Name _____ Class _____ Date _____

CHAPTER 12 Introduction to Plants

SECTION 1 What Is a Plant?

California Science Standards

7.1.b, 7.1.d, 7.5.a

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

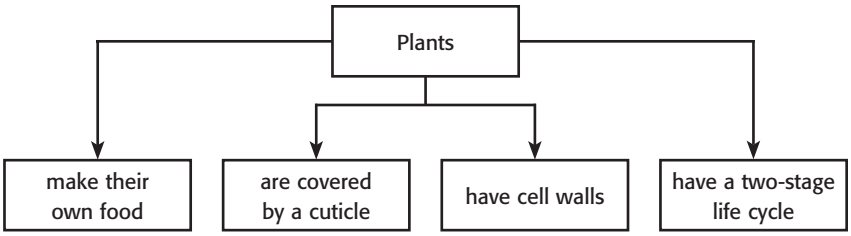
- What characteristics do all plants share?
- What are two differences between plant cells and animal cells?
- How are vascular plants different from nonvascular plants?

STUDY TIP

Organize As you read, make a diagram to show the major groups of plants. Be sure to include the characteristics of each group.

What Is a Plant?

A plant is an organism that uses sunlight to make food. Trees, grasses, ferns, cactuses, and dandelions are all types of plants. Plants can look very different, but they all share four characteristics.



MAKING THEIR OWN FOOD

Plants make food from carbon dioxide and water in a process called *photosynthesis*. Photosynthesis takes place in special organelles called *chloroplasts*. The process needs light energy. Inside the chloroplasts, a green pigment called *chlorophyll* collects energy from the sun for photosynthesis. Chlorophyll is what makes most plants look green. Animal cells do not have chloroplasts. ☑

READING CHECK

1. Define What is chlorophyll?

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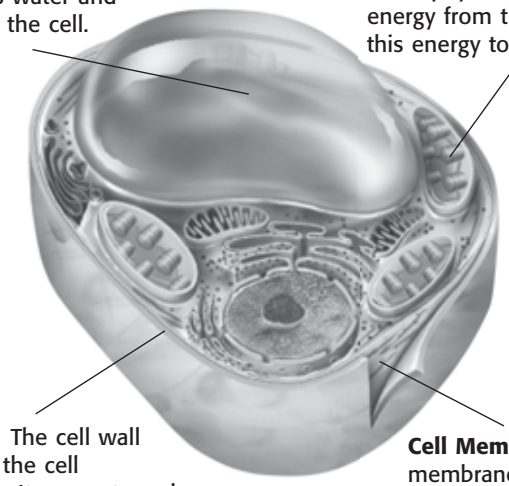
CUTICLE COVER

Every plant has a cuticle that covers and protects it. A *cuticle* is a waxy layer that coats a plant's leaves and stem. The cuticle keeps plants from drying out by keeping water inside the plant.

CELL WALLS

How do plants stay upright? They do not have skeletons, as many animals do. Instead, each plant cell is surrounded by a stiff cell wall. The cell wall is outside the cell membrane. Cell walls support and protect the plant cell. Animal cells do not have cell walls.

Structures in a Plant Cell



CALIFORNIA STANDARDS CHECK

7.1.b Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.

Word Help: distinguish to show differences between two or more objects

2. Describe Name two structures found in plant cells but not in animal cells. Describe the function of each structure.

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TWO-STAGE LIFE CYCLE

Many organisms, including plants, produce offspring when a sperm joins with an egg. This is called *sexual reproduction*. In animals, sexual reproduction happens in every generation. However, plants do not produce sperm and eggs in every generation.

Plants have a two-stage life cycle. This means that they need two generations to produce eggs and sperm. In the *sporophyte* stage, a plant makes spores. A *spore* is a cell that can divide and grow into a new plant. This new plant is called a *gametophyte*. In the gametophyte stage, the plants produce sperm and eggs. The sperm and eggs then join to produce a new sporophyte. ☑

READING CHECK

3. List What are the two stages of the plant life cycle?

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What Are the Main Groups of Plants?

There are two main groups of plants: vascular and non-vascular. A **vascular plant** has specialized vascular tissues. *Vascular tissues* move water and nutrients from one part of a plant to another. A **nonvascular plant** does not have vascular tissues to move water and nutrients.

NONVASCULAR PLANTS

Instead of special tissues to move water and nutrients, nonvascular plants depend on diffusion to move these materials. In *diffusion*, water and nutrients move through a cell membrane and into a cell. Diffusion works best over short distances. Each cell must get water and nutrients from the environment or a cell that is close by.

Nonvascular plants can rely on diffusion because they are small. If a nonvascular plant were large, not all of its cells would get enough water and nutrients. Most nonvascular plants live in damp areas, so each of their cells is close to water. ☑

READING CHECK

4. Identify How do water and nutrients move through a nonvascular plant?

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Nonvascular Plants

Mosses, liverworts, and hornworts

VASCULAR PLANTS

Many of the plants we are most familiar with are vascular plants. They include ferns, pine trees, cactuses, and tulips. Vascular plants are divided into two groups: seedless plants and seed plants. Seed plants are divided into two more groups based on whether or not the plant has flowers. Nonflowering seed plants, such as pine trees, are called **gymnosperms**. Flowering seed plants, such as magnolias, are called **angiosperms**.

Critical Thinking

5. Apply Concepts Do you think a sunflower is a gymnosperm or an angiosperm? Explain your answer.

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Vascular Plants

Seedless plants	Seed plants	
	Nonflowering	Flowering
Ferns, horsetails, and club mosses	Gymnosperms	Angiosperms
		

Name _____ Class _____ Date _____

Section 1 Review

7.1.b, 7.1.d, 7.5.a

SECTION VOCABULARY

angiosperm a flowering plant that produces seeds within a fruit **Wordwise** The root *angi* means "vessel." **gymnosperm** a woody, vascular seed plant whose seeds are not enclosed by an ovary or fruit **Wordwise** The root *gymn* means "naked." The root *sperm* means "seed."	**nonvascular plant** a plant that lacks specialized conducting tissues and true roots, stems, and leaves **vascular plant** a plant that has specialized tissues that conduct materials from one part of the plant to another

1. **Explain** What are the two main differences between a plant cell and an animal cell?

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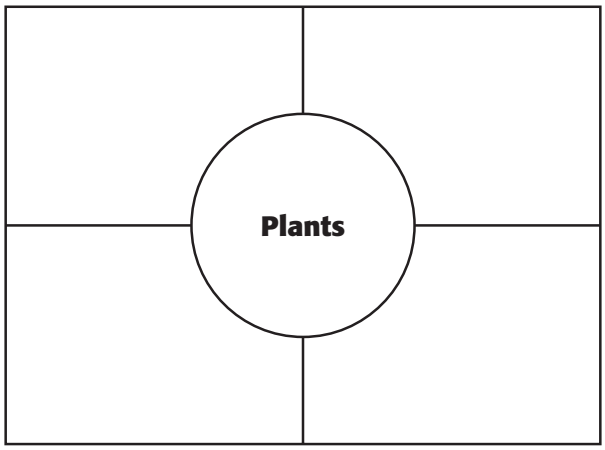
2. **Organize** Fill in each box in the figure below with one of the main characteristics of plants.



3. **Predict** What would happen to a plant if its chloroplasts stopped working? Explain your answer.

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4. **Compare** What is the main difference between vascular and nonvascular plants?

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