide nutrients for animals
  - B to support the flowers of the plant
  - C to attract bees
  - D to get animals to spread the seeds of the plant

*Part 3: Growth*

**Plants**

Organisms grow. Organisms need food to grow. The science word for food is **nutrients**.

Plants grow from seeds. Seeds need the right temperature to grow. They need light. Most grow in the spring, when the weather becomes warm. When the seedling continues to grow, it becomes a plant. In Louisiana, winters are usually mild and not too cold. In some places, the weather is very cold during the winter. Snow covers the ground. Most plants cannot grow in snow.



**Figure 3.7**  
**Soybean Seedlings**

The first part of the seed to grow is the root. Roots dig into the ground for water. The top part of the root becomes the stem. The **stem** of the plant holds it upward. It carries water from the roots to the rest of the plant. The stem grows leaves. The leaves make food for the plant from sunlight. This process is called **photosynthesis**. Leaves come in many different sizes and shapes.

An adult plant can make spores or flowers and seeds. **Adults** are organisms that have completely grown.



**Figure 3.8**  
**Adult Plants**

## Animals

Animals follow many different patterns of growth in their life cycle. Some animals are born as small versions of the adults they will become. Others undergo a dramatic transformation (change).

## Fish and Reptiles

Most fish and reptiles are born from eggs. When they hatch, they look like small adults. As soon as they hatch, fish can swim. Very few fish or reptiles care for their babies after they hatch or are born. They must survive on their own.

A few give birth to live babies. Most sharks give birth to live shark babies. Baby sharks are called pups. They must swim away quickly from their mother before she eats them. Pups look like small versions of adult sharks. They have a complete set of teeth. White sharks have one or two pups at a time. Other sharks can give birth to more than 100 pups at a time.

A few reptiles give birth to live babies. Garter snakes, which live in Louisiana and are harmless, give birth to live snakes.

## Mammals

Only five species of mammals in the world lay eggs. All other mammals give birth to live babies. When mammals are born, they usually look a lot like their parents. Kittens look like cats and puppies look like dogs. A baby giraffe looks like a giraffe (see Figure 3.8). Because they are born alive, mammals start life as babies. When mammals are young, they are called **juveniles**. Juveniles mammals usually stay with their moms until they can live on their own. When they can take care of themselves, they are adults.



**Figure 3.9**  
**Baby Giraffe and Mom**

### Birds

Birds undergo a transformation because baby birds usually do not look like their parents. Some baby birds do not even have feathers. The chick in Figure 3.9 does not look much like an adult hen (Figure 3.10). Young birds are called chicks. As chicks grow, they become adults. Hens become adults when they can lay eggs.



Figure 3.10  
Chicken Chick



Figure 3.11  
Adult Hen (Female Chicken)

Like mammals, baby birds need care from their parents. When they hatch, they cannot fly. Their parents must feed them.

The age when baby birds learn to fly depends on the species of the birds. Sparrows learn to fly in two weeks. The brown pelican can take up to three months to learn to fly. To get the chicks to fly, parent birds will hold the food they bring to the chicks further and further away. The chicks must leave the nest to get the food. Chicks learn to flap their wings to stay on the branch or get back up to the branch after falls.

There are two other types of animals: amphibians and insects. These types of animals experience many physical changes as they grow.

### Amphibians

Amphibians, like frogs, lay eggs. They lay their eggs in a group. Once a frog is hatched, it goes through four stages of growth. A frog starts life as a tadpole. It looks like a fish. It has a tail fin. It has gills instead of lungs and can breathe underwater. Then the tadpole begins to grow lungs and legs. It loses its tail. When it finishes growing and changing, it is an adult frog. It breathes air. This life cycle is shown in Figure 3.12.

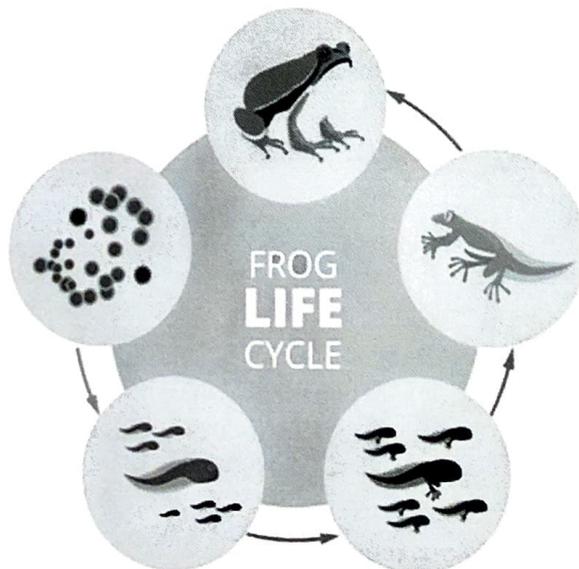


Figure 3.12  
Frog Life Cycle

## Insects

Insects also may look very different during different stages in their life cycle. Insects are born from eggs. That is always the beginning of their life cycle. Some insects have a life cycle with three stages. After they hatch, they are called nymphs. The nymph looks like the adult insect, only much smaller. It grows into the adult insect. As it grows, it sheds its skin.

Other insects grow in four stages. After they hatch, they are called larvae. A larva does not look like an adult of the species. A larva looks like a worm. Caterpillars are larvae. A larva eats a lot. Most larvae eat leaves. As a larva grows, it sheds its skin. Then the larva starts a new stage of life. It stops eating. It stops moving. It enters a stage where it is a pupa. Pupa is the plural word for more than one pupa. Pupae include cocoons and the chrysalises future butterflies build. Inside the pupa, the insect's body changes

shape. This change from a pupa to an adult insect is called metamorphosis. The insect uses its old body as food while it transforms. How long it takes a pupa to go through metamorphosis depends on the species of insect. Some pupae take years to grow into adult insects. In contrast, monarch butterflies are pupae for around 12 days. Insects claw or eat their way out of their pupa.

### Life Cycle of a Monarch Butterfly

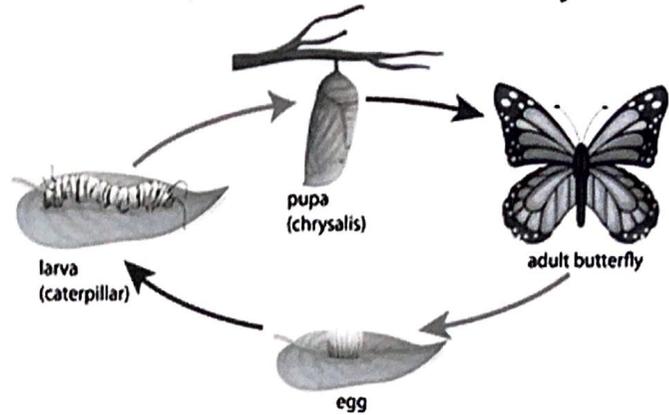


Figure 3.13  
Monarch Butterfly Life Cycle

## Life Span

How long an organism lives is called its **life span**. Some plants live on for a year. They are called annuals. People often plant annuals in flower gardens. How can you tell the age of a tree? By counting the number of rings on its trunk. Each ring stands for a year.



Figure 3.14  
Tree Rings



Figure 3.15  
Koi Fish

Different animals have different life spans. The mayfly is an insect that has existed since the millions of years before the dinosaurs. Mayflies hatch from eggs. They live as nymphs under water in rivers and streams. They live as nymphs for up to two years. Then they become adult mayflies. Adult mayflies have no mouths. They cannot eat. They live only until they lay eggs. Sometimes they live as adults for only a few hours. In contrast koi fish can live for over 200 years. Some trees can live for thousands of years.

**Practice 3.3**

- 1 The change from a larva to an adult during the pupa stage is called
    - A photosynthesis.
    - B giving birth.
    - C metamorphosis.
    - D life cycle.
  
  - 2 What animals give birth to babies who look like small adults? Select the **two** answers that are correct.
    - A insects with a three-stage life cycle
    - B frogs
    - C mammals
    - D birds
  
  - 3 A plant that is beginning to grow is called a
    - A baby.
    - B seedling.
    - C stem.
    - D nothing; there are no stages in plant life.
  
  - 4 What are the three stages of mammal life?
- 

**Bonus Question: Think like a Scientist**

You learned that some animals can sense magnetism and magnetic field lines. Biologists believe this helps them know where to go.

Is the statement below true?

Honeybees can sense magnetic field lines, and honeybees are animals, so all animals can sense magnetic field lines.

- A It is true because honeybees are animals.
- B It is true because animals need to sense magnetic field lines.
- C It is false because not all animals are magnetic.
- D It is false because only some animals can sense magnetic field lines.

## Chapter 3 Key Term Activity

## Word Bank

|            |                |           |
|------------|----------------|-----------|
| species    | photosynthesis | life span |
| life cycle | reproduce      |           |

The Seven Sisters is the biggest live oak tree in the US. Live oak trees are a(n) \_\_\_\_\_ of oak trees. It was a(n) \_\_\_\_\_ 1,500 years ago when it started to grow. Live oaks shed their leaves quickly in the spring while they grow new leaves. This means they are able to use \_\_\_\_\_ to make food all year long. The live oak has a long \_\_\_\_\_. Many live to be hundreds of years old. The live oak uses acorns to \_\_\_\_\_.

**Key terms are defined in the book's glossary.**

**Answer to Key Term Activities and Chapter Reviews are found in the Teacher's Guide.**

## How Heredity and the Environment Affect Plants and Animals

Performance Standards covered: 3-LS3-1, 3-LS3-2

### Essential Questions:

- Why do different animals look different?
- Why do some animals look like their parents?
- Does anything happen to them to change how they look as they grow?

### Key Term Activity at the end of the chapter.

#### *Part 1: Heredity*

Why is a baby Louisiana bear cub not a panda bear? The short answer is heredity. Offspring (children) resemble their parents. To resemble is to look or act somewhat like someone else. When parents pass along traits to offspring, it is called heredity.

Most animals in a species resemble each other. All tigers have stripes. All house cats also look alike even though they may come in many different colors. A way to think of a species is as a large family with many cousins. Species “family” members look alike because of genetic traits. Genetic means related to heredity. Genetic traits are inherited. Traits are physical characteristics or physical features seen in living things, such as having fins or wings. Other examples of traits include size or curly fur. There are perhaps thousands of different traits found in each living thing.

All living things inherit their physical traits from their parents and grandparents and great-grandparents and on and on into the past. Remember, a species is a group of living creatures who can have babies.

Pandas (sometimes called giant pandas) are a species of bear. They are native to China and eat bamboo. Pandas have a white body and head with black ears, eye patches, nose, and arms and legs. Pandas are not going to be green and purple or orange and blue. How they look is inherited from parents or other ancestors.



Figure 5.1  
Baby Pandas

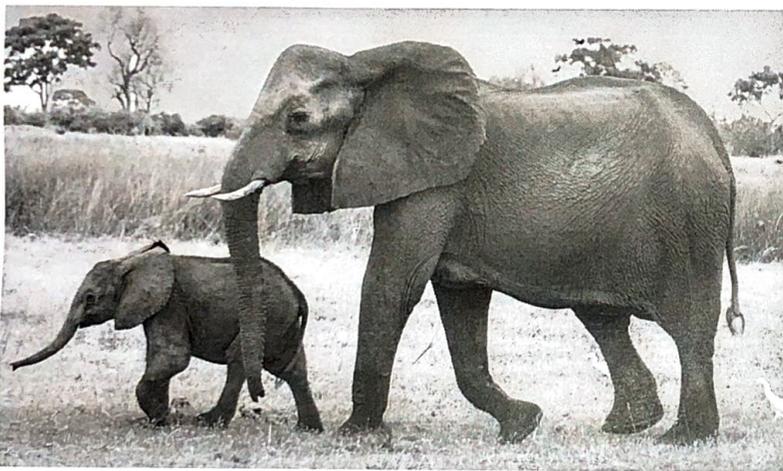
Pandas are unique. No other animals look like pandas. Scientists have looked for an explanation for the panda’s pattern of colors. They think the black color helps the panda hide in the shade of the bamboo forest, while the white color helps it hide in the snow (remember, pandas don’t hibernate).

Panda eye patches are different in size and shape. Biologists believe pandas may recognize (know) other pandas by their eye patches.

Pandas do not look like other bears. For a long time, biologists wondered if they were really bears. They studied panda DNA and compared it with the DNA of bears. **DNA** is found in the cells that make up the bodies of every living thing. Panda DNA is like bear DNA.

Sometimes species of animals look alike. There are two types of elephants in the world. There are African elephants and Asian elephants. When you first see them, they look alike. Both African and Asian elephants are large mammals with gray skin. They have trunks. They have little, thin tails.

If you look closer, they look slightly different. They are different species. When you look at the pictures in Figures 5.2 and 5.3, you can see that the babies look like their mothers. See if you can spot the differences between the Asian and the African elephants.



**Figure 5.2**  
African Elephant and Baby

African elephants are bigger than Asian elephants. They are the largest animals that live on land on Earth. They are taller and they weigh more. Their ears are much bigger. The ears of the African elephant look like the continent of Africa.

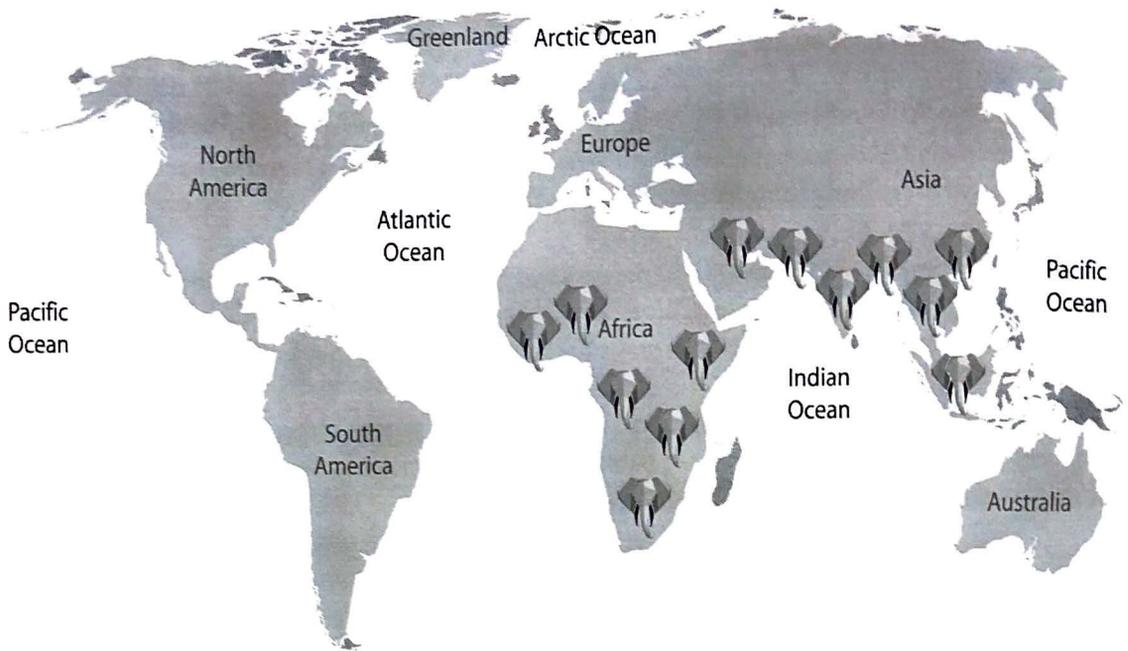
African elephants have a head with one dome (a dome is a rounded area). The heads of Asian elephants have two domes with a dent in the middle.

The skin of an African elephant is more wrinkled than the skin of the Asian elephant. It has more rings on its trunk and two fingers inside its trunk. The Asian elephant trunk has one finger.

There is an important difference between the tusks of the two species of elephants. The tusks that stick out of the mouths of elephants are actually long teeth. Male and female African elephants have tusks. But only male Asian elephants have tusks.



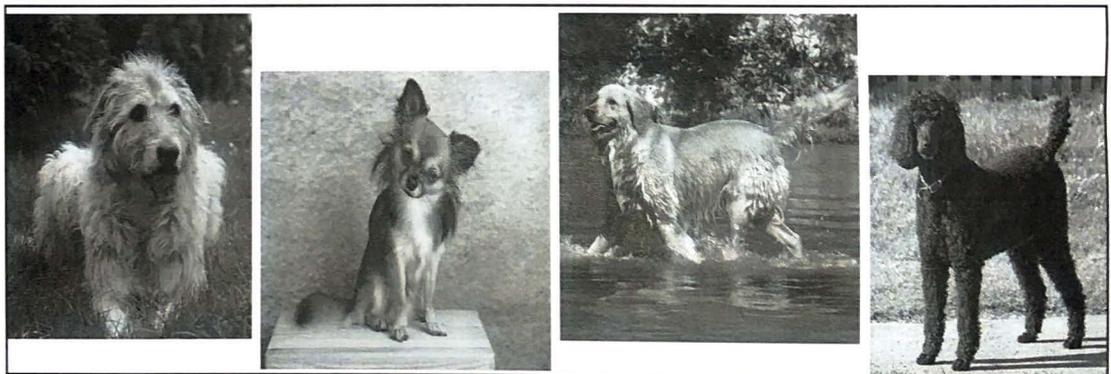
**Figure 5.3**  
Asian Elephant and Baby



**Figure 5.4**  
**Where Elephants Live**

Because African and Asian elephants live on different continents, they do not meet. So far, there has only been one baby born with an African and an Asian elephant parent. Sadly, that baby lived only a few weeks.

Sometimes different species of the same animal look very different. Pictured below are four breeds of dogs.



**Figure 5.5**  
**Different types of Dogs**

They look very different. Yet they are all dogs. The tallest dog breed in the world, the Irish Wolfhound, stands about three and a half feet tall. The shortest dog breed, the Chihuahua, can be as short as 6 inches tall as an adult. Dogs show how the heredity of an organism can be changed to meet human needs.



Figure 5.6  
Gray Wolf

The ancient ancestor of the dog was the gray wolf. Wolves and dogs have many traits in common. They walk on four legs and have fur, for example. Both wolves and dogs have 42 teeth. Figure 5.6 shows a wolf.

Wolves remained wild animals. They are aggressive hunters. They are different from dogs in some traits. Wolves have larger brains than dogs. They also have bigger teeth and paws and longer legs.

Yet, somehow some wolves became dogs. Humans first tamed dogs from wolves more than 10,000 years ago. Tame means not wild.

Many biologists believe the first tame dogs looked like the village dogs that live in poor villages today. Village dogs are usually medium-sized, brown, and have ears that stand up. In poor villages, people cannot afford to have pets. Village dogs live off garbage. Sometimes people feed them scraps. Village dogs protect people and their village by barking. Most dogs today are village dogs.

But in other parts of the world, the traits of dogs have been changed in many ways. Dog breeds have been created to serve human needs. The St. Bernard was bred to rescue people in the mountains in Europe. To help people, it has to be a gentle dog. To help adults, it had to be a huge dog. St. Bernard dogs can weigh over 200 lbs.



Figure 5.7  
Village Dog in India



Figure 5.8  
St. Bernard Dogs

Saint Bernard dogs have Saint Bernard puppies. People created breeds of dogs by letting dogs who shared a trait have babies. That trait was passed on to their babies through heredity. It was passed along in their DNA. Then those babies had babies. Before long, all the babies shared the trait the humans wanted. The dogs became a breed. A breed is a group of plants or animals that share certain traits. Breeds are not species because breeds can have babies with other breeds. When dogs have both parents that are part of a certain breed they are considered purebred dogs.

Dog breeds can be small or huge. They can be a certain color. They can have spots or eye patches. They can have fur that is straight or curly.

Plants also look like their parents. In fact, the first scientist to study heredity looked at plants. His name was Gregor Mendel. He studied how plants inherit their flower colors. He studied peas that had different color flowers. He found that when he bred peas with different colors, there was a pattern to how the peas inherited their flower color. He found that when both pea plants had purple flowers, their “children” had purple flowers. When he bred purple-flower pea plants with white-flower pea plants, their “children” had purple flowers. But when he bred those plants, one of four of the plant “grandchildren” had white flowers.

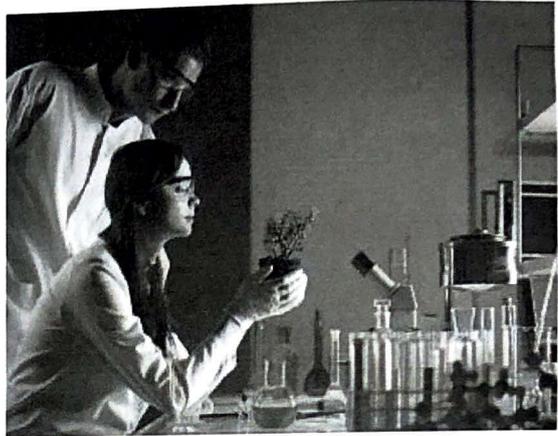


Figure 5.9  
Creating Better Plants

These patterns of heredity can be worked out when the ancestors of plants or animals are known.

But plants and animals do not always have offspring that look like them or their grandparents. Sometimes plants or animals inherit blended traits. **Blended traits** are traits that combine the traits of the parents. For example, a white flower and a red flower might produce pink offspring. Blended traits are a little like mixing paints.

Heredity has become very important in the survival of some plants. The American elm is a tree that once grew in Louisiana. In fact, there is a town called Elm Grove in Louisiana. American elm trees were killed by a tree disease (Dutch elm disease) from Europe. Scientists grew seedlings from the few American elm trees that survived. They hoped the seedlings would inherit resistance to the disease. Then they tried to give the seedlings Dutch elm disease. Many died. But some did not. They bred seeds from the seedlings that did not die. The process of breeding trees that inherited a resistance to the disease has taken a long time. But heredity will probably save the American elm. Now scientists have enough seeds and seedlings from trees that have inherited the ability to fight the disease to begin to plant them in many places.



Figure 5.10  
American Elm Tree

Practice 5.1

- 1 What does DNA do?
  - A It tells elephant cells to grow gray skin.
  - B It tells wolves what to eat.
  - C It tells plants to grow in dirt.
  - D It tells wolves where to live.
  
- 2 What would a Saint Bernard inherit as a trait? Select the **two** answers that are correct.
  - A being a seeing-eye dog
  - B her size
  - C her eye patches
  - D where she lives

Look at the picture below to answer the next question.



A



B



C



D

- 3 Mrs. Park wants to grow taller flowers in her garden. Which **two** plants should she use to make seeds for next year?
  - A
  - B
  - C
  - D
  
- 4 Mr. Hebert wants to grow orange flowers. What two plants should he use to attempt to make seeds for next year? Select the **two** answers that are correct.
  - A plants with red flowers
  - B plants with green flowers
  - C plants with yellow flowers
  - D plants with white flowers

*Part 2: Impact of Environment on Organisms*

The environment can have an impact on plants and animals. Long before humans began breeding the plants and animals they wanted, nature affected organisms. In another chapter, you will learn how plants and animals adapted (changed) to live in different habitats. Some animals inherited traits that helped them better survive where they lived.

But the environment can affect plants and animals right away. Remember, all living things need water, food, light, and a place to live.

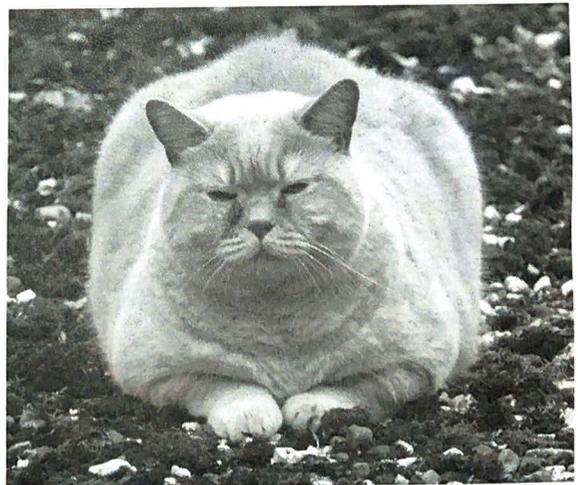


**Figure 5.11**  
**Corn in Drought**

In the same way, too much or too little food can hurt an animal. An animal that gets too much food will become overweight. A growing animal that gets some food but not enough food to reach its normal size will be smaller than it would have been if it had more food. The term for this is **stunted growth**.

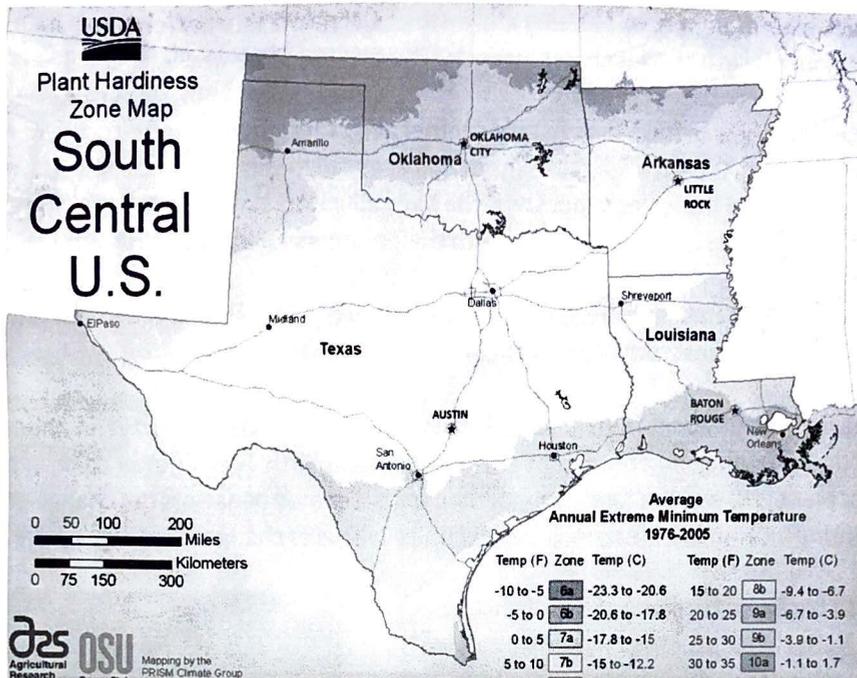
Lack of food can kill an animal. Plants can suffer stunted growth too. They will be smaller or even die if they do not get enough light or water.

Animals in nature do not get overweight. They get enough exercise searching for food and avoiding predators.



**Figure 5.12**  
**Overweight Cat**

Temperature can affect living things. If it is too hot, plants that need cool weather cannot grow. If it is too cold, plants that need warm weather will not grow. Figure 5.13 shows a plant hardiness zone map. Adults use it. *Hardiness* means able to withstand or cope with something. Plants are able to grow in their hardiness zones.



**Figure 5.13**  
**Plant Hardiness Zone Map**

Sea turtles' eggs develop faster in their nests when the weather is warm. Warm weather also produces more female sea turtles. When it is cooler, more males are born.

Animals that live in cold climates tend to be bigger—even when they are members of the same species. Deer are larger in the North than they are in the South. Being larger keeps them warmer. Because reptiles cannot produce their own heat inside their bodies like birds or mammals, they cannot live in the snow of the tundra. There are no snakes, lizards, or turtles in the tundra.

Living things also learn in their environment. How do pets learn to be overweight? They learn to beg for food. Their humans give them food because they love them.



**Figure 5.14**  
**Dog Begging for Food**

Learned behavior is different from heredity and instinct. Behaviors that are inherited are called **instincts**. Every animal in a species shares instincts. They act the same way.

Instincts tell animals how to raise their babies. Mother alligators guard their nests of eggs. When the eggs are ready to hatch, the baby alligators inside the eggs call to their mother. She opens the eggs and carries her babies to the water in her jaws. The baby alligators stay close to their mother. She protects them. Some baby alligators will stay with their mothers for up to a year.

When baby sea turtles hatch, they head for the ocean. They dig out of the nest and run toward the sea as a group. This helps at least some baby turtles survive. It is an instinct.

Learned behaviors are different from inherited traits. **Learned behaviors** are ways an animal learns to behave or do something. Inherited traits are determined at birth. Eye or flower color, or height if the animal or plant gets enough food, are inherited traits. Learned behaviors can change or become unlearned during an animal's life span. Inherited traits will never change.

Many animals have to learn some of their behaviors. Wild cats (lions, tigers, cheetahs) have many inherited traits such as sharp claws and whiskers that can help them find prey. As cubs (babies), they have some instincts to hunt. They play and pounce on each other just like kittens. But because they are smarter animals (not as smart as us but smarter than worms), they learn the details of hunting from watching their mothers. Puppies and kittens learn to trust people if they are treated well.

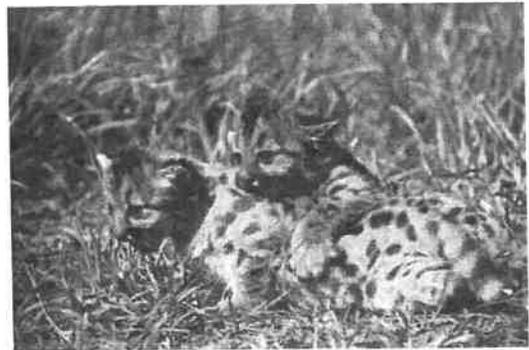


Figure 5.15  
Cubs Play Hunting

Usually, the smarter the animal, the more it must learn. That's why you spend years in school.

### Practice 5.2

- 1 Qwan wants a pet for his home in Alaska. He wants to be able to take his pet outside. What would NOT be a good pet for Qwan?
  - A a cat
  - B a dog
  - C a lizard
  - D a rabbit
- 2 When a baby sea turtle hatches and immediately heads toward the ocean, that is an example of
  - A learned behavior.
  - B breeding.
  - C DNA.
  - D instinct.

- 3 It takes about 60 days for sea turtle eggs to hatch. If the weather is unusually warm, what is **likely** to happen? Select **two** the answers that are correct.
- A More male turtles will be born.
  - B More female turtles will be born.
  - C The eggs will hatch sooner than 60 days.
  - D The eggs will hatch later than 60 days.
- 4 An animal that does not get enough food will suffer
- A increased growth.
  - B stunted growth.
  - C drought growth.
  - D instincts.

**Bonus Question: Think like a Scientist**

If you wanted to create a breed of dog that could live on Mars with astronauts, list and describe two traits you would want it to have.

## Chapter 5 Key Term Activity

### Word Bank

traits  
heredity

inherited traits  
stunted growth

learned behavior

Anthony wanted the best dog ever. He knew what \_\_\_\_\_ he was looking for in a dog. He wanted his dog to be big, brown, and have stand-up ears.

He knew fur color and floppy ears are \_\_\_\_\_ that dogs get from their parents through \_\_\_\_\_. They would inherit size too unless they suffered \_\_\_\_\_ from not getting enough good food.

What dog did Anthony get? He got a medium sized black dog with floppy ears! But his was the best dog ever. Anthony was kind with his dog. He was patient. He praised his dog when his dog did good.

The dog loved Anthony. It trusted Anthony. That was its \_\_\_\_\_  
\_\_\_\_\_ from the way Anthony cared for his dog.

Anthony's dog was his best friend ever.

**Key terms are defined in the book's glossary.**

**Answer to Key Term Activities and Chapter Reviews are found in the Teacher's Guide.**