

Red Edition
Grade 3–4
reading level

Purple Edition
Grade 4–5
reading level

Objectives

- Compare how plants are alike.
- Explore why animals need plants.
- List what plants need to live and grow.
- Discuss different parts of plants.
- Define *nonvascular* plants.
- Define *vascular* plants.
- Explore the functions of roots, stems, and leaves.
- Describe how plants make food.
- Explain how plants get energy from food.
- Understand how adaptations help plants live in their environments.

Reading Comprehension Skills

Preview the Book ♦ How to Read Diagrams
Main Idea and Details ♦ Cause and Effect

Skillbuilders are available for this title.

Supporting English Learners

Activate Prior Knowledge Enhance English Learners' ability to organize what they already know about plants' needs and structures. Tie new information to students' own experiences, and then relate it to the science concepts in each section. Make explicit connections to new learning and concepts covered in previous sections.

Summary

The Delta Science Content Reader *Plant Needs* describes what a plant is and the resources that a plant needs to live and grow. Students learn that the majority of plants share similar structures, including roots, stems, and leaves, each of which functions to help meet the plants' needs. The book then reviews the processes by which plants make their own food and use that food for energy. It concludes with a discussion of ways in which plants survive in and respond to their environments.

Science Background

Plants are everywhere, from fields and forests to oceans and deserts. In fact, there are more than 250,000 different types of plants, ranging in size from the towering sequoia to the microscopic duckweed. But regardless of their habitat or appearance, all plants share the need for water, light, carbon dioxide, and nutrients.

Plants fall into two main categories. Vascular plants—the largest division of the plant kingdom—have supportive water-conducting tissues to transport water and nutrients. Nonvascular plants, such as primitive mosses and worts, do not.

Vascular plants have three main structures they use to meet their needs—roots, stems, and leaves. Each of these structures is involved in photosynthesis, the process by which plants make their own food. A plant absorbs water from the soil through its roots and captures carbon dioxide from the air and energy from sunlight through its leaves. During photosynthesis, water and carbon dioxide combine in the presence of light energy to produce a sugar, which provides food for the plant. Vascular tissue in the stem transports water from the roots to the leaves and sugar from the leaves to other parts of the plant.

A structure or behavior that helps an organism survive in its environment is called an adaptation. Plant adaptations help plants compete for resources, protect themselves, and reproduce.



What Do Plants Need? (pages 2–7)

Before Reading

Discuss the Cover

Cover Image Discuss the photograph on the cover of *Plant Needs*. Use the information on the inside front cover to support the discussion.

Science Statement Discuss the science statement. Encourage students to think about how a plant might meet each of its needs.

Build Reading Skills (page 2)

Preview the Book Use Build Reading Skills on page 2 to review how to preview the book. Discuss the steps. Then model previewing captions and labels.

Think Aloud *I know a caption gives more information about a picture. I see that the picture on page 7 shows some parts of a plant. The caption tells me that parts called roots, stems, and leaves help the plant get what it needs. The labels point out where each part of the plant is in the picture. As I read, I will pay attention to captions and labels to help me understand what the pictures show.*

Guide students as they finish previewing *Plant Needs*. Focus on nonfiction text features.

- Prompt them to look at the headings, photographs, captions, and diagrams. Ask questions such as *Why do you think that feature is there? How will it help you understand what you read?*
- Prompt them to look at the bold Vocabulary words. Guide the class in looking up a Vocabulary word in the Glossary.

Students can apply the skill in the Reflect on Reading activity on page 7.

K-W-L Chart Have students begin a K-W-L chart. They should add to it after each section.

What I Know	What I Want to Learn	What I Learned
Plants need light to grow.	How does light help plants grow?	

Make a Connection (page 3)

Make a Connection Discuss the Make a Connection questions. Use this discussion to build background and activate prior knowledge about what plants need. (Possible answer: I know about many plants, such as dandelions and daisies. Plants need water and sunlight to live and grow.)

Find Out About Read each statement to help students set a reading purpose. Explain that these are the important topics that they will learn about in this section.

Vocabulary Read the Vocabulary words aloud. Explain to students that they will see these words in bold in this section. Start a word web on the board with *Organisms* in the center. Add *Plants* and *Animals* in two connected circles. Have students add information to the web as they read.

During Reading

About Plants (page 4)

- Ask: *What is an organism?* (a living thing)
- ✓ **Checkpoint** (page 4) (make their own food, use food for energy to live and grow, do not move from place to place, reproduce, made of cells)

Importance of Plants to Animals (page 5)

- ✓ **Checkpoint** (page 5) (Animals depend on plants for food and oxygen. Some animals also depend on plants for shelter. People depend on plants for many things.)

Plant Needs (page 6)

- Emphasize that an organism's environment is all the physical things and conditions that surround it.
- ✓ **Checkpoint** (page 6) (air, water, light, nutrients, space—room to grow)

Plant Parts (page 7)

- Discuss that a spore is a tiny cell that can grow and develop into a new plant. Ask if students are familiar with mosses or ferns, which grow from spores.
- ✓ **Checkpoint** (page 7) (roots, stems, leaves)

After Reading

Reflect on Reading (page 7) Have students review the headings from this section before completing the

activity. Have them explain to a partner what they learned, using their own words.

Apply Science Concepts (page 7) This activity applies a concept from Find Out About on page 3. (Possible answers: paper, pencils, fruits, vegetables, clothes; Clothes are important to me because they keep me warm.)

What Are Two Types of Plants? (pages 8–15)

Before Reading

Build Reading Skills (page 8)

How to Read Diagrams Use Build Reading Skills on page 8 to review how to read diagrams. Discuss the tips. Discuss with students that arrows, numbers, keys, legends, symbols, and color coding can be important features of diagrams. Then model how to read the diagram on page 14.

Think Aloud *The title tells me that this diagram is about the parts of a leaf. The labels “top of leaf” and “bottom of leaf” tell me I am looking at parts inside the leaf. The caption tells me that a leaf’s main job is to make food for the plant. When I look at the label “chloroplasts,” I learn that these parts are where the food is made.*

Guide students as they practice reading the diagram. Students can apply the skill in the Reflect on Reading activity on page 15.

Make a Connection (page 9)

Make a Connection Discuss the Make a Connection question. Use this discussion to build background and activate prior knowledge about types of plants. (Possible answer: Moss doesn’t have flowers, is shorter, and can grow on trees.)

Find Out About Read each statement to help students set a reading purpose. Explain that these are the important topics that they will learn about in this section.

Vocabulary Read the Vocabulary words aloud. Explain to students that they will see these words in bold in this section. Start a T-chart on the board for *nonvascular plants* and *vascular plants*. Have students add details to the chart as they read.

During Reading

Nonvascular Plants (page 10)

- Point to the picture of moss. Ask: *Why do mosses grow on rocks near rivers and streams?* (They often grow in damp places like this because they need a lot of water.)

✓ **Checkpoint** (page 10) (A nonvascular plant takes water and nutrients into its cells right from the environment. It takes in water directly from the ground and from the air. The water moves from one cell to another inside the plant. A nonvascular plant is usually small and grows low to the ground because it cannot move materials very far this way.)

Vascular Plants (page 11)

- Ask: *Why can vascular plants grow taller than nonvascular plants?* (Their vascular tissue lets materials move quickly from one part of the plant to other parts.)

- Ask: *What do the two kinds of tubes in vascular tissue do?* (Xylem moves water and nutrients up from the roots to the rest of the plant. Phloem moves food down from the leaves to other plant parts.)

✓ **Checkpoint** (page 11) (A vascular plant has tubes to move materials quickly to all parts of the plant.)

Roots (page 12)

- Ask: *What part of a root takes in water and nutrients from the soil?* (root hairs)
- Ask: *What are two kinds of roots?* (taproots, fibrous roots) *Which kind spread out in all directions?* (fibrous roots)

✓ **Checkpoint** (page 12) (take in water and nutrients, hold the plant in the ground, store food the plant has made)

Stems (page 13)

- Ask: *How are nonwoody plants and woody plants different?* (Nonwoody plants have soft, green stems that grow taller, but not much wider, and usually die each year. Woody plants have stems made of wood that grow wider each year.)

✓ **Checkpoint** (page 13) (holds up the leaves so they can reach sunlight; moves water, nutrients, and food through the plant; stores food and water)

Leaves (page 14)

- Ask: *What are three important parts of a leaf?* (chloroplasts, veins, stomata)
- Review the diagram of the parts of a leaf on page 14. Ask: *How does this diagram help you understand the way plants let gases into and out of a leaf?* (I can see the tiny holes called stomata where the gases pass through.)

✓ **Checkpoint** (page 15) (make food for the plant)

After Reading

Reflect on Reading (page 15) Be sure students know that trees have fibrous roots. (Diagrams should have clearly labeled roots, stems, and leaves. Possible answers: Roots: take in water and nutrients; Stem: holds up leaves; Leaves: make food)

Apply Science Concepts (page 15) This activity applies a concept from Find Out About on page 9. Have partners think in terms of what people can do to help roots, stems, and leaves get what they need. (Possible answers: water plants, use poles to help hold up stems, plant them where it is sunny)

How Do Plants Make and Use Food? (pages 16–19)

Before Reading

Build Reading Skills (page 16)

Main Idea and Details Use Build Reading Skills on page 16 to review main idea and details. Discuss the tips. Then model how to identify the main idea about how plants make food on page 18.

Think Aloud *I see the heading “Making Food,” so I know this section must be about how plants make food. What is the main idea? The main idea is often in the first sentence of a paragraph. The first sentence of the first paragraph on this page says that the way plants make their own food is called photosynthesis. This must be the main idea.*

Students can apply the skill in the Reflect on Reading activity on page 19.

Make a Connection (page 17)

Make a Connection Discuss the Make a Connection

question. Use this discussion to build background and activate prior knowledge about how plants make and use food. (Possible answer: Their leaves must use sunlight, air, and water to make a kind of food.)

Find Out About Read each statement to help students set a reading purpose. Explain that these are the important topics that they will learn about in this section.

Vocabulary Read the Vocabulary words aloud. Explain to students that they will see these words in bold in this section. Start a T-chart on the board for *photosynthesis* and *respiration*. Have students add information about each process as they read.

During Reading

Making Food (page 18)

- Explain that air is made up of a number of different gases, including nitrogen, oxygen, and carbon dioxide.
- Ask: *What is chlorophyll?* (a green material inside the chloroplasts in a leaf’s cells) *What does it do?* (collects energy from sunlight)
- Ask: *What is given off as waste during photosynthesis?* (the gas oxygen)

✓ **Checkpoint** (page 18) (Plant cells use energy from sunlight to combine water and carbon dioxide to make a kind of sugar; photosynthesis)

Using Food (page 19)

- Emphasize that the energy plants get when they break down sugar originally comes from sunlight.
- Ask: *What role do stomata have in respiration?* (take in oxygen, give off water and carbon dioxide)
- Discuss the respiration diagram. Ask: *Why is some text in the diagram red and some text blue?* (Red: materials taken in during respiration; Blue: waste given off during respiration)
- Have students compare the diagrams of photosynthesis and respiration on pages 18 and 19. Tell them to look at the colors and placement of the labels in both diagrams. Guide them to understand that the colors and placement of the labels show that the ideas are “opposite.”

✓ **Checkpoint** (page 19) (Plant cells use oxygen to break down sugar to get energy; respiration)

After Reading

Reflect on Reading (page 19) Recall that a large section of text can have one main idea and many supporting details. (Possible answers: Main idea: Plants make food through photosynthesis. Details: need water, carbon dioxide, sunlight; use energy from sunlight to combine water and carbon dioxide to make sugar; give off oxygen as waste)

Apply Science Concepts (page 19) This activity applies a concept from Find Out About on page 17. Have students review the diagrams on pages 18 and 19 before drawing. (Drawings should show animals breathing out carbon dioxide and breathing in oxygen, and plants taking in carbon dioxide and letting out oxygen through leaves.)

How Do Environments Affect Plants? (pages 20–23)

Before Reading

Build Reading Skills (page 20)

Cause and Effect Use Build Reading Skills on page 20 to review cause and effect. Then read aloud the caption for the photograph of the potted plant on page 23, and model identifying cause and effect.

Think Aloud *Look at this plant. To identify cause and effect, I ask myself questions. What happens to the plant? It bends toward the window. Why does this happen? It is responding to sunlight outside.*

Guide students to identify other causes and effects as they read. Students can apply the skill in the Reflect on Reading activity on page 23.

Make a Connection (page 21)

Make a Connection Discuss the Make a Connection questions. Use this discussion to build background and activate prior knowledge about how environments affect plants. (Possible answer: Deserts are very dry. Maybe cactus plants can store water so they don't dry out and die.)

Find Out About Read each statement to help students set a reading purpose. Explain that these are the important topics that they will learn about in this section.

Vocabulary Read the Vocabulary words aloud. Explain to students that they will see these words in bold in this section. Start a word web on the board with *adaptations* in the center. Have students suggest examples as they read.

During Reading

Plant Adaptations (page 22)

- Discuss examples of adaptations. Many rain forest plants have slick leaves with grooves and pointed tips to help them shed water to avoid getting moldy and weighed down. If a giraffe grazes for too long on an acacia tree, the tree pumps a bitter-tasting substance into its leaves.
- Have students think back to the two different kinds of roots. Ask: *What might happen to a carrot plant in a desert?* (Possible answer: It would die because brief desert rains wouldn't get enough water down to its deep taproot.)
- ✓ **Checkpoint** (page 22) (a special way a plant has of surviving in its environment; Possible answer: A cactus may store water in its thick stem.)

Plant Responses (page 23)

- Explain that gravity is the force that pulls objects toward each other. Gravity keeps us on the ground.
- ✓ **Checkpoint** (page 23) (response to light)

After Reading

Reflect on Reading (page 23) (Possible answers: Light effects: Leaves and stems grow toward light, roots usually grow away from it; Gravity effects: Roots grow down toward the pull of gravity, stems grow up away from it; Touch effects: Some plants grow toward what they touch.)

Apply Science Concepts (page 23) This activity applies a concept from Find Out About on page 21. Before students begin their observations, have them review what they learned about roots, stems, and leaves. Guide them to think about some of the different factors, such as climate, that might affect plant part adaptations in your environment.

 **Continued on last page**

Name: _____

Date: _____

Test: Plant Needs

Part A: Vocabulary

adaptation	nonvascular	oxygen	phloem
photosynthesis	respiration	vascular	xylem

Choose the correct vocabulary word for each sentence. Write the word on the line.

1. Plants give off _____, a gas that animals breathe.
2. Mosses and other _____ plants take in water right from the ground surface and from the air.
3. Most plants have _____ tissue that carries water, food, and nutrients to all parts of the plant.
4. A tree's wood is made of old _____.
5. Food moves down from the leaves to other parts of the plant through tubes called _____.
6. The way plants make their own food is called _____.
7. Plants get energy from sugar through _____.
8. Prairie grasses have soft stems. This _____ helps them bend so they can survive in their windy environment.

Part B: Science Concepts

Mark the best answer to each question.

9. No matter how different they look, all plants _____.
Ⓐ have xylem and phloem Ⓒ are made of cells
Ⓑ eat food to get energy Ⓓ have leaves year-round
10. In which parts of a plants' leaves does photosynthesis take place?
Ⓐ veins Ⓒ thorns
Ⓑ chloroplasts Ⓓ stomata

Test: Plant Needs (continued)

11. What does chlorophyll do for a plant?

- (A) collects sunlight
- (B) stores food
- (C) absorbs water
- (D) gives off oxygen

12. When a pea plant grows around a pole, it is showing a response to _____.

- (A) gravity
- (B) light
- (C) height
- (D) touch

Write the answer.

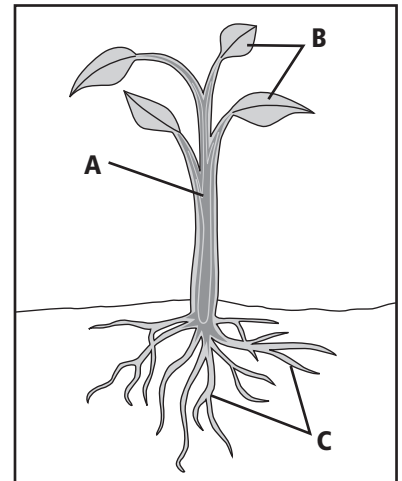
13. Explain why animals depend on plants for food.

14. Look at the diagram. Name the parts labeled A, B, and C. Then tell one job each part does for the plant.

A _____

B _____

C _____



15. Describe photosynthesis. Be sure to explain what plants need for this process and what they make as waste.

Let's Review

(inside back cover)

Have students complete their K-W-L charts before answering these questions. Possible answers are shown.

- 1. Cover Connection** (I learned that most plants have roots, stems, and leaves. Each part helps the plant meet its needs in a different way, such as by taking in water and nutrients, holding up the leaves, and collecting sunlight.)
- (Plants need light, water, and air to make food. They need nutrients to grow and repair themselves. They need space, or room to grow.)
- (Roots: take in water and nutrients, hold plant in ground, store food; Stem: holds up leaves so they reach sunlight, moves materials through plant, stores food and water; Leaves: make food, help move water)
- (Photosynthesis is the way plants make their own food with water, carbon dioxide, and sunlight. Without this process, plants could not make food. They would not have energy to live and grow.)
- (Yes. Adaptations are ways a plant has of surviving. Spines help a cactus plant survive by keeping it safe from animals that want to eat it.)
- 6. How to Read Diagrams** (The red arrows show that leaves take in carbon dioxide from air and energy from sunlight, and roots take in water from soil. The plant combines water, carbon dioxide, and energy from sunlight to make sugar and oxygen. The blue

arrows show that oxygen is given off into the air, and the sugar is used or stored by the plant.)

- 7. Write** (Reports should include the plant's physical description and environment; animals that eat or find shelter in it; what people may use it for; and any adaptations, such as leaf shape or defenses.)

Try It! Students should observe that colored water has moved up the tubes in the stalk, or stem. Guide them to understand that as water is lost from the top of the stalk, more water is pulled up to replace it.

Science at Home Have students do this activity at home with a family member. Tell them to study the shape of the food to determine what part of the plant it came from. Encourage them to explain to family members what that part did for the plant.

Answers to Test

(Teacher's Guide pages 6–7)

- oxygen
- nonvascular
- vascular
- xylem
- phloem
- photosynthesis
- respiration
- adaptation
- C
- B
- A
- D
13. Animals cannot make their own food as plants do. Instead, animals must eat food to get energy to live and grow. Some animals eat plants. Other animals eat animals that have eaten plants.
- A: stem—holds up leaves; moves water, nutrients, and food; stores food and water; B: leaves—make sugar that is food for plant; C: roots—take in water and nutrients, hold plant in ground, store food
15. In photosynthesis, plants combine energy from sunlight, carbon dioxide from air, and water from soil to make sugar. The leaves give off the gas oxygen as waste.

ADDITIONAL ASSESSMENT OPPORTUNITIES Use the Checkpoints, Reflect on Reading, and Apply Science Concepts features and Let's Review questions as additional assessment opportunities.

Delta Science Content Readers are 24-page nonfiction student books with informative, engaging text and full-color photos and illustrations. The readers present key science content and vocabulary found on state tests, present key reading skills and strategies useful for reading informational text, support and extend the experiences and content of hands-on activities, promote scientific inquiry, and serve as a home-school link. They are available in two editions: Red Edition for Grades 3–4 and Purple Edition for Grades 4–5.

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**Plant Needs
Teacher's Guide**
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