

SECTION**2**

Reproduction of Flowering Plants

Key Concept Flowering plants reproduce sexually and asexually.

What You Will Learn

- After pollination, sexual reproduction in flowering plants occurs when an egg is fertilized by a sperm.
- Seeds form from fertilized ovules. The ovary of a flower becomes a fruit.
- In the proper conditions, seeds can sprout and develop into plants.
- Flowering plants can reproduce asexually.

Why It Matters

Flowering plants and their reproductive structures provide food for many organisms.

Vocabulary

- dormant

READING STRATEGY

Graphic Organizer In your **Science Journal**, create an Idea Wheel about the stages of sexual reproduction in a flowering plant.

▶ Imagine you are standing in a field of wildflowers. You're surrounded by bright colors and sweet fragrances. You can hear bees buzzing from flower to flower. Flowering plants are the largest and most diverse group of plants. Their success is partly due to their flowers. Flowers are structures for sexual reproduction. In sexual reproduction, an egg is fertilized by a sperm.

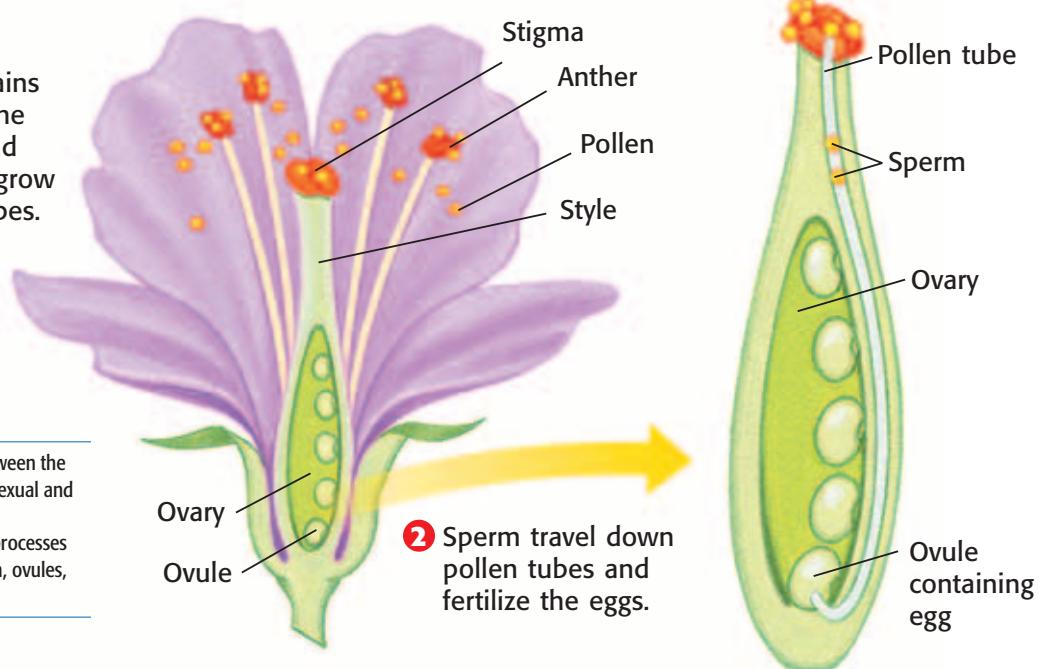
Fertilization

The fertilization of flowering plants takes place within the flower. *Pollination* occurs when pollen, which carries sperm, is moved from anthers to stigmas. Usually, wind or animals move pollen from one flower to another flower. After pollen lands on the stigma, a tube grows from each pollen grain. The tube grows through the style to an ovule. Ovules are found inside the ovary. Each ovule contains an egg. Sperm from the pollen grain move down the pollen tube and into an ovule. Fertilization occurs when a sperm fuses with the egg inside an ovule. **Figure 1** shows pollination and fertilization.

Standards Check Describe sexual reproduction in plants.  7.2.a

Figure 1 Pollination and Fertilization

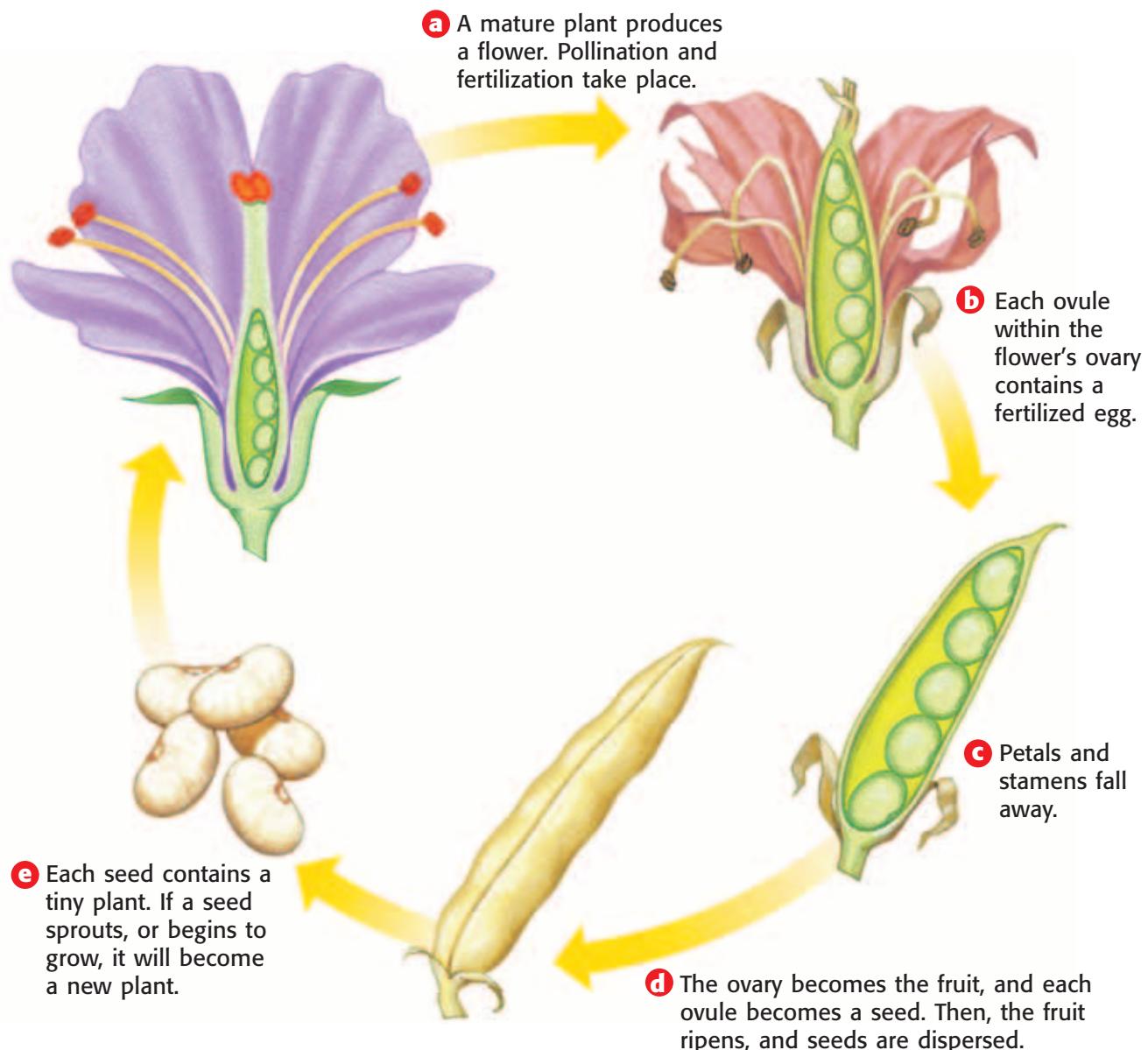
- 1 Pollen grains land on the stigma and begin to grow pollen tubes.



7.2.a Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.

7.5.f Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.

Figure 2 Seed Production



From Flower to Fruit

After fertilization takes place, the ovule develops into a seed. The seed contains a tiny, undeveloped plant, called an *embryo*. The ovary surrounding the ovule becomes a fruit, as **Figure 2** shows.

As it swells and ripens, a fruit protects its developing seeds. **Figure 3** shows a common fruit. Fruits often help a plant spread its seeds. Many fruits are edible. Animals may eat these fruits. Then, the animals discard the seeds away from the parent plant. Fruits such as burrs are spread when they get caught in an animal's fur. And some fruits are carried by the wind.

Standards Check Where do seeds and fruit come from? 7.5.f

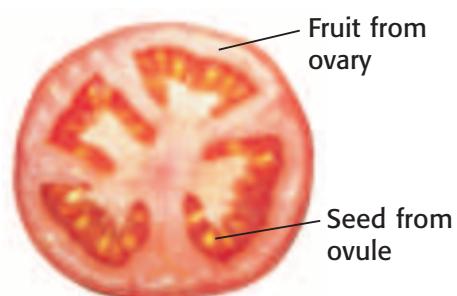


Figure 3 Tomatoes develop from a flower's ovary and ovules.

From Seed to Plant

dormant (DAWR muhnt) describes the inactive state of a seed or other plant part when conditions are unfavorable to growth

Once a seed is fully developed, the embryo inside the seed stops growing. If the conditions are not favorable for growth, the seed may become **dormant**, or inactive. Dormant seeds often survive long periods of drought or freezing temperatures. Some seeds need extreme conditions, such as cold winters or forest fires, to break their dormancy.

When seeds are dropped or planted in a suitable environment, the seeds sprout. To sprout, most seeds need water, air, and warm temperatures. Each plant species has an ideal temperature at which most of its seeds begin to grow. For many plants, the ideal temperature for growth is about 27°C (80.6°F). **Figure 4** shows the *germination*, or sprouting, of a bean seed.

Quick Lab



7.2.a
7.7.c

Plant Cuttings

- Get an **African violet** leaf from your teacher. Create a sketch of the leaf.
- Place the leaf in a **cup of soil** so that the tip of the leaf is above the soil.
- Water the plant, and place it in a sunny location. Predict what will happen.
- If the soil feels dry, water the plant as needed for three days. Record your observations.
- On the fourth day, carefully take the leaf out of the soil. Use water to gently remove the soil from the leaf. Sketch the leaf.
- How is the leaf different? What is happening to the leaf cells of this plant?



15 min plus follow-up



Other Methods of Reproduction

Flowering plants can also reproduce asexually. But they do not need flowers to do so. Instead, a new plant grows from one of the plant parts, such as a stem or root. The following are three examples of structures plants use to reproduce asexually:

- Plantlets** Tiny plants grow along the edges of a plant's leaves. These plantlets fall off and grow on their own.
- Tubers** Underground stems, or tubers, can produce new plants after a dormant season.
- Runners** Above-ground stems from which new plants can grow are called *runners*.

Figure 5 shows examples of these three structures. A plant that results from sexual reproduction is genetically related to both parents. But a new plant that grows from the plantlet, tuber, or runner of another plant is genetically identical to that plant.

Standards Check What are three structures that plants use to reproduce asexually?  7.2.a



Figure 4 Seeds grow into new plants. First, the roots begin to grow. Then, the shoot grows up through the soil.

Figure 5 Three Structures for Asexual Reproduction



Kalanchoe plants produce **plantlets** along the edges of their leaves. The plantlets eventually fall off and root in the soil to grow on their own.



A potato is a **tuber**, or underground stem. The "eyes" of potatoes are buds that can grow into new plants.



The strawberry plant produces **runners**, or stems that grow horizontally along the ground. Buds along the runners take root and grow into new plants.

SECTION Review



7.2.a, 7.5.f

Summary

- In the sexual reproduction of flowering plants, a sperm fertilizes an egg.
- After fertilization, seeds and fruit form. The seeds may sprout into new plants.
- A dormant seed can survive drought and freezing temperatures. Some seeds need extreme conditions to break their dormancy.
- Some plants use plantlets, tubers, or runners to reproduce asexually.

Understanding Concepts

- Comparing** How are pollination and fertilization related?
- Identifying** Which part of a flower develops into a fruit? into a seed?
- Concluding** Why do some seeds become dormant?
- Describing** How do plants reproduce asexually?

Critical Thinking

- Identifying Relationships** When may asexual reproduction be important for the survival of some flowering plants?
- Analyzing Ideas** Sexual reproduction produces more genetic variety than asexual reproduction does. Why is variety important?

Math Skills

- Using Equations** A seed sprouts when the temperature is 27°C. If the temperature starts at 20°C and rises 1.5°C each week, how many weeks will the seed take to sprout?

Challenge

- Predicting Consequences** How might the world be different if the ovaries of fertilized plants no longer developed into fruits?

Internet Resources

For a variety of links related to this chapter, go to www.scilinks.org
Topic: **Reproduction of Plants**
SciLinks code: HY71295

