



Life Science

Plant Diversity

Advanced Level

Structures of Plants

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Structures of Plants

How are plants alike and different?

CORE CURRICULUM STATEMENTS

Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

Some traits of living things have been inherited (e.g., color of flowers and number of limbs of animals).

Plants and animals closely resemble their parents and other individuals in their species.

Plants and animals can transfer specific traits to their offspring when they reproduce.

Individual organisms and species change over time.

Each plant has different structures that serve different functions in growth, survival, and reproduction.

- roots help support the plant and take in water and nutrients
- leaves help plants utilize sunlight to make food for the plant
- stems, stalks, trunks, and other similar structures provide support for the plant
- some plants have flowers
- flowers are reproductive structures of plants that produce fruit which contains seeds
- seeds contain stored food that aids in germination and the growth of young plants



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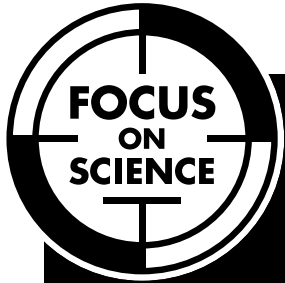
Life Science

Plant Diversity

Structures of Plants

by Tom Sibila





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Curriculum materials for your content standards

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– Predict –

*What do you think you will
learn from reading this book?*

What Is a Plant?

Did you know that plants and animals share something in common? They are both **organisms**. That means that they are both living things. As living things, plants and animals grow, adapt to their environment, and reproduce.

Plants are different from animals in some ways. One difference is that plants make their own food. They get energy from sunlight and mix it with water and gases from the air. This process is called **photosynthesis**. Animals cannot make their own food. They must eat other plants and animals to survive.

Plants also look different than animals. They don't have feathers, fur, or skin. They have roots, leaves, stems, and flowers.

organism: any living thing

photosynthesis: the process by which plants make food
reproduce: to produce others of the same kind

Parts of a Plant

When you see an animal outside, it often looks very busy. Birds fly from tree to tree. Squirrels dart around looking for acorns to eat and store. At night, many animals sleep, but others become even more active.

When you look at a plant, you might think it is not doing much. However, plants are busy day and night. During the day they collect the sun's energy and make food.

At night, plants **transport** this food from the leaves to other parts of the plant. Plants also transport water and minerals from the roots to other parts of the plant.

Plants have five structures that allow them to grow, survive, and reproduce. They are roots, leaves, stems, flowers, and seeds.

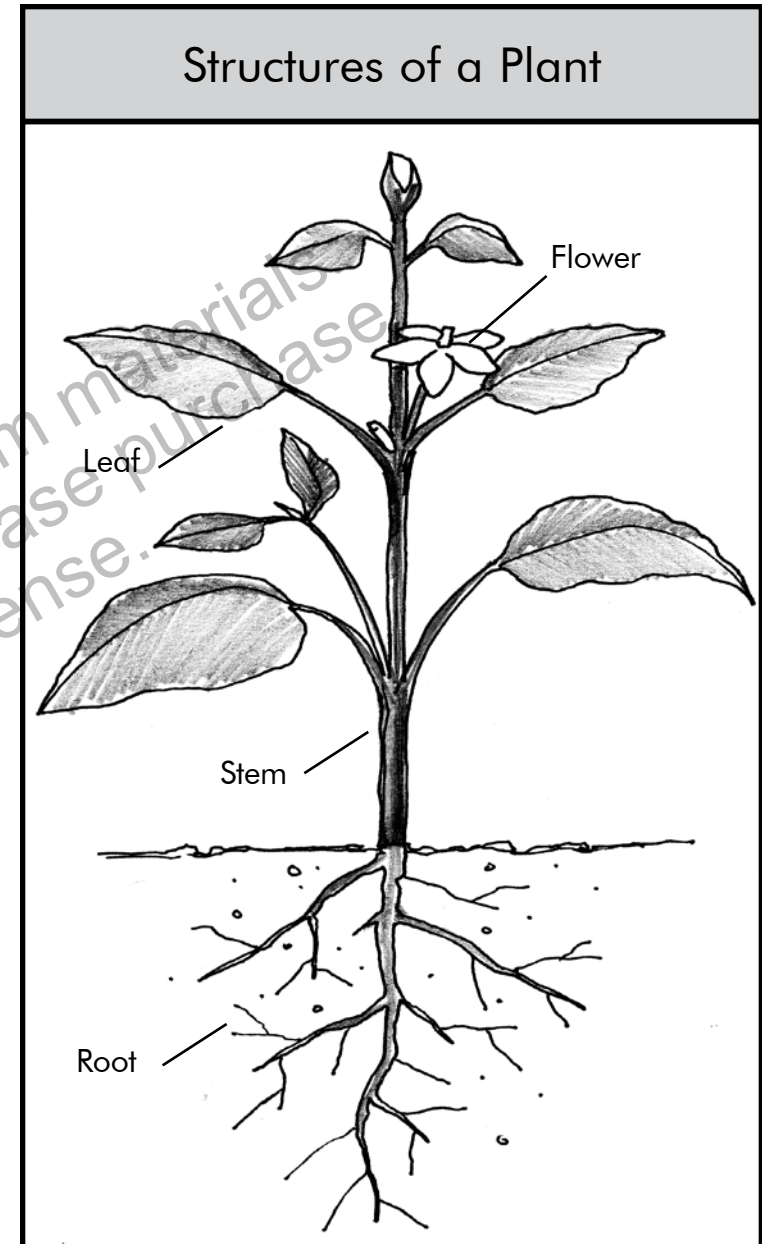
transport: to carry from one place to another

Roots

The roots of a plant serve two main functions. Roots hold, or anchor, the plant in the soil. The deeper the roots go in the soil, the harder it is to pull a plant out of the soil. Without roots, a plant would blow away in the wind.

Roots have another equally important job. Roots collect water and minerals from the soil in the ground. They transport these **nutrients** up to the stem. A plant's main root is just below the surface of the soil. The main root then branches off into several smaller roots that spread down and out to collect water and minerals. Roots can also store food for the plant.

nutrients: things needed by people, plants, and animals to stay healthy



Leaves

Leaves come in many sizes and shapes. They are often used to help identify plants. Some leaves are flat and wide, while other leaves are spiky and thin. Leaves make food for a plant.

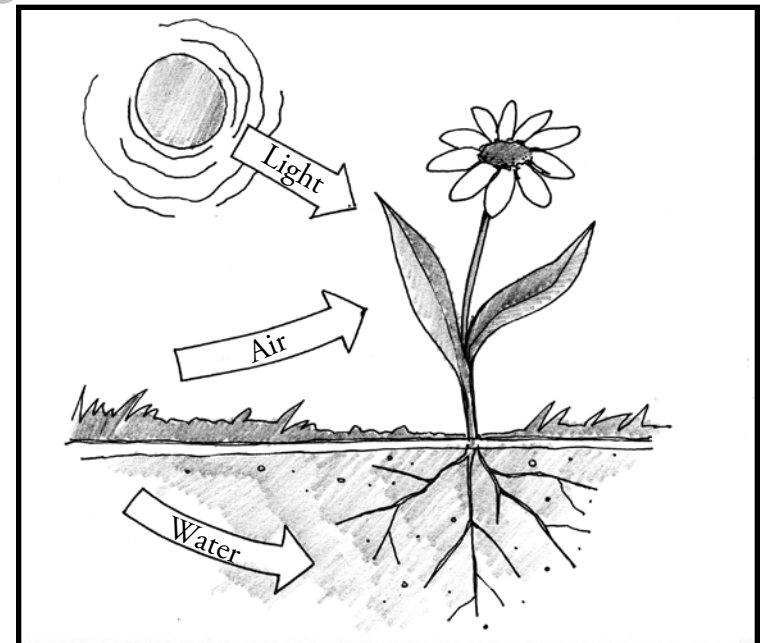


– Categorize –

How could you group the leaves shown above?

Photosynthesis

To make food, plants need water, carbon dioxide from the air, and sunlight. The leaves absorb energy from the sun. Tiny openings in the leaves collect carbon dioxide. Leaves collect some water but also get water from the plant's roots. The process of photosynthesis creates sugar, which is used as food for the plant. Tiny veins in the leaves transport the food to the rest of the plant.



Stems

The stem holds up the structures of the plant that are above ground. For example, the stem holds up the leaves so they can capture sunlight to make food. The stem also holds up flowers.

Stems have another important function. They have tubes running through them. One type carries water and minerals from the roots up to the leaves. Another type carries the food from the leaves down to other parts of the plant, including the roots.

The stem is often called the highway of a plant because it transports important nutrients through the plant.

– Explain –

What is the function of the stem in a plant?



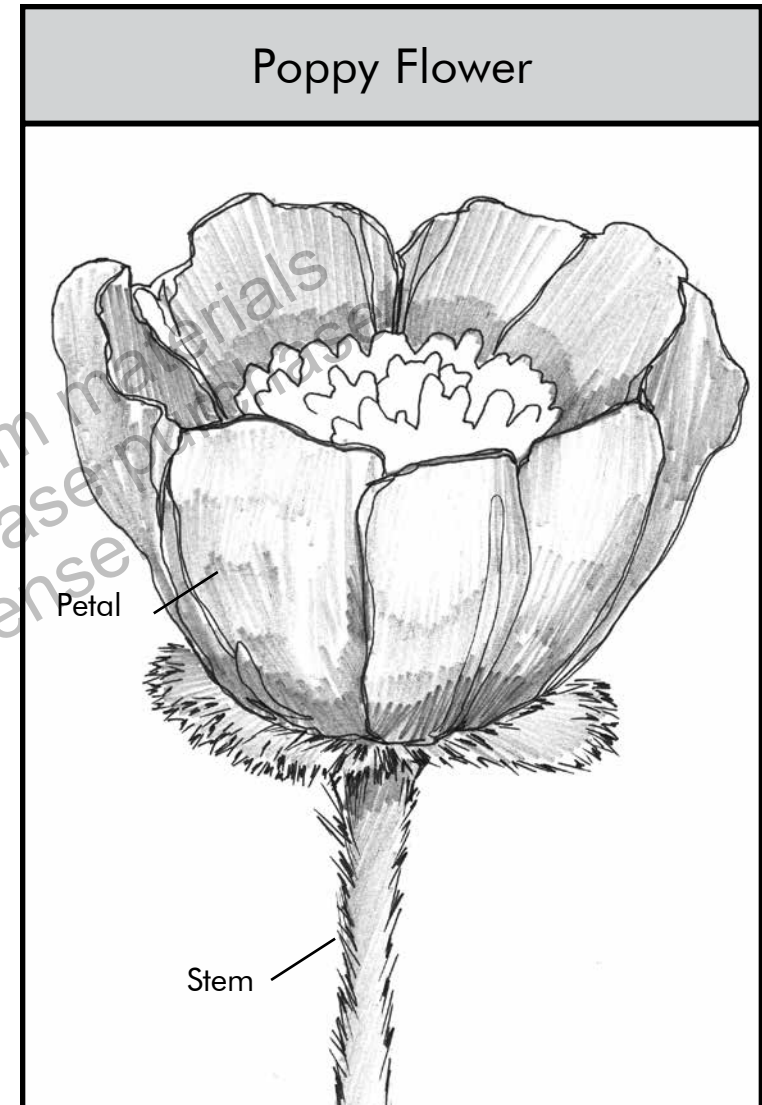
Flowers

Leaves, stems, and roots help a plant survive. But flowers help a plant **species** survive. Flowers help plants reproduce by making seeds. These seeds can then grow into new plants. A poppy is a good example of how a flower produces seeds.

A poppy flower is attached to a stem. The stem provides nutrients to the flower. Each flower has brightly colored petals. The colors of the petals attract bees and other insects.

Inside the flower are pads covered with pollen. Bees and other insects pick up pollen from one flower and take it to another. Transporting pollen between flowers is necessary to make seeds.

species: a group of plants or animals that are alike in certain ways



A poppy flower is attached to a stem. The stem provides nutrients to the flower. Each flower has brightly colored petals. The colors of the petals attract insects and bees.

Seeds

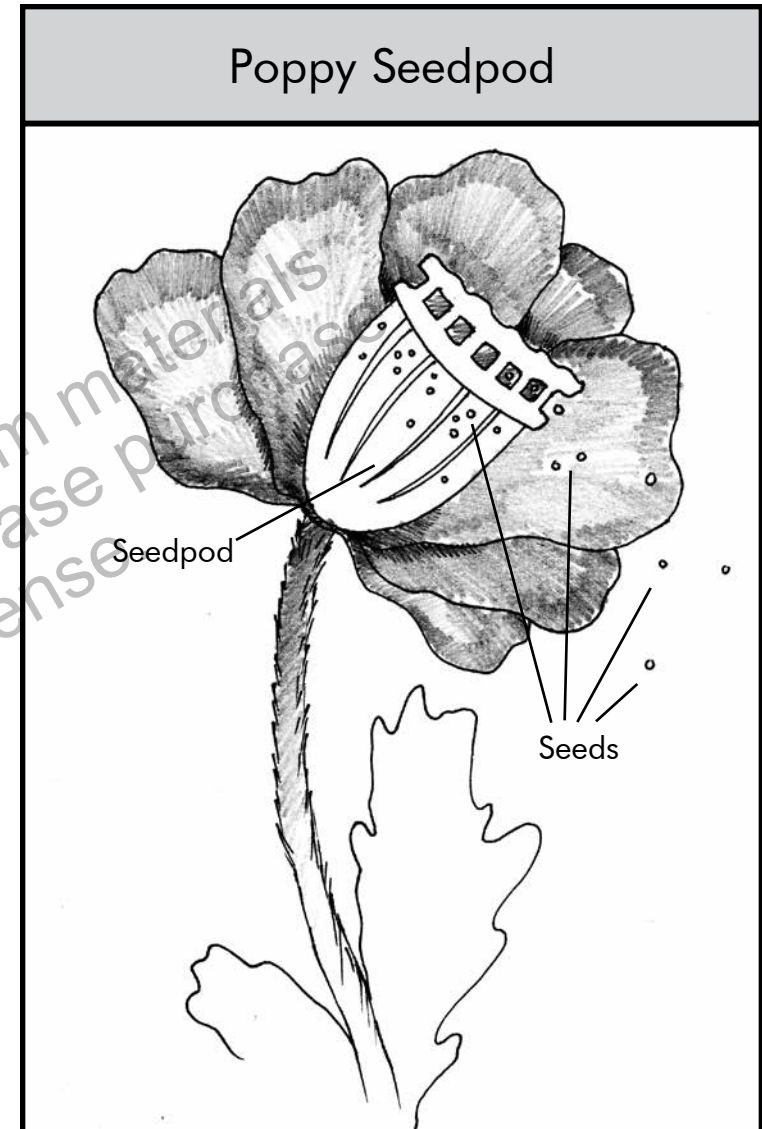
Also inside the flower is a seedpod. When a bee or other insect brings pollen from another flower, the pollen sticks to the top of the seedpod. Inside the seedpod are seeds waiting to grow. When the pollen joins these seeds, they begin to grow.

The flower petals dry up and fall off. Their work of attracting bees and other insects is over. The seedpod is left behind.

Each seedpod has holes around the top. When the wind blows, or the plant is knocked down, the seeds fall out. Now, new poppies can grow from these seeds. This species of plant continues to survive year after year in this way.

– Summarize –

Tell a friend how a flower helps plants reproduce.



Each seedpod has holes around the top. When the wind blows, or the plant is knocked down, the seeds fall out.

Plants Look Like Their Parents

Have you ever been told that you look just like your mother or father? Have you ever noticed that someone who is tall usually has a parent who is tall? This happens because parents pass **traits** on to their children. A trait is any characteristic that can be used to identify or describe an organism.

People **inherit** traits from their parents. If your parents are short, you probably will be short. If your parents have thick hair, you will probably have thick hair.

All animals, not just humans, pass on traits to their **offspring**. So do plants!

trait: a special quality or characteristic
inherit: to receive a trait from a parent
offspring: the young of a human, animal, or plant

Remember the pictures of leaves you saw on page 8? There were many different sizes and shapes. However, the maple tree will always have the same size and shape of leaf. It will never look like the leaf of an oak tree. That's because the maple tree passes its traits, such as leaf size and shape, on to its offspring.

Think about the poppy you read about. When a seed grows into a poppy plant, the flower it produces will look like the flower of the parent plant. Traits are passed on from parent to offspring.

Sum It Up

You have read that plants have structures that allow them to reproduce, grow, and survive as a species. Their most important structures are roots, stems, leaves, flowers, and seeds. Also remember that plants and animals pass on traits to their offspring. This makes each plant species unique.

Glossary

inherit—to receive a trait from a parent

nutrients—things needed by people, plants, and animals to stay healthy

offspring—the young of a human, animal, or plant

organism—any living thing

photosynthesis—the process by which plants make food

reproduce—to produce others of the same kind

species—a group of plants or animals that are alike in certain ways

trait—a special quality or characteristic

transport—to carry from one place to another

To Find Out More . . .

Want to learn more about plants?

Try these books

From Seed to Plant by Allan Fowler.
Children's Press, 2001.

Read and Learn: Plants—Seeds (Plants)
by Patricia Whitehouse. Raintree, 2004.

A Seed Is Sleepy by Dianna Hutts Aston.
Chronicle, 2007.

Seeds (Plant Parts) by Vijaya Bodach.
Capstone, 2006.

Seeds by Ken Robbins. Atheneum, 2005.

Access these Web sites

The Great Plant Escape
www.urbanext.uiuc.edu/gpel/index.html

Biology of Plants: Missouri Botanical
Garden
www.mbgnet.net/bioplants/main.html

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Assessments

Structures of Plants

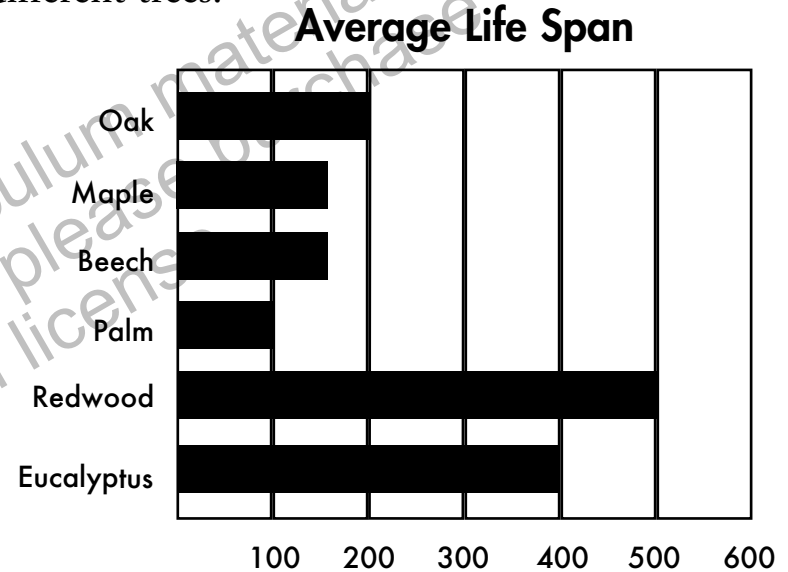
Print pages 18–20 of this PDF for the assessments.

Check Understanding

Shade the circle next to the correct answer or write your answers on the lines provided.

- Green plants get the energy they need to make food from
 - water
 - soil
 - sunlight
 - air
- A student puts two identical plants in a pot on the same windowsill. He plants one in pebbles and the other in clay. He gives both the same amount of water. This experiment tests how the plant responds to
 - water
 - soil
 - sunlight
 - air

Base your answers to questions 3 and 4 on the bar graph below and on your knowledge of science. The bar graph shows the average life span of 6 different trees.



- Which tree has the shortest life span?

- How much longer is the life span of a redwood tree than the life span of an oak tree?

Check Understanding

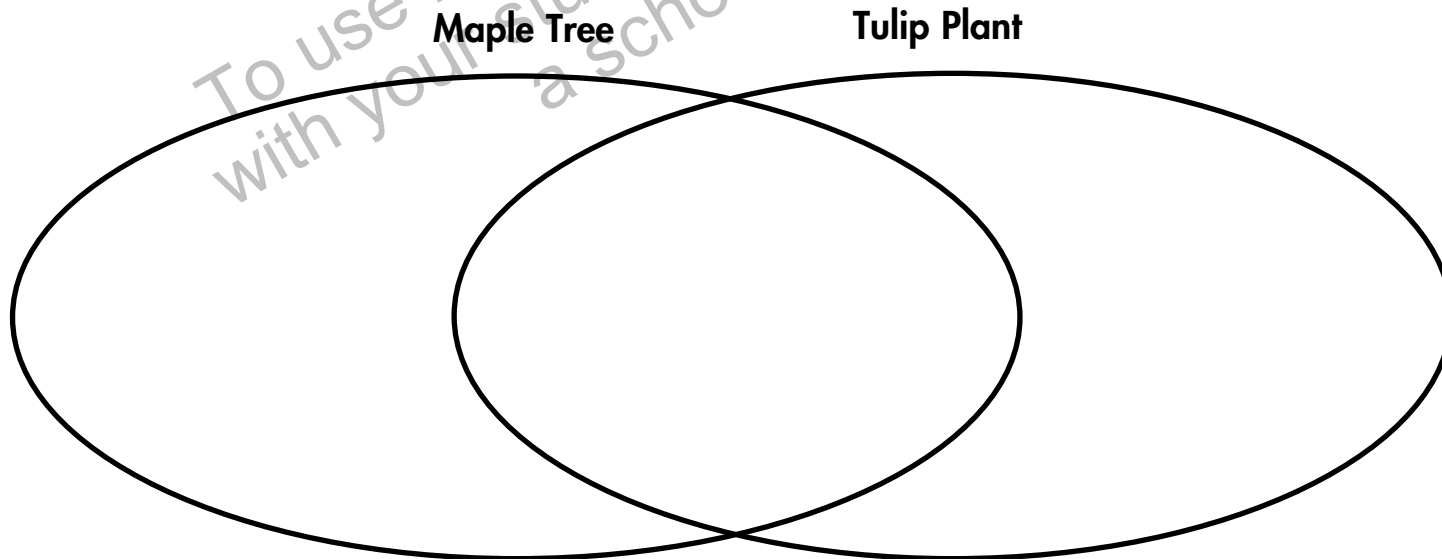
Record your answers in the space provided.

5. Some properties of a maple tree and a tulip plant are listed below.

Maple Tree
stems
25 feet tall
bark on stems
points on leaves
seeds
deep roots

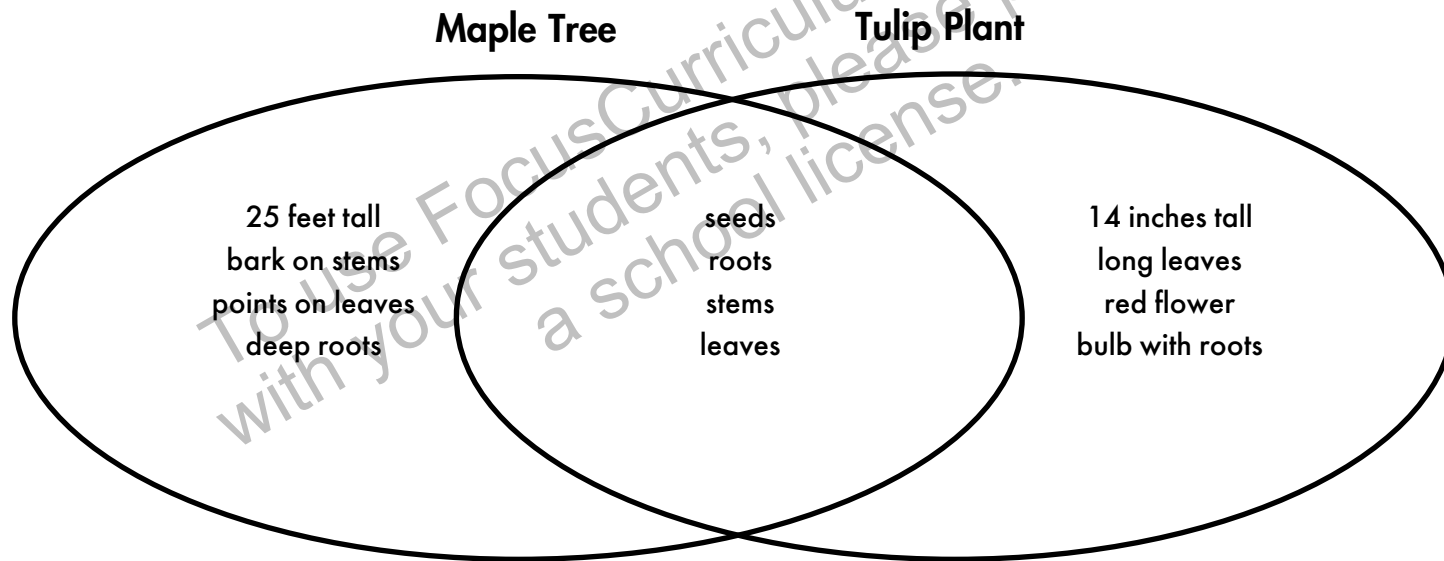
Tulip Plant
14 inches tall
seeds
long leaves
red flower
bulb with roots
stems

Complete the Venn diagram below to compare and contrast the maple tree and the tulip plant. Use all of the properties listed above.



Assessment Scoring Guidelines

1. Answer C is correct.
2. Answer B is correct.
3. Palm
4. 300 years
- 5.





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English Language Arts Activities

Structures of Plants

Print pages 22–26 of this PDF for the reading activities.

Figure Out New Words

TRY THE SKILL

In this book, you learned many new words. Now you can use what you learned to figure out even more words.

For example, *organism* means, “any living thing.” So *organic* must mean, “coming from a living thing.”

Read the words and their meanings in the box below. Then shade the circle next to the correct word on the other side of this page.

nutrients—things needed by people, plants, and animals to stay healthy

reproduce—to produce others of the same kind

transport—to carry from one place to another

1. A _____ is an exact copy of something.
 (A) nutritious
 (B) reproduction
 (C) transportation
2. Vegetables and fruit are part of a _____ meal.
 (A) nutritious
 (B) reproduction
 (C) transportation
3. A car or bicycle is a form of _____.
 (A) nutritious
 (B) reproduction
 (C) transportation

Identify a Purpose

TRY THE SKILL

Knowing why something was written can help you understand it. These are the main reasons why an author writes:

- to give readers information
- to tell readers how to do something
- to persuade readers to think or act in a certain way
- to entertain readers.

What is the main purpose of this book?

Most of this book was written to give you information. It tells about the different structures of plants. You are not expected to learn how to do something. You are not persuaded to think or act in a certain way. So the main purpose of this book was to inform.

Read the description of each selection. Then identify its main purpose.

1. This selection tells how leaves collect sunlight to make food.

- Ⓐ to inform
- Ⓑ to instruct
- Ⓒ to persuade
- Ⓓ to entertain

2. This selection tells readers that planting gardens is a fun to do.

- Ⓐ to inform
- Ⓑ to instruct
- Ⓒ to persuade
- Ⓓ to entertain

Predict the Content of a Book

TRY THE SKILL

A table of contents lists the titles of the chapters in a book. The titles tell you which topics the book covers. Sometimes, chapter titles are followed by subheadings. These subheadings tell more about what each chapter covers. A table of contents can help you predict what the book is about before you read it.

Look at the table of contents below. Then answer the questions to the right.

	Page
Chapter 1: What Giraffes Look Like	4
Height and Weight	5
Patterns of Spots	7
Chapter 2: Where Giraffes Live	9
Chapter 3: How Giraffes Form Families	14
Finding Mates	16
Taking Care of Babies	18
Chapter 4: How Giraffes Protect Themselves	22
Chapter 5: How People Are Helping to Protect Giraffes	24

1. Which of these is not a main topic in this book?

- (A) Where giraffes live
- (B) How giraffes form families
- (C) Taking care of babies
- (D) How giraffes protect themselves

2. Which chapter tells whether you should expect to see giraffes in Africa?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

3. Do you think giraffes have any trouble surviving? Explain why or why not.

Summarize Information

TRY THE SKILL

When you summarize a paragraph, you explain its main idea in one or two sentences. For example, read this paragraph:

Stems have another important function. They have tubes running through them. One type carries water and minerals from the roots up to the leaves. Another type of tube carries the food made by the leaves down to other parts of the plants including the roots. The stem is often called the highway of a plant—transporting important nutrients through the plant.

Here is a good summary.

Stems transport nutrients from the leaves and roots to other parts of the plant.

Read the paragraph. Then write a summary of it.

The leaves, stems, and roots are important structures to help a plant survive. The flowers help a plant species survive. Flowers help plants reproduce. They do this by making seeds. These seeds can then grow into new plants. A poppy is a good example of how a flower produces seeds.

Answer Key

Figure Out New Words

1. B
2. A
3. C

Identify a Purpose

1. A
2. C

Predict the Content of a Book

1. C
2. B
3. Yes, because Chapter 5 explains how people are helping protect giraffes.

Summarize Information

Flowers help a plant survive.

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