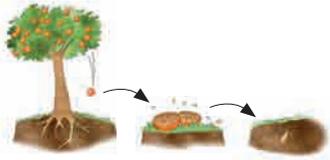


Key Words

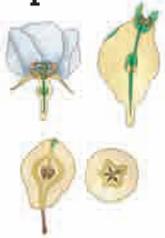
native



life cycle



reproduce



pollinate



crop



Plants



In this unit you will learn to:

- describe the needs of plants and the function of roots, stems and leaves.
- describe how flowering plants change throughout their life cycles.
- describe how plants are important to living things and the environment, and propose protection measures.
- identify different types of plants.
- make inferences and predictions about plants.
- value the importance of taking care of forests.



What Do You Know?

1. Mark the plant characteristics with a ✓.

They grow. They move. They react.

2. Classify the plants in the picture using the words below.

tree

bush

grass

3. What do plants need to live?

Scientific Skill: Infer and predict

4. Look at and describe the following pictures.

plant 1



plant 2



a. How is **plant 2** different from **plant 1**?

b. What would happen to **plant 1** if you cut its roots?

Plant Structures and Needs

Let's Connect

1. Look at the picture and mark your answers with a ✓. Infer

When Mariana moved to a new house, she forgot to take out a plant her mother had put in a box. A few days later, she found it as shown in the picture.



- a. What parts of the plant **withered**?

roots leaves stem flowers

- b. What was this plant missing in order to be healthy?

air water light shelter

- c. What does a plant need to live?

Plants have three main structures or parts: the **roots**, the **stem** and the **leaves**. Through their parts, plants receive the **water**, **light** and **air** that they need to grow. Some plants also have **flowers**, **fruits** and **seeds**.



Did You Know...?

Cacti are able to accumulate water because they have adapted to live in dry places. Ferns, on the other hand, need to live in humid environments.

Let's Practice

2. Write the names of the main parts of the plant. Identify



3. Match the parts of the plant with the labels that represent their needs. Relate



Word Focus

Light

1. Not heavy.
2. The **brightness** produced by the sun, a lamp, a fire, etc.
How is it used in the text?

luminosity

Let's Summarize

Plants have three main structures or parts: the roots, the stem and the leaves. Through these, they get the water, light and air that they need to live.

The Function of the Roots

Let's Connect

1. Look at the pictures and answer.

 **Plant 1**



 **Plant 2**



a. What structures do you see in both plants? *Identify*

b. What differences do you see between the two sets of roots? *Compare*

c. Which plant's roots give it more support? *Infer*

The roots are the part of the plant that allow it to hold firmly to the ground and to absorb water and minerals that are essential for its development and growth. In this case, water and minerals go from the soil to the root.



Did You Know...?

long, thin, orange vegetable

Some plants, like **carrots**, have a very thick main root with other thinner roots coming from the thick one.

Let's Practice

2. Which of these roots will be able to absorb more water? Mark with a ✓. Predict



3. Explain what will happen in each situation. Predict

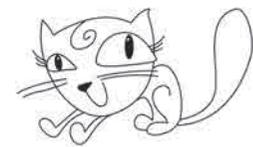
Situation 1

If you plant a carrot in a flowerpot with soil, will it grow?

Situation 2

If you plant a carrot in a flowerpot with stones, will it grow?

The roots grow in the opposite direction to the stem.



Let's Summarize

The function of a plant's roots is to absorb water and minerals and to stabilize the plant.



Staying Healthy

There are many roots that we eat on a daily basis, such as carrots and beets. These roots give us nutrients, such as vitamins and minerals, which help us grow and stay healthy. Do you know of any other edible roots? Research and find out!

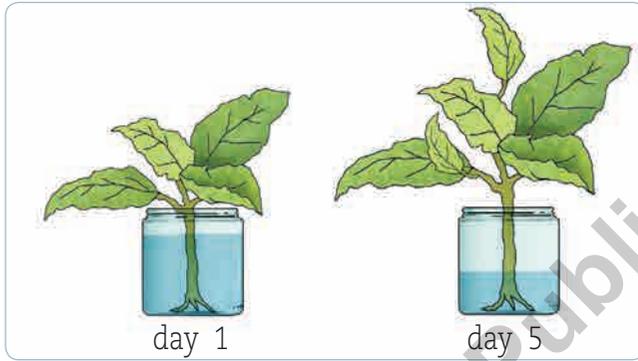
dark red root vegetable

The Function of the Stem

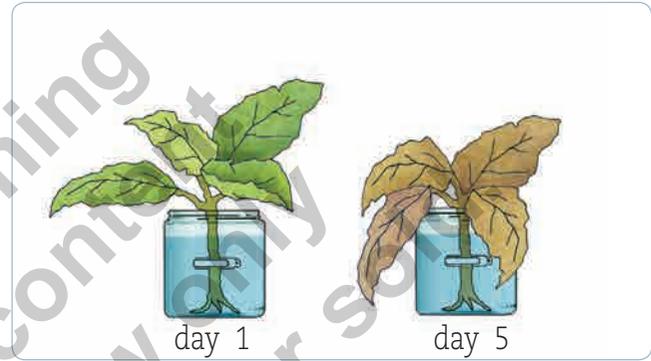
Let's Connect

1. Watch the two stages of an experiment carefully and answer. *Infer*

Situation 1



Situation 2



▲ Material that does not let water go up the stem.

- a. What differences can you find between situation 1 and situation 2?

- b. Why did the water level not decrease in situation 2?

- c. What is the stem for? Mark with a ✓.

To absorb water and minerals.

To transport substances to all the parts of the plant.

- d. Which plant should have more water and minerals in its leaves at the end of the experiment?

If you do not remember what infer means, ask your teacher!



The **stem's** function is to transport water and minerals absorbed by the roots to all the parts of the plant. It also connects the roots with the leaves, flowers and fruit.

Let's Practice

2. Karen wanted to prepare an experiment to show the function of a stem to her classmates. She found the following pictures.



Help Karen finish her assignment.

- a. What materials does Karen need to do this experiment? *Identify*

- b. Which steps should she follow in this experiment? Go to **Cutout 1** on **page 159** and glue the steps in the right order. *Put in order*

Three empty dashed boxes for pasting cutouts.

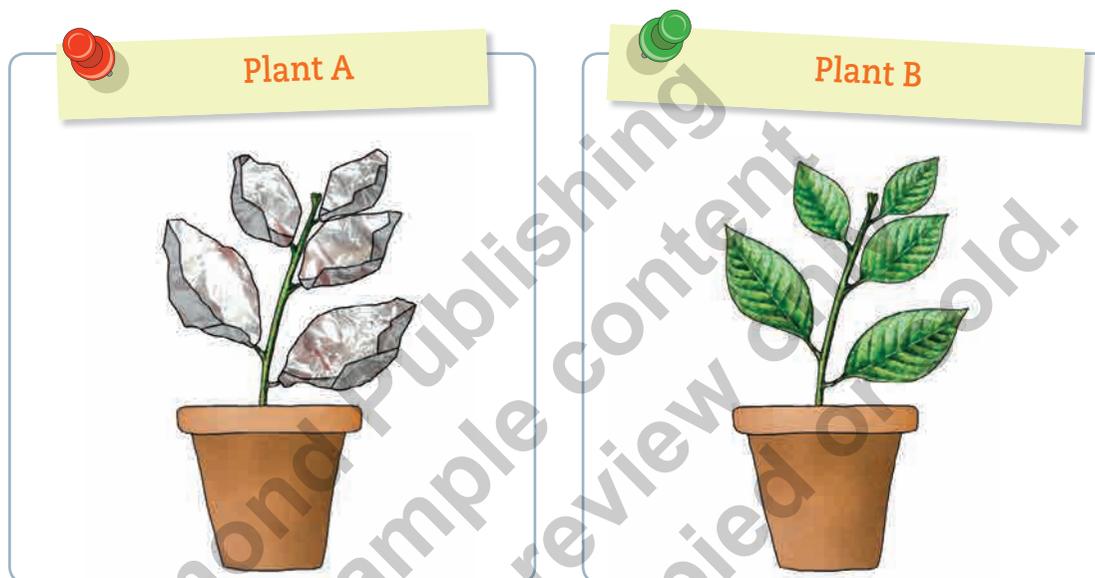
Let's Summarize

The main functions of the stem are to transport water and minerals and connect the parts of the plant.

The Function of the Leaves

Let's Connect

1. Look at the pictures and answer. *Predict*



- a. What will happen to plant A after a week?

- b. Why are leaves important to a plant?

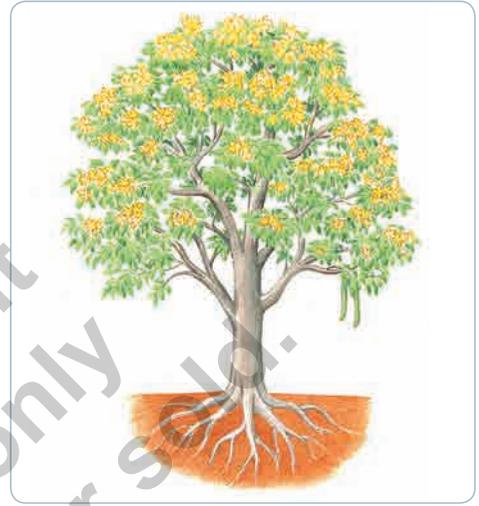
Plants **produce their own nutrients**. This important process happens in the leaves. It is called **photosynthesis**.

In order to make photosynthesis possible, a plant needs **water**, **carbon dioxide** and **light energy**. Water is absorbed by the roots and distributed by the stem. Carbon dioxide is a gas in the air that is absorbed by a plant's leaves. Light energy is energy the plant absorbs from the sun or other light sources. The photosynthesis process makes nutrients for the plant and **releases** oxygen, which is essential for all living things.



Let's Practice

2. Look at the picture and answer.
- a. In which part of the plant does photosynthesis occur? Circle.
Identify
- b. What do plants need for photosynthesis? Explain



3. Talk with a partner about the importance of photosynthesis for all living things. Apply

Let's Summarize

Leaves are one of a plant's parts or structures. Their function is to produce nutrients through photosynthesis.

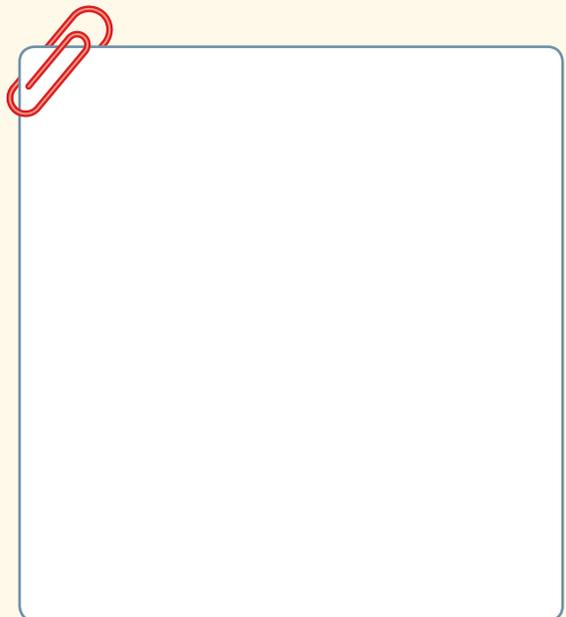
Quiz Yourself

1. Draw a plant and include its main parts. Color the route that water and minerals take through the plant in red, and explain the function of each structure.

Leaves:

Stem:

Roots:



What is a Root's Function?

Basic Framework

The main structures of the plant are the roots, the stem and the leaves. Each one allows the plant to grow and develop.

■ Observation

Look and answer.



Why do you think the carrot grew?

When you **infer**, you are giving a possible answer based on an observation.

■ Research Question

What would happen if we put a radish in a glass of water?

■ Hypothesis

The radish will absorb the water, allowing the root and the stem to develop.

■ Prediction

1. Mark with a ✓ what you think will happen if you put a radish in water.

- Roots will grow out of the radish. Therefore, the plant will grow.
- Nothing will happen to the radish. Therefore, the plant will not grow.

If you want to better understand what **predict** means, look at the example in the **Scientific Research Skills** foldout.



When you **predict**, you are giving an answer based on your **knowledge** about what you think is going to happen in a particular phenomenon or process.

→ learning

■ Experimental Procedure

Supplies

- water
- a ruler
- aluminum foil
- a clear plastic cup
- a radish
- a marker
- 2 skewers

Steps

a long piece of wood or metal

1. With the help of an adult, cut the ends of the radish.
2. Push a skewer through each side of the radish. This will create a way to support the radish over the cup (see photograph 1). **Warning:** be careful when using the skewers.
3. Pour water into the cup until it covers the bottom of the radish. Mark the water level on the cup with the marker.
4. Cut a piece of foil and cover the top of the cup (see photograph 2).
5. After seven days, observe the water level and the bottom of the radish.
6. Write your observations in your notebook.

photograph 1



photograph 2



■ Results

1. Did the root grow? yes no
2. What happened to the water level?
 It increased. It decreased.

■ Conclusion

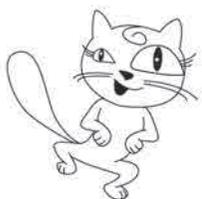
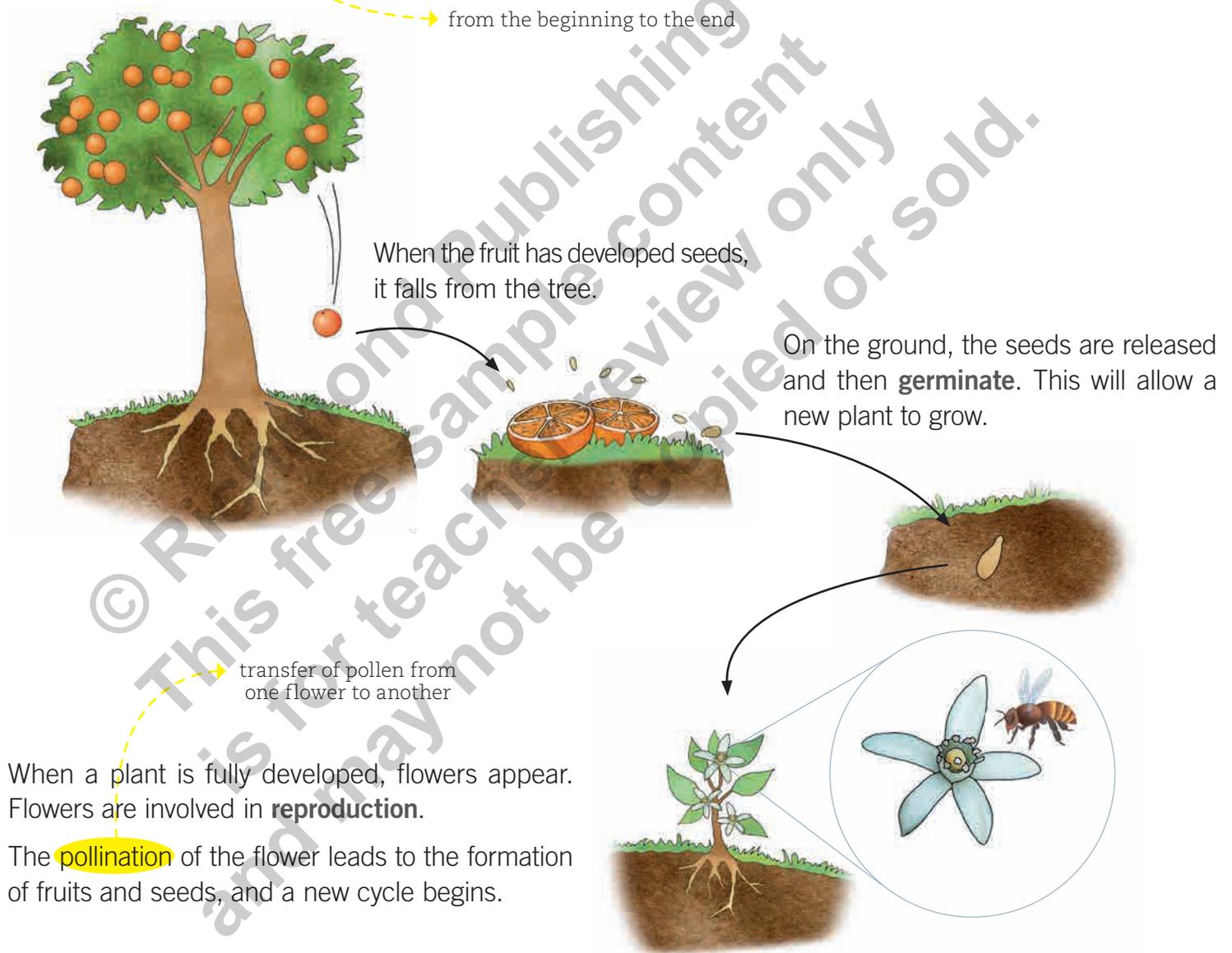
1. Was your prediction correct? yes no
2. According to your results, what is the main function of the root?

In this experiment, you **inferred** based on observation. The prediction allowed you to give an anticipated answer about what was going to happen to the radish if it was left in a cup of water.

The Life Cycle of Flowering Plants

Let's Connect

As you already know, plants are living things: they grow, they reproduce and they react. Also, they experience a series of changes **throughout** their lives, which means they have a life cycle. Look at the life cycle of a flowering plant.



How do plants without flowers reproduce? Do some research!

Let's Practice

1. Put the life cycle of a flowering plant in order from 1 to 6. *Put in order*

- 1 The seed germinates.
- The fruit falls to the ground.
- Pollination occurs.
- The seed falls on the ground.
- A flowering plant grows.
- The fruit that contains the seeds is formed.



Fun Fact!

Tomatoes and avocados are fruits, not vegetables. And bananas and watermelons are berries!



Challenge

Make a diorama that shows each step of the life cycle of a plant.

2. Why are seeds important in the life cycle of a plant? *Explain*



Fun Fact!

Some plants do not have flowers, but they do have seeds. They are called **conifers** because they form cones with seeds inside. These seeds will eventually make new plants. Some examples of conifers are pines, firs and cypresses.



Let's Summarize

Plants are living things: they grow, reproduce and react. They also have a life cycle.

Seed Germination

Let's Connect

1. Look at the pictures of the results of an experiment. *Infer*



- a. Why did one of the seeds germinate?

- Because it was watered.
- Because it was not watered.

- b. Which stage of the life cycle is being studied in this experiment?

- fruit formation germination

As you saw in the activity above, a seed can develop into a new plant. This process is called **germination**, and it happens when the outside of the seed breaks open and a new plant grows from it.

Some seeds are in a **latent period**, which means they are in an **inactive state** waiting for the right conditions to germinate. They need things like appropriate temperature and water and enough light, which vary according to the type of seed. Seeds can **survive** for long periods of time without germinating thanks to their protective shell.

→ continue to exist



- ▲ The flowering desert phenomenon is an example of seeds after a latent period.

Let's Practice

2. A scientist was studying the germination process of seeds. To do so, he planted six seeds from the same plant in different flowerpots and exposed each one to different conditions. The scientist recorded the data in a table like the one below. *Analyze*

Flowerpot	1	2	3	4	5	6
Average temperature (°C)	0	5	10	15	20	25
Results after two weeks						

- a. What is the best temperature for the germination of this type of seed?

5 °C 10 °C 20 °C

- b. What elements should be present for germination to occur?

water air correct temperature

- c. Which seed **did not** germinate?

2 4 6



Remember!

° is read as “degrees” and C stands for Celsius.

Let's Summarize

Germination is the process in which a seed, in the right conditions, develops and grows into a plant.

Pollination

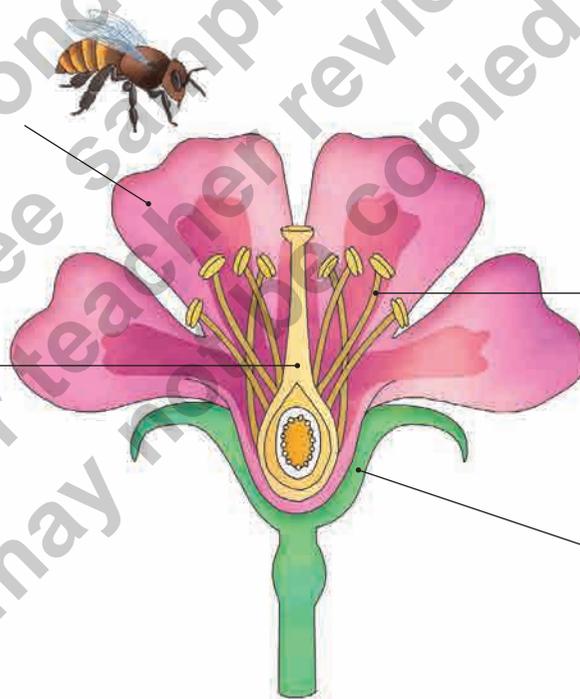
Let's Connect

1. Find a lily to dissect. First, you will need to take off the petals. Then draw what you see. *Observe*
 - a. Where are the seeds?



Petals come in many colors in order to attract insects, which help pollination.

The **pistil** is the feminine part of the flower. It has **specialized** parts for reproduction.



The **stamen** is the masculine part of the flower. It produces pollen.

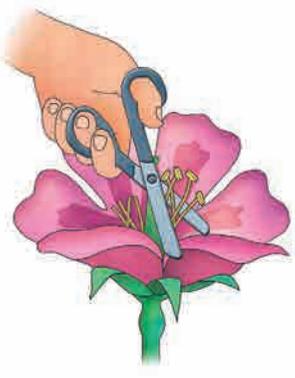
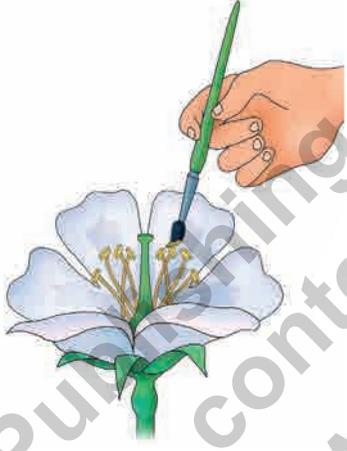
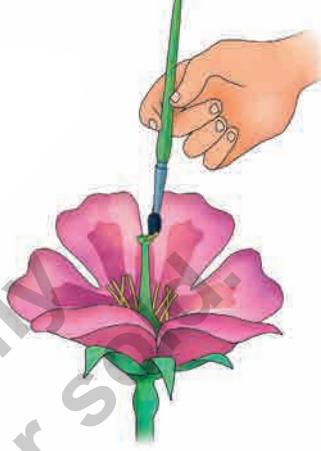
The **sepals** are the protective, lower part of a flower. They are usually green.

What are the functions of bees and the wind in plant reproduction? Discuss with a partner.

In order for plants to reproduce, it is necessary that pollen from the stamen reaches the pistil. This movement is known as **pollination**, and it is made possible by **pollinators** such as insects, hummingbirds and the wind.

Let's Practice

2. Below is one of the methods used to make a plant produce flowers of a different color. **Analyze**

		
The stamens of a flower of one color are cut off. The pistil is left intact.	Pollen from a white flower is extracted with a brush.	The pollen is then transferred to the pistil of the colored flower.

a. What stage of the life cycle of plants does this method simulate?

- germination fruit formation pollination

b. What does the brush represent? Explain.



Education through Values

It is important to respect all living things. We take care of flowers because they are necessary for plants to reproduce and they make the environment beautiful. What can you do to protect flowers?



Let's Summarize

Pollination is the way plants reproduce and requires the movement of pollen from the stamen to the pistil. Some pollinators are insects, hummingbirds and the wind.

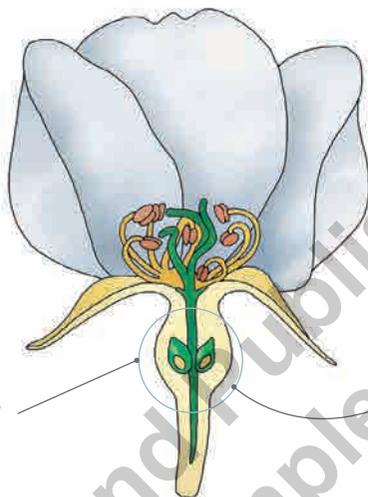
Fruit Formation

Let's Connect

Look at how the seed grows and how fruit is formed.

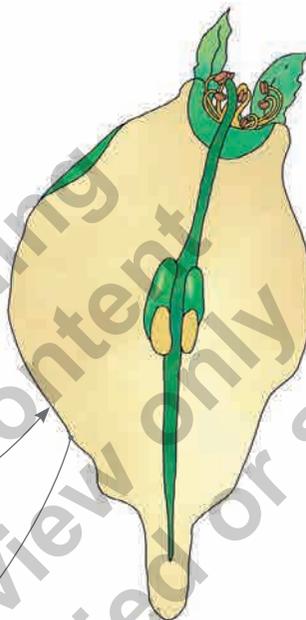
1

After pollination occurs in the flower, the seeds start forming inside the ovary.



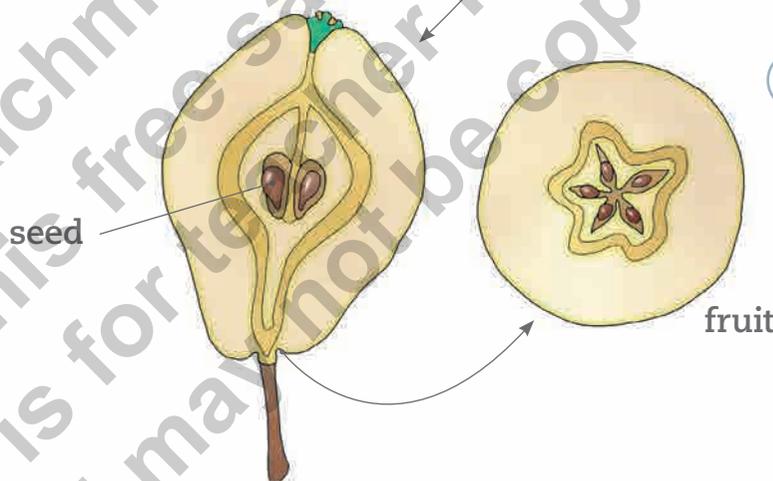
2

Fruit is formed inside the flower as the walls of the ovary start to grow.



3

Once the walls of the ovary have grown and covered the seeds completely, the fruit is fully formed.



In order to make a new plant, seeds must get to a place where they can germinate and grow. This is known as seed **dispersal**. In order for seed dispersal to happen, dispersal agents are needed, including the wind and animals that eat fruit.

exhibit



Staying Healthy

It is important to include fruits and vegetables in our diet. Experts recommend eating five portions a day.

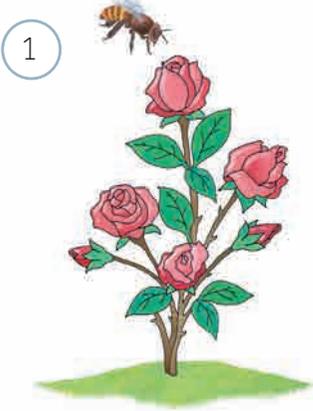


Challenge

Bring different fruits as a snack for a week and save the seeds. Then think of a creative way to **display** the seeds with a short description of what fruits they come from, which part of the fruit is the ovary and how the ovary protects the seed.

Let's Practice

1. Look at the pictures.



a. How does a flower turn into a fruit? Explain

Let's Summarize

After pollination, the seed starts to grow and is completely covered by the ovary until the fruit is formed.

Quiz Yourself

1. Describe the main stages of a flowering plant's life cycle.

Let's Check!

1. What do plants need to live? Mark with a ✓.

water

soil

carbon dioxide

oxygen

shelter

sunlight



2. Write the names of the main plant structures. Then match them with the parts in the picture.



3. Complete the sentences.

The roots absorb _____ and the _____ that plants need to live.

The function of the stem is to _____ water and nutrients.

Inside the _____, _____ occurs.

The _____ process allows _____ to make their own nutrients.



4. Match each concept in column A with its description in column B.



Column A

Column B

Pollination

It is inside the fruit and can make a new plant.

Flower

They are pollinators.

Fruit

This is the process where pollen is transferred from the stamen to the pistil.

Germination

This is the plant structure that comes from the flower and protects the seeds.

Seed

This is the plant structure where the reproductive organs are located.

Hummingbirds, wind, insects

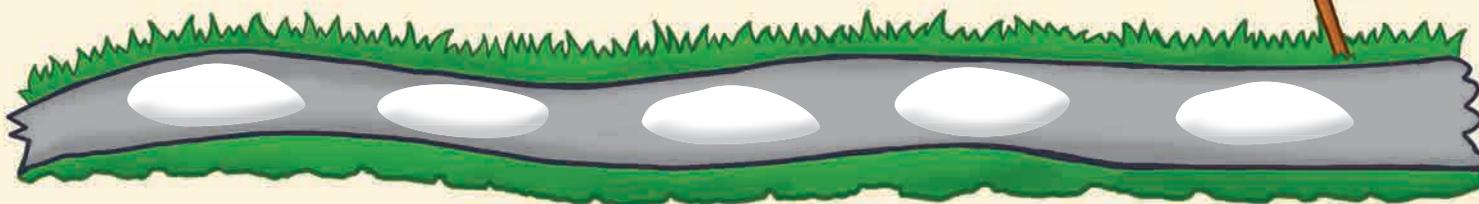
This is the formation of a new plant from a seed.

5. How do bees contribute to plant reproduction? Explain.



How Did You Do?

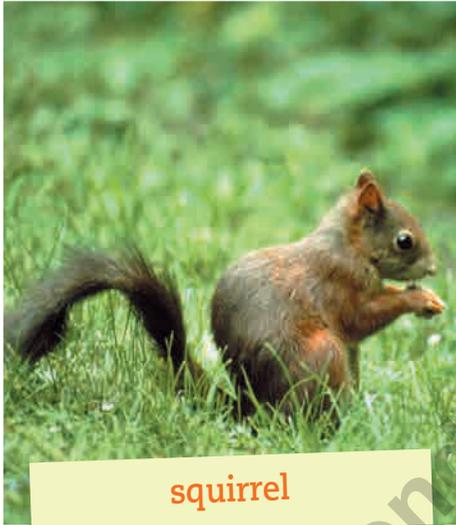
For each 😊 color a 🥚.



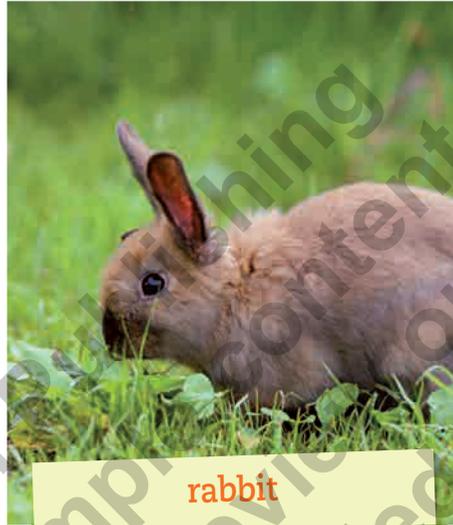
Plants and Animals

Let's Connect

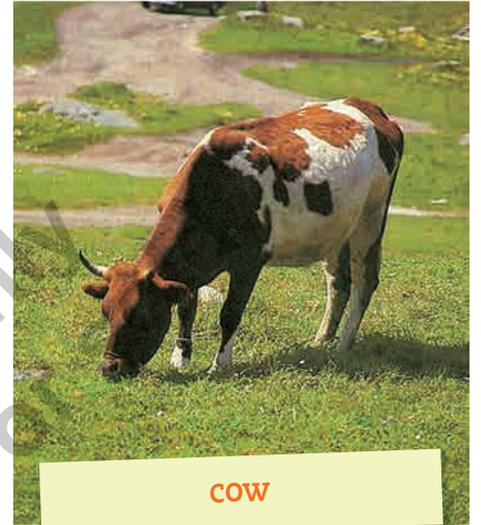
1. Look at the pictures and answer the questions.



squirrel



rabbit



cow

- a. What do these animals' diets have in **common**? *Compare*

- b. What other function can plants have for animals? *Infer*

 food

 protection

 shelter

→ a structure in which a bird lays its eggs

Many animals use plants as **food**. For example, cows eat grass and pandas eat bamboo. Animals also use plants as **shelter**—in other words, as places that they can use for protection. For example, many birds build their **nests** in trees, and many insects live on stems, leaves or in tree trunks. Plants are important because they provide the **oxygen** animals need to breathe. It is very important to take care of plants, since they are necessary for the **survival** of all living things. One way to take care of them is to plant trees and create protected zones.

→ continued existence

How can you take care of plants?



Let's Practice

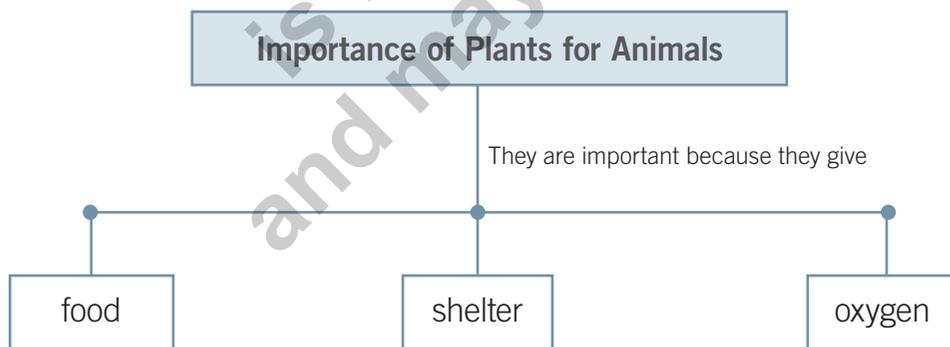
2. Look at the picture. Grass is food for the rabbit, and the rabbit is food for the snake.



a. What would happen to the living things that eat plants if plants disappeared from the earth? *Infer*

b. What can you do to take care of grass? *Propose*

Let's Summarize



How do you contribute to taking care of plants?



Plants in Our Lives

Let's Connect

Humans also benefit from plants. Some of their main uses are:

Food: Plants contain several nutrients, such as vitamins and minerals, that are very important to humans. For this reason, many plant parts are part of our daily diets.



Medicine: Many plants are used as home remedies—for example, chamomile and mint. Others are used in the pharmaceutical industry, such as willow bark, which is used to make aspirin.

the covering
of a tree trunk



Industry: Some plants provide us with useful materials, like wood or cotton, and allow us to make objects that we use daily.



Decoration: Because of their shape, color or smell, some plants are used to decorate, like orchids and carnations.



Talk with a partner about other ways we use plants.



Did You Know...?

Aloe vera is a plant that contains many beneficial substances for our bodies. More than seventy beneficial substances have been identified in aloe vera! For example, aloe vera helps heal scars and hydrate the skin, and it also disinfects.

marks from an old cut

Let's Practice

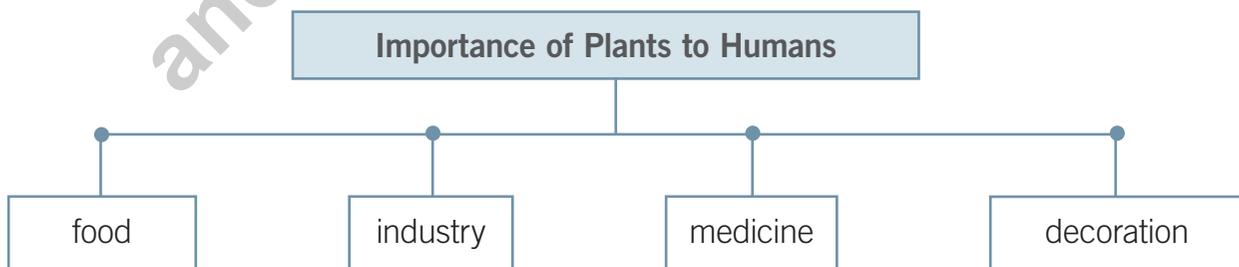
1. Go to **Cutout 2** on **page 159** and classify the plants according to their uses. *Classify*

The image shows four yellow sticky notes pinned to a surface, each with a dashed rectangular box for writing. The sticky notes are labeled as follows:

- Food**: Pinned with a red pushpin.
- Medicine**: Pinned with a green pushpin.
- Industry**: Pinned with an orange pushpin.
- Decoration**: Pinned with a blue pushpin.

A large watermark is overlaid diagonally across the sticky notes, reading: "© Richmond Publishing This free sample content is for teacher review only and may not be copied or sold."

Let's Summarize



Plants and the Environment

Let's Connect

As you have already learned, plants have benefits for animals and humans. They are also important for the environment, **mainly** because photosynthesis produces oxygen, an essential gas for many living things.

Plants are also important for conserving soil because their roots protect it from **erosion**.

Plants are important for living things, so it is necessary to protect them and take care of them. To take care of plants, we should follow these recommendations:

→ principally

- Do not **litter**.
- Prevent forest fires. → leave trash in public places
- Do not cut flowers and branches.
- Do not remove bark from trees.
- Plant trees.
- Respect protected zones, such as national parks and reserves.
- Participate in reforestation campaigns.

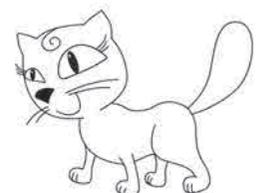


▲ Everglades, Florida



▲ Grand Canyon, Arizona

What other recommendations would you give to protect plants?



Let's Practice

1. How do plants help the environment? Explain

Let's Summarize

Plants are important for the environment because they supply oxygen and protect the soil from erosion.

Quiz Yourself

1. Why are plants important to animals?

2. How do humans benefit from plants?

3. Thinking about their importance to the environment, what measures would you recommend to take care of plants? Explain.



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What Did You Learn?

1. Match each structure with its function.

Roots

Leaves

Flowers

Stem

Fruit

Protects the seeds.

Transports water to all the parts of the plant.

Capture gases and sunlight and carry out photosynthesis.

Have the feminine and masculine reproductive organs.

Absorb water and minerals.



2. Draw the life cycle of a flowering plant. Then explain the process.



3. Why are plants important to all living things? Explain.



4. Name five plants native to your country and propose ways of protecting them.



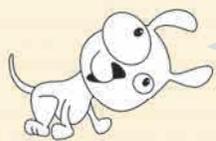
Scientific Skill: Infer and predict

5. Maggie bought a white carnation and put it in a clear vase of water. After a week, she noticed that there was less water in the vase than before.



a. Why does Maggie's vase have less water now?

b. If you put blue ink in the vase with the white carnation, what do you think would happen?



Collect a white carnation, a vase of water and some blue ink, and test your prediction.

How Did You Do?

For each 😊 color a 🥚.

