

On Level



Life Science

Plant and Animal Adaptation

# How Plants Survive

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Student Book  
•  
Assessments and  
Reading Activities

# How Plants Survive

How are plants well-suited to live in their environments?

## CORE CURRICULUM STATEMENTS

### **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

In order to survive in their environment, plants and animals must be adapted to that environment.

- seeds disperse by a plant's own mechanism and/or in a variety of ways that can include wind, water, and animals
- leaf, flower, stem, and root adaptations may include variations in size, shape, thickness, color, smell, and texture
- animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation, and migration

### **Organisms maintain a dynamic equilibrium that sustains life.**

Plants respond to changes in their environment. For example, the leaves of some green plants change position as the direction of light changes; the parts of some plants undergo seasonal changes that enable the plant to grow; seeds germinate, and leaves form and grow.

### **Plants and animals depend on each other and their physical environment.**

When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

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# Student Book

*How Plants Survive*

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# How Plants Survive

How are plants well-suited to live in their environments?

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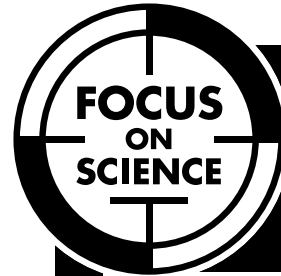
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# How Plants Survive

by Stan Hall





Life Science

Plant and Animal Adaptation

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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?*

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## INTRODUCTION

# What Do Plants Need?

Plants are everywhere! Many thousands of different types of plants can be found in New York alone.

Trees and bushes are plants. Grasses are plants. Flowers in your garden are plants. Fruits and vegetables grow on plants.

Plants need food, water, air, and light to **survive**. We depend on plants to survive.

Plants have special **structures** that help them meet their needs. These include roots, stems, flowers, and seeds. They can also change in ways that help them get what they need.

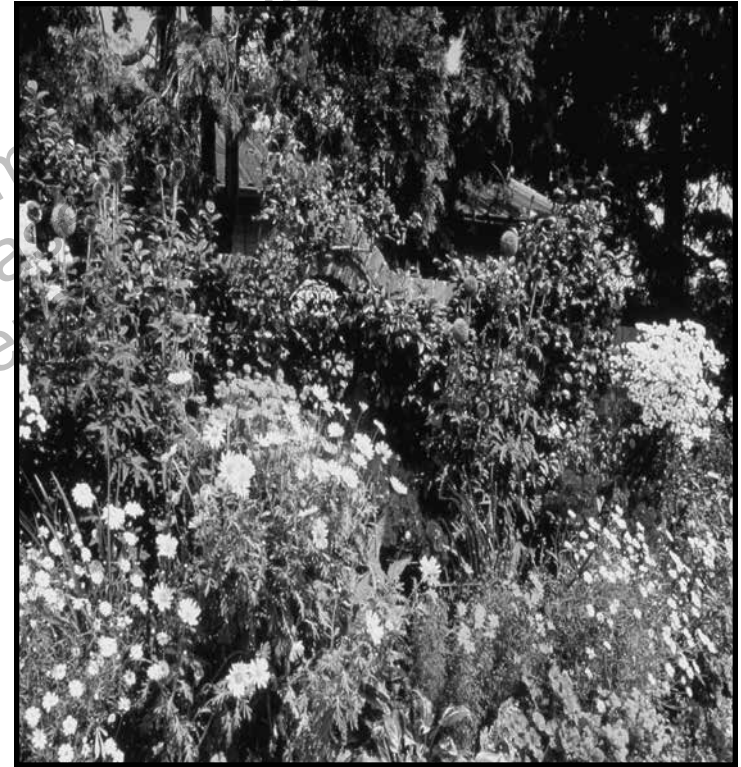
– Reflect –

*What kinds of plants live near your home?*

**survive:** to remain alive  
**structure:** a part of an organism

---

Plants have been growing for hundreds of millions of years. They have been **adapting** and surviving for all that time. In this book, you will find out what helps plants survive.



*Plants have the same basic needs as you—  
food, water, air, and space.*

**adapt:** to change to fit into a new situation

## CHAPTER 1

# Structures for Survival

In this chapter, you will learn about the different structures of a plant. Each structure has special **functions** that help the plant survive.

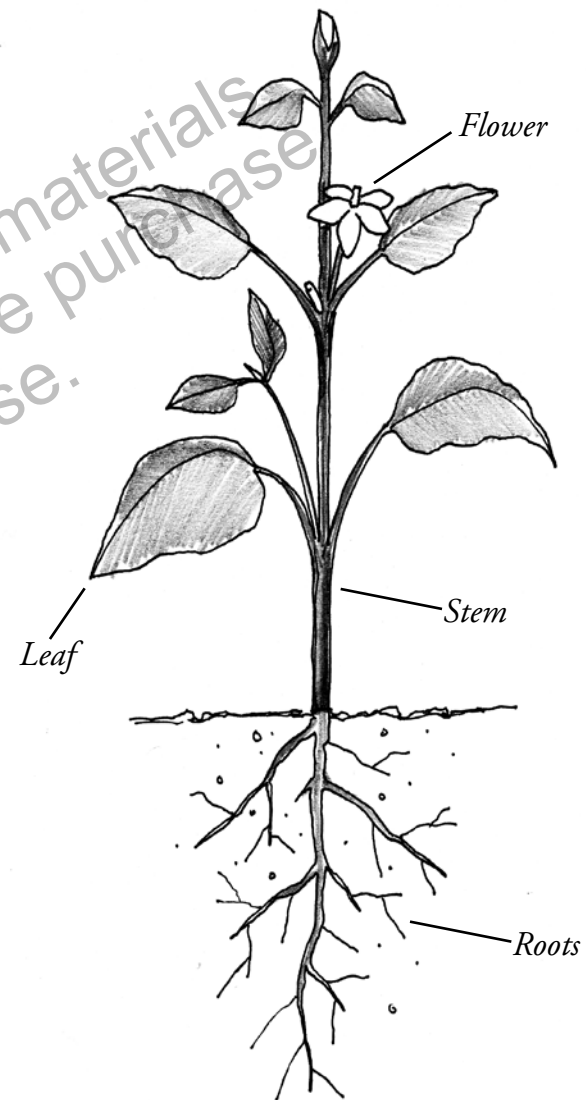
Structure	Function
Roots	<ul style="list-style-type: none"><li>• Holds plants in place</li><li>• Takes nutrients from soil and water</li></ul>
Stems, Stalks, and Trunks	<ul style="list-style-type: none"><li>• Carries nutrients and water to other parts of plants</li><li>• Support other parts of plants</li></ul>
Leaves	<ul style="list-style-type: none"><li>• Takes energy from sunlight to make food for plants</li></ul>
Flowers and Seeds	<ul style="list-style-type: none"><li>• Makes new plants through reproduction</li></ul>

– Connect –

*What are some body structures that help you survive?*

**function:** what an organ, body part, or structure does

## Structures of Plants





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## Roots

Roots grow down into the soil to hold a plant in place. As a plant grows, the roots grow larger and move deeper in the soil. This makes the plant stronger. That is why older trees with deep roots can survive windstorms better than younger trees.

Not every root is in the ground where you can't see it, though. Many tropical trees have thin roots above the ground that help keep the tree standing up in the thin, wet soil.

Roots also suck up nutrients and water from the soil. The nutrients and water are transported to other parts of the plant that need them.

Roots can also change to adapt to their environment. For example, plants in the desert usually have very deep roots. This is necessary because the weather is hot and dry. Water is only found deep under the ground.

---

### Survivor Plant: Acacia Tree

Workers were digging a well in the Kalahari Desert in Africa. They found that roots of an Acacia tree measured up to 220 feet deep in the ground. That is as tall as an 18-story building!



Many roots can be eaten. Some of the vegetables you eat are roots. These include carrots, radishes, parsnips, sweet potatoes, yams, and ginger.

– Connect –  
*What kinds of roots do you like to eat?*

---

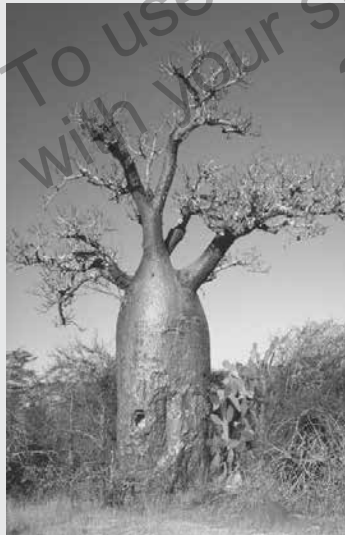
## Stems, Stalks, and Trunks

Tomato plants have stems. Corn plants have stalks. Trees have trunks. Stems, stalks, and trunks all have the same purpose. They carry nutrients, water, and food throughout the plant.

These structures also support other parts of the plant including leaves, flowers, and seeds. They have different sizes, shapes, and thicknesses to help the plant survive.

### Survivor Plant: Baobab Tree

These huge trees live on dry, hot grasslands in Africa. Baobab trees have thick trunks that can store thousands of gallons of water. Baobab trees can live for more than 1,000 years.



---

Think about celery. The stalk is the part you eat. It has an important function. The stringy bits of the stalk are the water pipes. Water and nutrients pass from the soil through the water pipes. The water goes to the leaves of the celery plant.

Many foods you eat are stems or stalks. These include asparagus, rhubarb, radish, and sugar cane.

### Survivor Plant: Saguaro Cactus

The long arms of a giant saguaro cactus are stems. The desert has very little rain, so the saguaro's stems store every drop of water it can get.



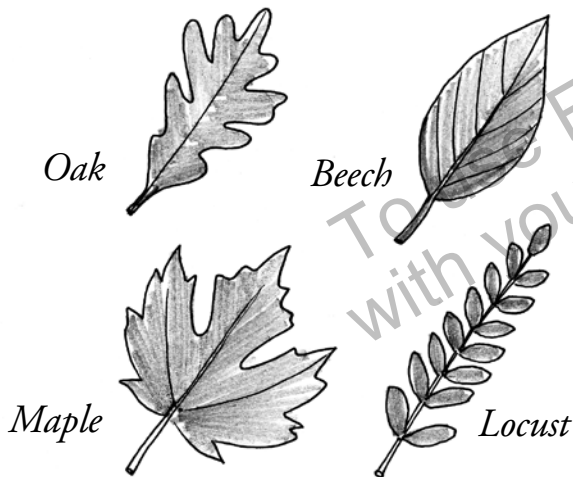
– Connect –

*How do your eyes and ears help you survive?*

## Leaves

Most plants produce their own food. Leaves take energy from sunlight to help make the food the plant needs.

Leaves have many different shapes and sizes. Most leaves are flat so they can take in a lot of sunlight. They are thin so sunlight can enter the leaf. Here are examples of just a few kinds of leaves.

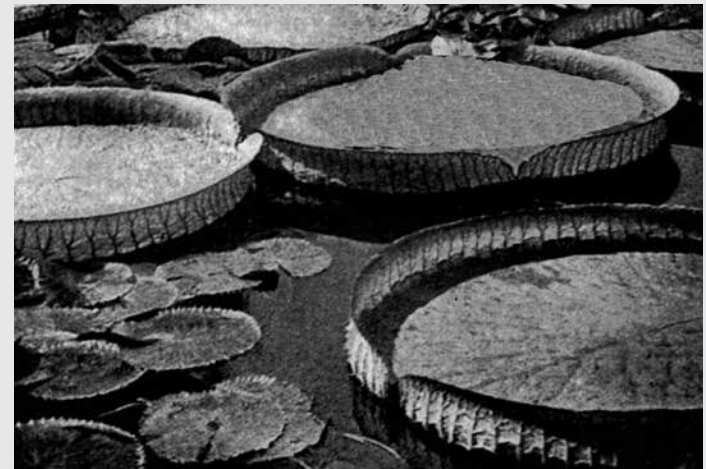


– Distinguish –  
Describe how some leaves look different from others.

Humans and animals need leaves to survive. Leaves are a major part of the human **diet**. Lettuce, spinach, kale, and chard are all leaves you can eat.

### Survivor Plant: Amazon Water Lily

The Amazon water lily of South America is the largest of all known water plants. The water lily's leaves are up to seven feet wide! The leaves' huge size allows the rest of the plant, which is in deep, muddy water, to take in more sunlight in order to survive.



**diet:** what an organism eats and drinks

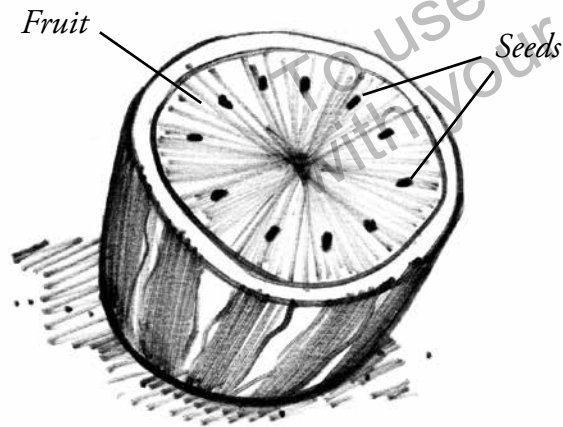
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## Flowers and Seeds

Some plants have flowers. Flowers have many different sizes, shapes, colors, and smells. Flowers are the **reproductive** structures of plants that produce fruit.

Fruit contains seeds.

Think about a watermelon with its red, juicy flesh and black seeds. When the flower of the watermelon plant dies, the fruit grows. Inside the fruit are seeds. The fruit gives the seeds the food they need to grow into a new plant.



**reproductive:** produces new life

---

Nuts are another example of seeds. Animals like squirrels help plants reproduce by carrying seeds to other places. A seed that a squirrel buries can grow into a new tree.

Sometimes, animals don't even know they are carrying seeds. Some plants have burrs, which are seeds with a prickly covering. Burrs get stuck in an animal's hair or fur. The animal carries the seed to a new place where it falls off and then can grow.

Seeds **disperse** in other ways, too. When they drop off a plant they can be carried by wind or water.

– Predict –

*What might happen to a sunflower seed  
blown by the wind to a meadow?*

**disperse:** to go in different directions

## Adapting to Survive

Plants change as their environment changes. They must adapt to the climate where they live.

For example, when Earth turns, the sun is in a different part of the sky. The leaves of some green plants turn toward the sun to get more light.

### Survivor Plant: Giant Groundsel

The weather is extremely cold at night on top of Africa's Mount Kenya. The giant groundsel that grow there unfold thick leaves during the day to take in sunlight. The plants fold in the leaves at night to stay warm and survive.



---

Plants change during the four seasons. In New York, you see this a lot because our state has many deciduous trees. Deciduous means “falling off.”

Think about trees in autumn. The green leaves on deciduous trees turn red, orange, and gold. Then the leaves fall to the ground. In winter, the trees rest and barely grow. It adapted to the weather.

The weather becomes warmer with spring rains. The trees start to bloom with flowers. Seeds come from these flowers, giving food to animals. Leaf buds open. Then the leaves unfold. The leaves use sunlight to make food for the trees.

In the summer, leaves are green. Then autumn returns and the **cycle** begins again.

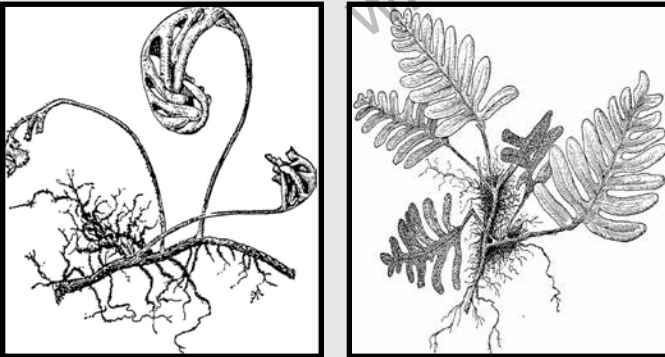
**cycle:** a period of time in which a series of events happens

Plants adapt to changes in weather in other ways. For example, droughts happen when very little rain falls and the weather is hot. Some plants can't survive the lack of water.

Other plants have adapted. Plants like wild blackberry bushes have adapted to survive a drought.

### Survivor Plant: Resurrection Fern

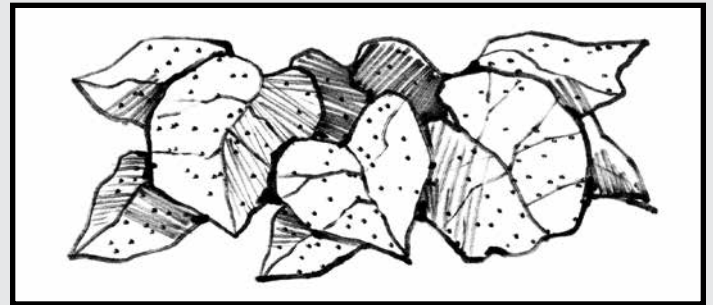
No rain is no problem for the resurrection fern. This plant lives by attaching itself to a large tree. It lives off the nutrients in tree bark and from the air. In dry seasons, the fronds (leaves) of the fern turn brown and shrivel up. The plant looks dead, but it is alive. All it takes is one rain shower for the fronds to uncurl and turn green again.



Some plants are moving to survive. Scientists have found that some kinds of plants have moved away from lower **altitudes**. Temperatures have become warmer in these places. Each **generation** of these plants grows at a cooler place uphill.

### Survivor Plant: Lichen

More than 150 lichens live in Antarctica, the world's coldest place. A lichen is a small plant made of algae and fungus. Lichens survive and reproduce in freezing weather because they have adapted to the cold. They also grow low to the ground for protection from high winds.



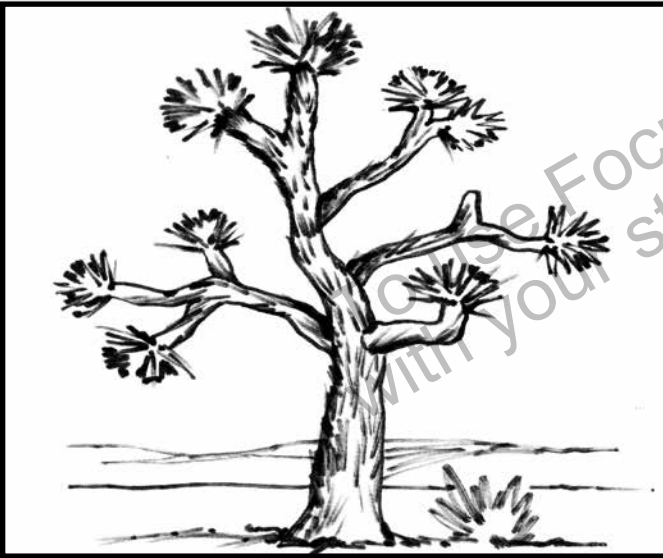
**altitude:** the height of an object above sea level  
**generation:** the time between the birth of parents and the birth of their offspring

---

Any plant or animal that can't adapt to its environment will die. Adaptation is why there are so many different plants in different parts of the world.

### **Survivor Plant: Joshua Tree**

Desert plants like the Joshua tree have adapted to very high temperatures and little rain. The Joshua tree grows mainly in California.



*– Predict –*

*What might happen if a Joshua tree was planted in the rain forest?*

---

## **Why Plants Survive**

Plants survive for many reasons. They are able to make their own food using the sun's energy. They have special structures—roots; stems, stalks, or trunks; leaves; flowers, fruit, and seeds. These structures give support and help plants make new plants. Plants also survive by adapting to changes in seasons, weather, and environment.

We depend on plants to live. You read that the fruits and vegetables people eat are parts of plants. For example, carrot is a root, asparagus is a stem, and lettuce is a leaf.

When plants survive, we survive, too.

*– Evaluate –*

*Imagine that all food crops have died. Why couldn't humans survive just by eating meat?*

---

## Glossary

**adapt**—to change to fit into a new situation

**altitude**—the height of an object above sea level

**cycle**—a period of time in which a series of events happens

**diet**—what an organism eats and drinks

**disperse**—to go in different directions

**function**—what an organ, body part, or structure does

**generation**—the time between the birth of parents and the birth of their offspring

**reproductive**—produces new life

**structure**—a part of an organism

**survive**—to remain alive

---

## To Find Out More . . .

Want to learn more about plants?

### Try these books

*Amazing Plants* by Honor Head. Gareth Stevens Publishing, 2007.

*A Walk in the Deciduous Forest* by Rebecca L. Johnson. Carolrhoda Books, 2001.

*Meat-Eating Plants and Other Extreme Plant Life* by June Preszler. Capstone Press, 2010.

*Plants: Flowering Plants, Ferns, Mosses, and Other Plants* by Shar Levine. Crabtree Publishing Company, 2010.

### Access these Web sites

Biology4Kids

[http://biology4kids.com/files/plants\\_main.html](http://biology4kids.com/files/plants_main.html)

neoK12

[www.neok12.com/Plants.htm](http://www.neok12.com/Plants.htm)

Plants for Kids

[www.kathimitchell.com/plants.html](http://www.kathimitchell.com/plants.html)



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# Assessments

*How Plants Survive*

Print pages 20–22 of this PDF for the assessments.

# Check Understanding

Shade the circle next to the correct answer.

Note that question 1 has only three choices.

1. A group of plants grows under a tree. As the tree grows, its leaves block sunlight from the plants. Each generation of plants grows farther away from the tree. When the plants move, which process are they using to survive?
  - Ⓐ food production
  - Ⓑ adaptation
  - Ⓒ reproduction
2. The function of a plant's stem, stalk, or trunk is to
  - Ⓐ get energy from the sun
  - Ⓑ hold the plant in place
  - Ⓒ carry water through the plant
  - Ⓓ take nutrients from the soil
3. What are the reproductive structures of plants?
  - Ⓐ flowers
  - Ⓑ roots
  - Ⓒ leaves
  - Ⓓ stems
4. If a plant does not get enough sunlight, it will
  - Ⓐ stop making food
  - Ⓑ reproduce more often
  - Ⓒ grow deeper roots
  - Ⓓ move to different place

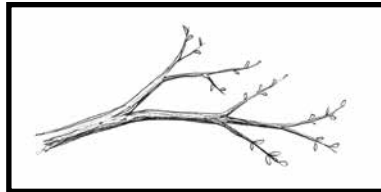
# Check Understanding

Write your answers in the chart or on the lines provided.

5. The diagrams below show the same tree branch during each of the four seasons.



A



B



C



D

Identify the seasons shown in A, B, C, and D.

A	
B	
C	
D	

6. Describe **one** way animals help plants reproduce.

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# Assessment Scoring Guidelines

1. Answer B is correct.
2. Answer C is correct.
3. Answer A is correct.
4. Answer A is correct.

5.

A	Summer
B	Spring
C	Winter
D	Autum

6. Animals like squirrels bury nuts (seeds) in the ground.  
Burrs get stuck on animals and drop off in a new place.

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# English Language Arts Activities

*How Plants Survive*

Print pages 24–28 of this PDF for the reading activities.

# Summarize Main Ideas

## TRY THE SKILL

Summarizing means retelling the main ideas of something you have read using as few words as you can. Summarizing helps you understand what you read.

**Read this paragraph from *How Plants Survive*.**

Nuts are seeds. Animals like squirrels help plants reproduce by carrying seeds to other places. A seed that a squirrel buries grows into a tree.

**Is this sentence a good summary of the paragraph?**

Squirrels carry seeds to other places.

**No! This is not the main idea of the paragraph. Is the sentence below a good summary?**

Animals carry plant seeds to new places so they can reproduce.

**Read each paragraph. Shade the circle next to the best summary.**

1. Tomato plants have stems. Corn plants have stalks. Trees have trunks. Stems, stalks, and trunks all have the same purpose. They carry nutrients, water, and food throughout the plant. These structures support the other parts of the plant. They have different sizes, shapes, and thicknesses to help the plant survive.
  - Ⓐ Stems support the other part of the plant.
  - Ⓑ Roots suck up water and nutrients from the soil.
  - Ⓒ Stems, stalks, and trunks all do the same things to help a plant survive.
2. Many kinds of plants are moving to survive. Scientists have found that some kinds of plants have moved away from lower altitudes. Temperatures have gotten warmer in these places. Each generation of these plants grows at a cooler place uphill.
  - Ⓐ Earth is growing warmer.
  - Ⓑ Warmer temperatures cause plants to move to cooler places to survive.
  - Ⓒ Temperatures are warmer at lower altitudes.

# Classify Information

## TRY THE SKILL

Graphic organizers help you understand information by taking it out of the text and putting it in the form of a picture. Often, when you see a set of facts, the facts make more sense than when you read them in the text. You read about many plants in this book.

**Use this organizer to classify several plants according to their characteristics. The first one has been done for you.**

Plant Classifications			
Plant	Type	Where It Grows	Important Structure
Baobab Tree	Tree	Grasslands in Africa	Thick trunk to store water
Amazon Water Lily			
Saguaro Cactus			
Acacia Tree			

**Use the information in the chart to write a summary comparing and contrasting the characteristics of two plants.**

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# Fact and Opinion

## TRY THE SKILL

A fact is a statement that can be proven. For example:

Leaves have many different shapes and sizes.

An opinion is a statement based on what someone thinks or believes. For example:

Everyone should have a leaf collection.

Sometimes writers mix facts and opinions. It is important to ask questions when you read. Ask yourself, "Is this always true or is this what someone thinks?" If the answer is "always true," then it is a fact.

Mark each statement below *F* for fact or *O* for opinion.

1. Plants in the desert usually have the deepest roots. \_\_\_\_\_
2. Leaves are a major part of the human diet. \_\_\_\_\_
3. The giant groundsel is the most impressive plant there is. \_\_\_\_\_
4. Lichen survives and reproduces in freezing temperatures. \_\_\_\_\_
5. Rhubarb is a delicious vegetable. \_\_\_\_\_
6. Autumn is the best season of the year. \_\_\_\_\_

# Use the Table of Contents

## TRY THE SKILL

The table of contents tells the reader what is in the book. It also tells the page number.

Read the table of contents from *How Plants Survive*.

Introduction:	
Plants Survive.....	4
Chapter 1:	
Structures for Survival.....	6
Roots.....	7
Stems, Stalks, and Trunks.....	10
Leaves.....	12
Flowers and Seeds.....	14
Chapter 2:	
Adapting to Survive.....	16
Glossary.....	22
To Find Out More.....	23
Index.....	24

**What page has information about roots?**

Page 7, because the subheading on Page 7 is “Roots.”

Read the table of contents from *How Plants Survive*. Shade the circle next to the correct answer.

1. What page would you begin reading to learn about seeds?  
 A Page 4  
 B Page 10  
 C Page 14
2. Which chapter would you read to find information about changes trees go through to survive different kinds of weather?  
 A Introduction  
 B Chapter 1  
 C Chapter 2
3. What page would you read to find out where you can get more information about plants?  
 A Page 6  
 B Page 23  
 C Page 24

# Answer Key

## Summarize Main Ideas

1. C
2. B

## Classify Information

Plant Classifications			
Plant	Type	Where It Grows	Important Structure
Baobab Tree	Tree	Grasslands in Africa	Thick trunk to store water
Amazon Water Lily	Water plant	South America	Huge leaves to take in sunlight
Saguaro Cactus	Cactus	Desert	Thick, long stems to store water
Acacia Tree	Tree	Desert	Extremely deep roots to get water

Answers will vary depending on which two plants the student chooses.

## Fact and Opinion

1. F
2. F
3. O
4. F
5. O
6. O

## Use the Table of Contents

1. C
2. C
3. B