Week #3

SC.4.L.16.1 Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination. **SC.4.L.16.4** Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.

ESSENTIAL **QUESTION**

How Do Plants Reproduce?

Engage Your Brain

Find the answer to the following question in this lesson and record it here.

Bees need flowers for food. How do flowers need bees?

_____

_____

_____

_____

_____

ACTIVE READING

Lesson Vocabulary

List the terms. As you learn about each one, make notes in the Interactive Glossary.

_____ _____

_____ _____

_____ _____

Signal Words

In this lesson, you will read about the sequence of stages in a plant's life cycle. Words that signal sequence include *now, before, after, first, next, start,* and *then*. Active readers look for signal words that identify sequence to help them remember what they read.

How Does a Garden Grow?

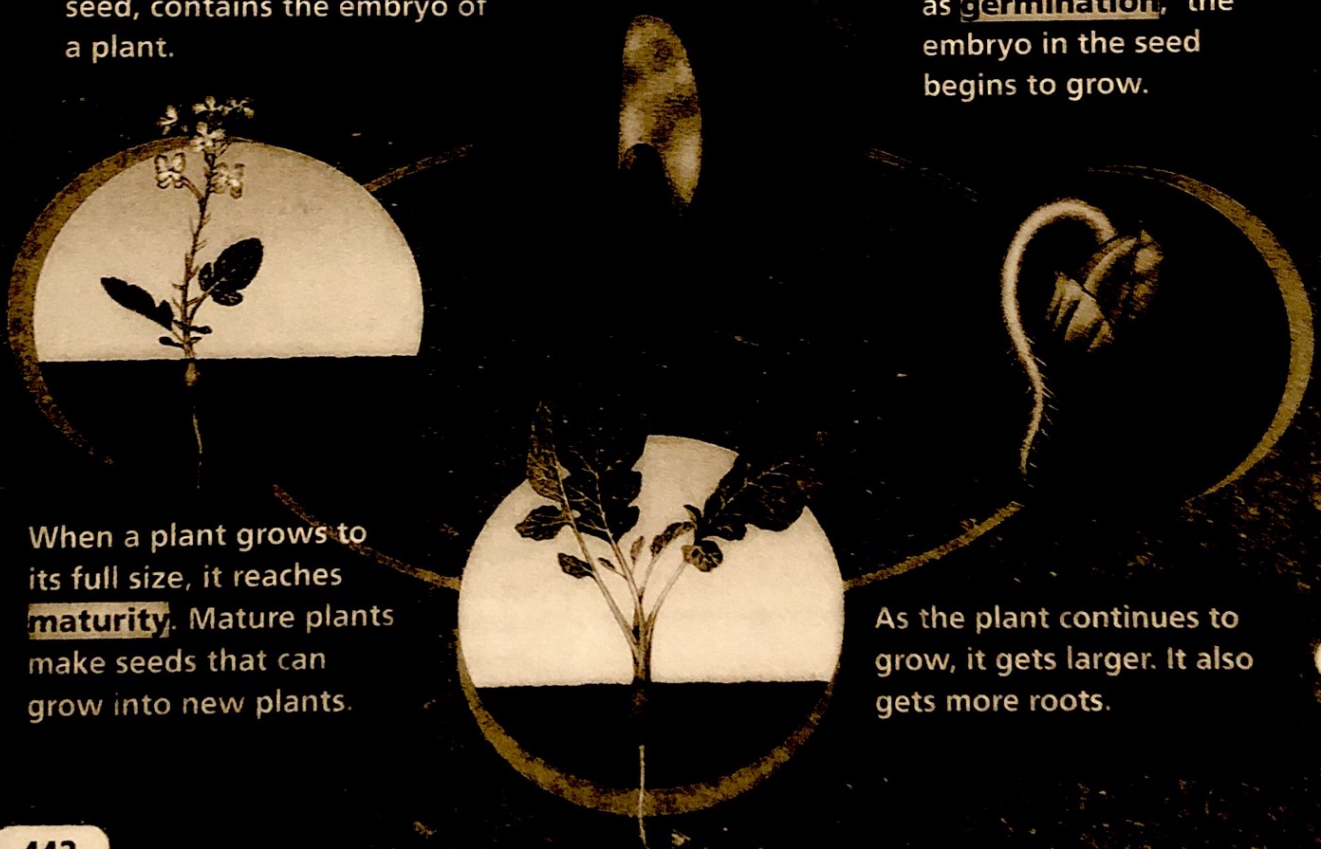
Think of some of the plants you saw on your way to school today. You might have seen trees, grasses, flowers, or even weeds. Where did all of these plants come from?

As you read the next page, circle the signal words that show the sequence in which a plant grows.

Radish Life Cycle

A seed, such as this radish seed, contains the embryo of a plant.

When a seed sprouts during a process known as **germination**, the embryo in the seed begins to grow.



When a plant grows to its full size, it reaches **maturity**. Mature plants make seeds that can grow into new plants.

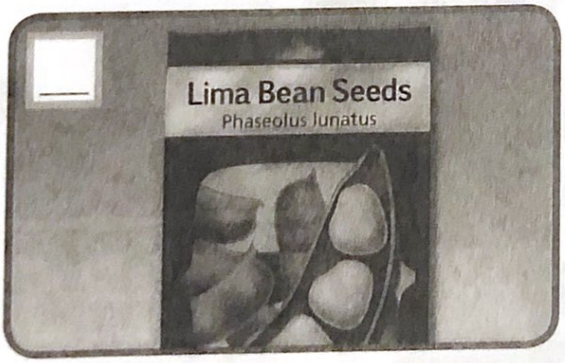
As the plant continues to grow, it gets larger. It also gets more roots.

When a plant grows, it goes through a series of set stages. The series of stages that a living thing goes through as it develops is called a *life cycle*. It is important for people to understand plant life cycles, because most of the food we eat comes from plants.

Most plants grow from seeds. First, a seed is placed in soil, so it can sprout. Next, the plant grows until it reaches maturity. A mature plant may grow flowers or cones. Then these structures make more seeds. You will learn about flowers and cones on the next pages.

Lima Bean Life Cycle

Place the pictures in the correct sequence to show the life cycle of a lima bean plant. Write a number next to each picture. Start with the seed.



Flowers and Cones

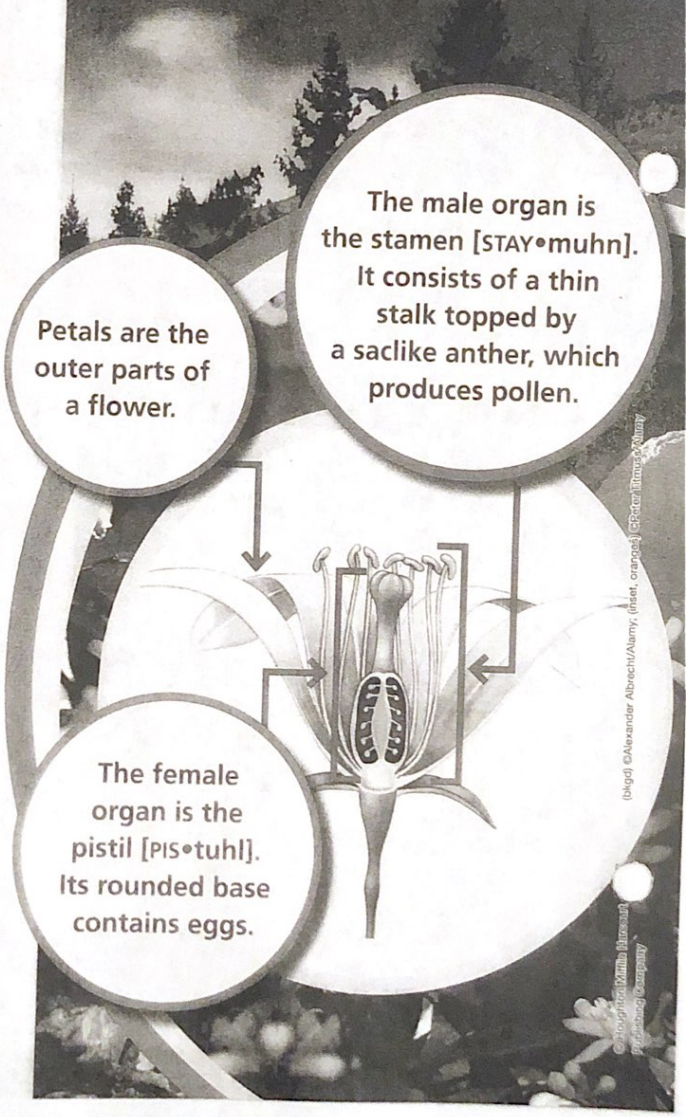
There are about 310,000 types of plants. Almost 90% of them produce seeds. How do plants produce seeds?

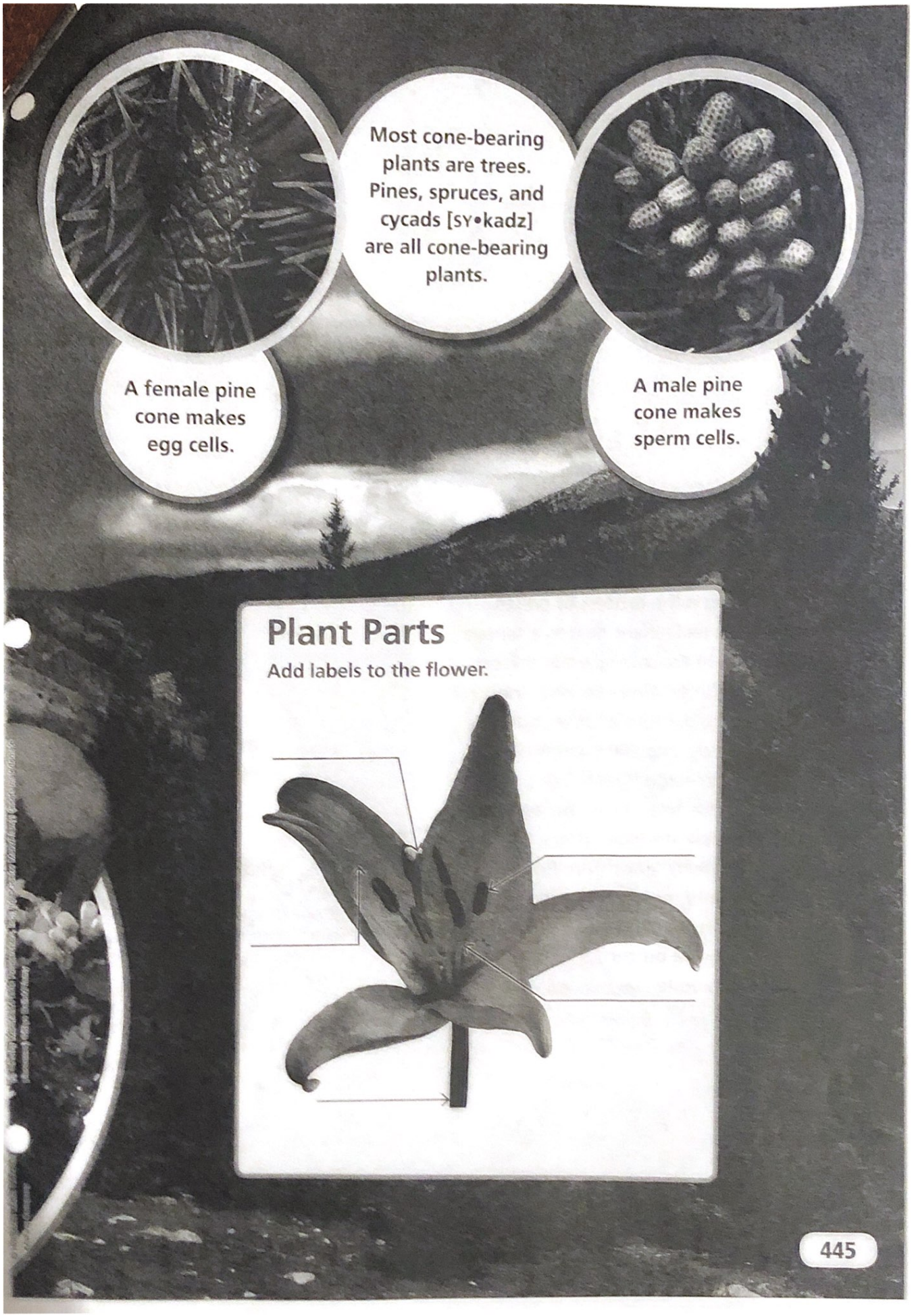
As you read this page, underline the names of male plant parts and circle the names of female plant parts.

Flowers and cones are reproductive structures that make seeds. They produce sex cells. Sex cells are used during *sexual reproduction*. Male sex cells are called sperm, and female sex cells are called eggs. **Fertilization** is the process of a sperm and an egg cell joining together. A fertilized egg grows into an embryo inside a seed.

About 1,000 types of plants produce seeds in cones. In plants with cones, sperm are made in male cones and eggs are made in female cones.

Most plants produce seeds in structures called flowers. In plants with flowers, grains of pollen, produced in parts called anthers, contain the sperm. Eggs are made in a structure called a pistil. Many flowers have both anthers and a pistil. As you can see in the picture, flowers have many other parts as well.





Plant Parts

Add labels to the flower.

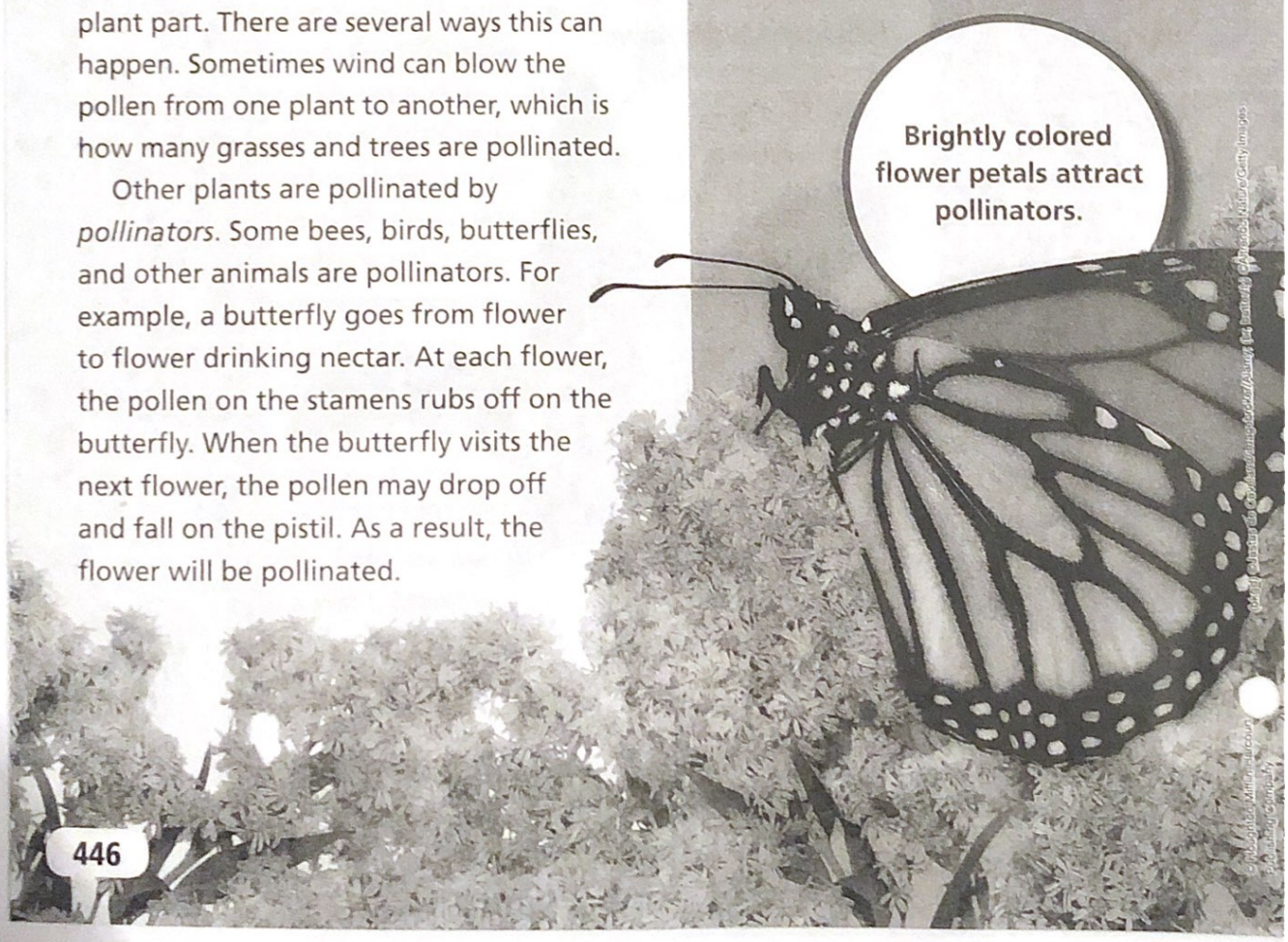
The Power of Pollen

In order for plant eggs to be fertilized, pollen has to move from the male parts to the female parts. How does the pollen get there?

ACTIVE **READING** Underline ways plants can be pollinated.

Plants reproduce through pollination. **Pollination** is the process of pollen moving from a male plant part to a female plant part. There are several ways this can happen. Sometimes wind can blow the pollen from one plant to another, which is how many grasses and trees are pollinated.

Other plants are pollinated by *pollinators*. Some bees, birds, butterflies, and other animals are pollinators. For example, a butterfly goes from flower to flower drinking nectar. At each flower, the pollen on the stamens rubs off on the butterfly. When the butterfly visits the next flower, the pollen may drop off and fall on the pistil. As a result, the flower will be pollinated.



Brightly colored flower petals attract pollinators.

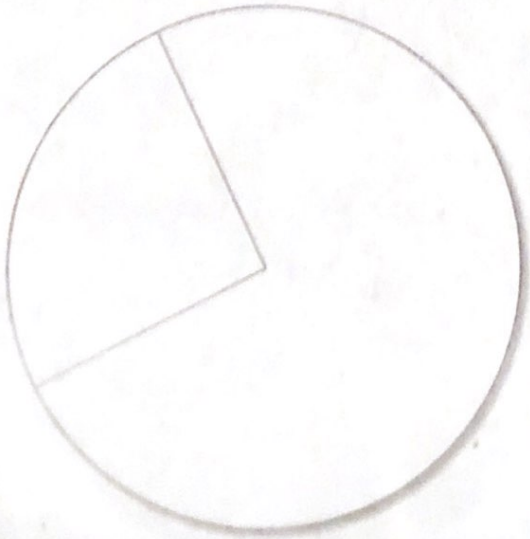
Some water plants are pollinated by water. Flowing water carries the pollen from plant to plant.

Wind blows pollen from male cones. The wind may carry the pollen to a female cone.

DO THE **MATH**

Work with Fractions

Animals pollinate $\frac{3}{4}$ of seed-making plants. Wind and water pollinate the other $\frac{1}{4}$ of plants. Use this information to label the parts of the circle.



Seeds on the Move

Unlike most animals, plants cannot move around in their environment. So how can a plant's seeds be spread from place to place?

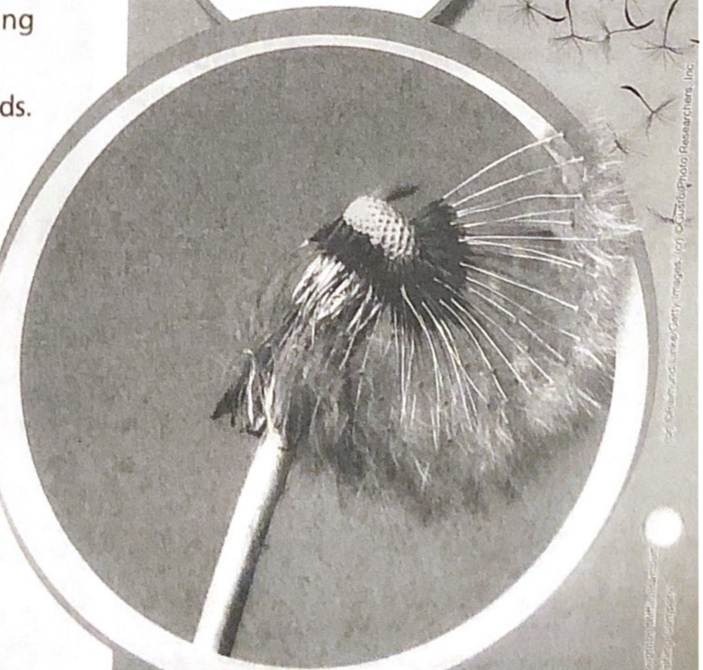
ACTIVE READING As you read, underline three things that help seeds move from place to place.

Animals play a big role in moving plant seeds. The base of the pistil of flowers grows into a fruit that contains the flower's seeds. Think of the seeds in an apple or in a blackberry. When an animal eats these fruits, the seeds pass through the animal's body before being deposited elsewhere.

Other animals will find and bury seeds. Think of squirrels. Squirrels bury acorns so that they will have food in the winter. The squirrels will dig up and eat most of the acorns, but they may forget a few. These acorns will grow into new oak trees.

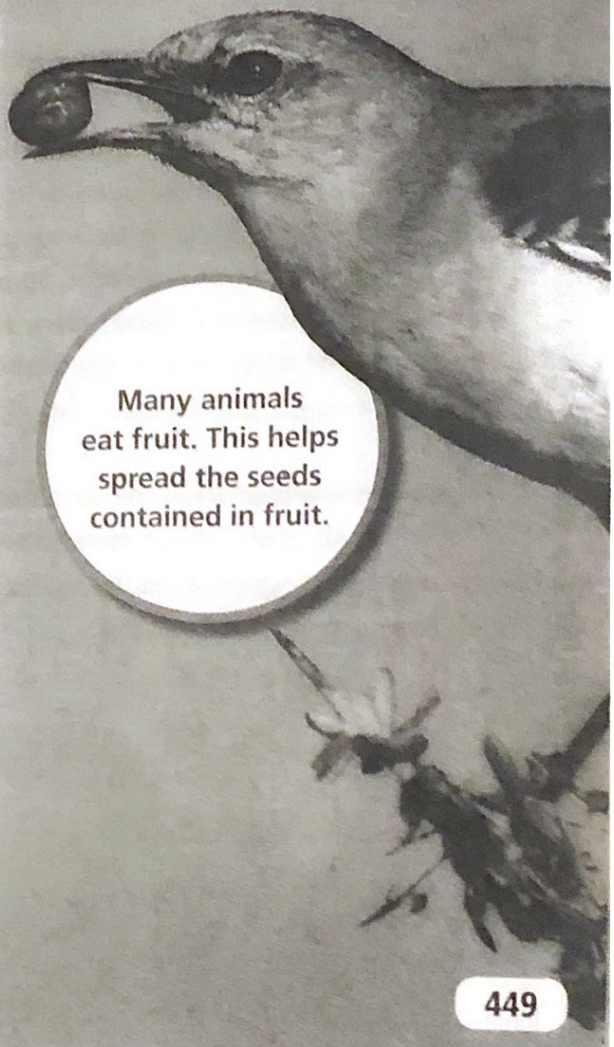
Seeds, such as burs, can also travel on an animal's body. Other kinds of seeds are very light. They can be carried by the wind. Still other seeds, including coconuts, float in water.

Some seeds are very light. They can be blown around by the wind.



Some seeds are covered in little hooks. These seeds are called burs. They can easily attach to fur or even to your socks!

▶ How are each of these seeds most likely spread from place to place?



Many animals eat fruit. This helps spread the seeds contained in fruit.

Other Ways Plants Grow

Pine trees, beans, and sunflowers all grow from seeds. Other plants do not grow from seeds. These plants grow from structures called spores.

ACTIVE READING As you read this page, draw one line under a cause. Draw two lines under its effect.

Spores are very tiny. They can be carried long distances by the wind.

Have you ever looked at the underside of a fern leaf? You may have seen black or brown spots, like the ones in this picture. These spots are made up of pockets filled with spores.

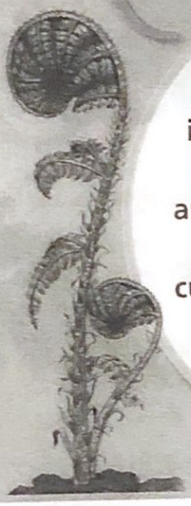
A **spore** is a cell that can grow into a new plant when the conditions are right. Some plants, such as mosses and ferns, grow from spores instead of seeds. Plants that grow from spores have two distinct forms in their life cycles.

Spores are released when the structures that hold them break open. Wind carries the spores to new places. If a spore lands in a good spot, it will grow into a plant.

A fern leaf, or frond, is one form of the plant. Spore clusters grow on the undersides of the fronds. When the clusters burst, spores are carried by the wind.

If a spore lands in a place with good light and water, it begins to grow into a tiny, flat, heart-shaped structure.

The heart-shaped structure is the other form of the plant. It produces eggs and sperm. If a sperm cell fertilizes an egg cell, a curled frond will begin to develop and push out of the ground.



The new plant reaches maturity when it can reproduce.

▶ Fill in the chart to compare and contrast characteristics of seeds and spores.

Seeds	Both	Spores

Sum It Up »

Read the summary statements. Then match each statement with the correct image.

____ 1. When a seed germinates, the embryo in the seed grows.

____ 2. The female organ of the flower is the pistil. The male organ of the flower is the stamen.

____ 3. In order to make new seeds, flowers or cones need to be pollinated by animals, wind, or water.

____ 4. Seeds can travel by water or wind, on an animal's body, or inside an animal's body.

____ 5. Spores are stored in clusters on the underside of fern leaves.

A 

B 

C 

D 

E 

Brain Check

LESSON 1

Name _____

Vocabulary Review

Use the words in the box to complete each sentence.

cone
cycle
fertilization*
germination*
maturity*
pollen
pollination*
seed
spore*

* Key Lesson Vocabulary

1. The process that happens when a sperm joins with an egg is called _____.

2. _____ is the stage in a plant's life cycle when it has grown enough to reproduce.

3. When an egg within a pistil is fertilized, a _____ forms.

4. All of the stages a plant goes through as it develops is called its life _____.

5. _____ is when pollen falls on a flower's pistil.

6. The process of a small root and stem beginning to grow out of a seed is called _____.

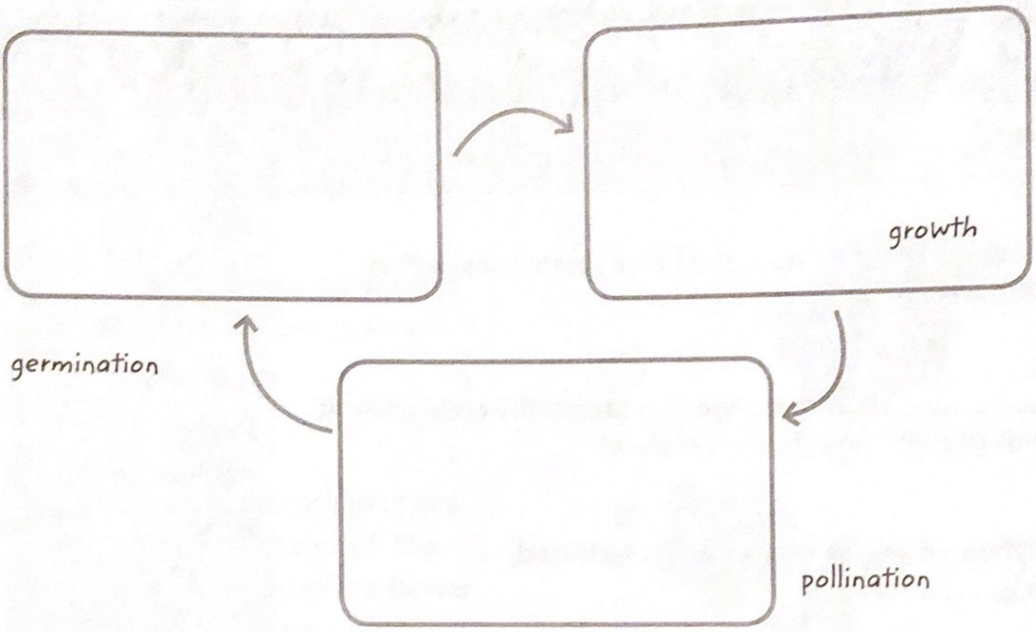
7. _____ contains the male sex cells in seed-forming plants.

8. A _____ is the structure that pine trees and spruce trees use to reproduce.

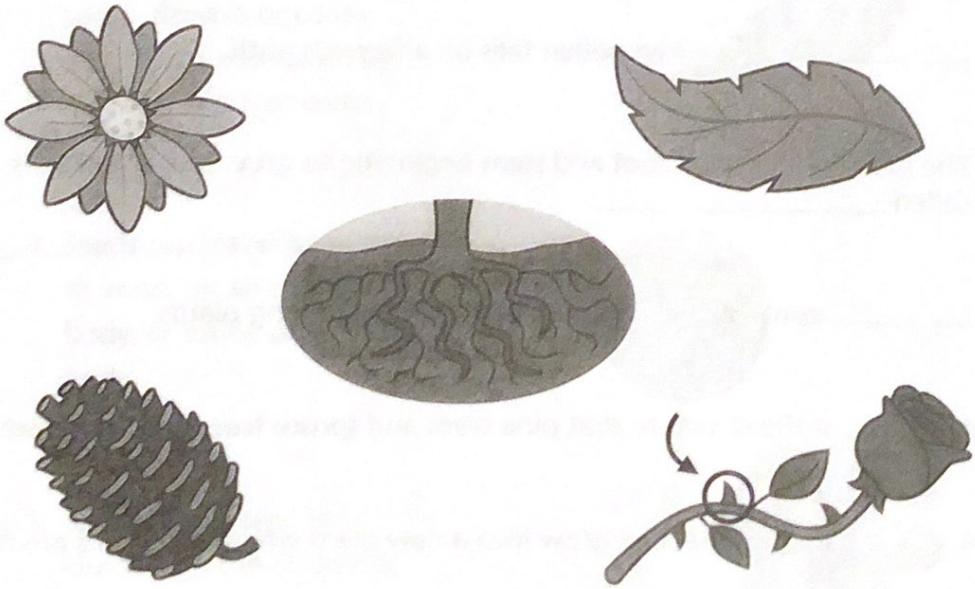
9. A _____ is a cell that can grow into a new plant when conditions are right.

Apply Concepts

2 Draw the life cycle of a flowering plant.



3 Circle the structure(s) that plants use to reproduce.



4 List three ways a seed-forming plant can be pollinated.

1. _____

_____

2. _____

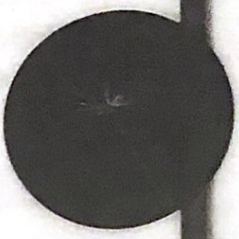
_____

3. _____

_____

_____

5 Look at the seed shown here. How do you think this seed is spread? Explain your answer.



_____

_____

_____

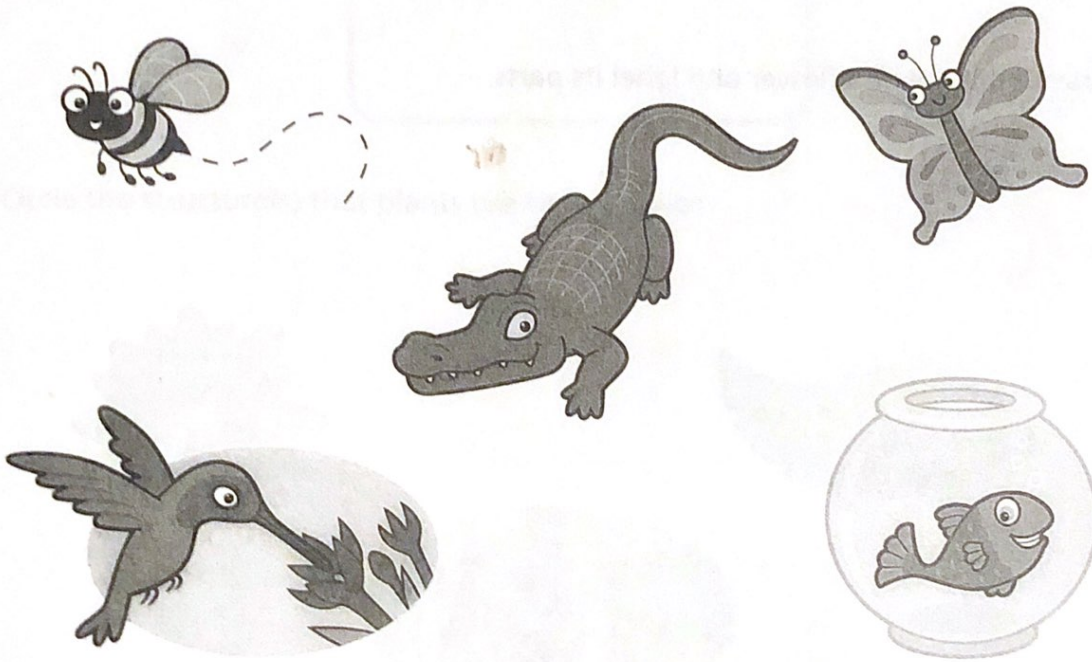
_____

_____

6 Draw a picture of a flower and label its parts.

7 Explain how pollination is different from fertilization in flowers. (Hint: Which needs to happen first—pollination or fertilization?)

8 Circle the pollinator(s) below.



Take It Home! See *ScienceSaurus*® for more information about characteristics of living things.