



Life Sciences

Plant Diversity

Advanced Level

# Life Cycles of Plants

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FOR:

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Covered  
•  
Student Book  
•  
Assessments and  
Reading Activities

# Life Cycles of Plants

How are plants alike and different?

## CORE CURRICULUM STATEMENTS

**Living things are both similar to and different from each other and from nonliving things.**

Plants require air, water, nutrients, and light in order to live and thrive.

Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die.

**The continuity of life is sustained through reproduction and development.**

Plants and animals have life cycles. These may include beginning of a life, development into an adult, reproduction as an adult, and eventually death.

Each kind of plant goes through its own stages of growth and development that may include seed, young plant, and mature plant.

The length of time from beginning of development to death of the plant is called its life span.

Life cycles of some plants include changes from seed to mature plant.

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

Plants respond to changes in their environment.



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# Student Book

*Life Cycles of Plants*

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# Life Cycles of Plants

How are plants alike and different?

AL

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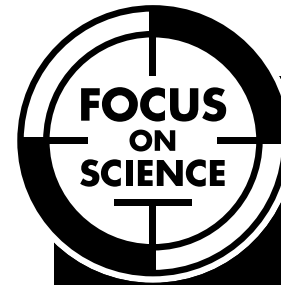
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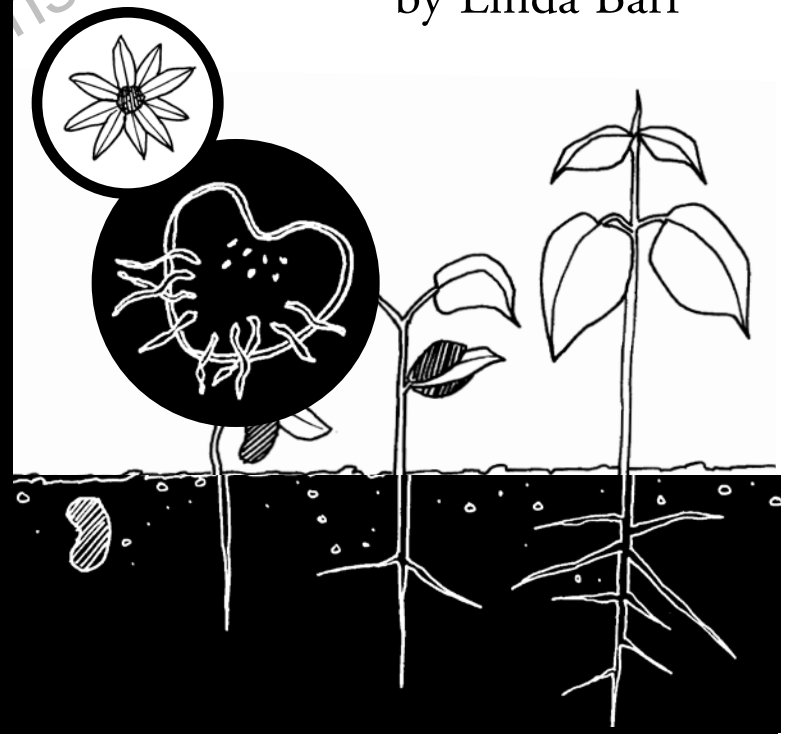


Life Sciences

Plant Diversity

# Life Cycles of Plants

by Linda Barr





Life Sciences

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*– Predict –*

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

## Is It Real?

Have you seen “fake” plants and flowers made of plastic, paper, or silk? These plants are not alive. Some people decorate with them because they require no care and cannot wilt or die. You can usually tell that a plant is not real by how it looks or how it feels.

What are the other differences between fake plants and real ones? Real plants require care because they have needs that must be met. They must have enough water, sunlight, and carbon dioxide from the air so that they can produce their own food. All real plants must have a place to grow, and most of them need warmth and soil with nutrients in it. A fake plant does not need anything except occasional dusting.

Real plants grow and react to changes around them. For example, many flowers and leaves turn to face the sunlight. When the days become shorter in the fall, the leaves on oak and maple trees change colors. Real plants wilt when they don’t get enough water and die if that continues. Fake plants do not react to changes in their **environment**.

Real plants **reproduce**, making seeds or bulbs, that can grow into new plants of the same kind. Real plants are made of living cells, not plastic.

You might guess that all plants do not reproduce in the same way. In this book, you will learn different ways that plants reproduce.

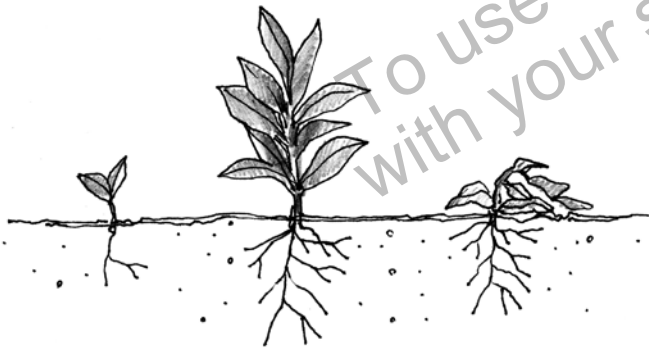
– Apply –  
*How would you investigate  
 whether a plant is real?*

**environment:** the things that surround living things  
**reproduce:** to produce offspring—new plants or animals

## Plants Have a Life Span

All plants have a life span. A life span is the amount of time an **organism** remains alive. All plants grow up, grow old, and then die.

A plant's life span is affected by many things such as available soil, light, and water. Wind, fire, and disease also affect a plant's life span. Of course, human interaction, such as cutting down trees, can affect the life span of any plant.



*All plants grow up, grow old, and then die.*

**organism:** any living thing

Different plants have different life spans. For example, the life span of an oak tree is longer than that of a daisy. An oak tree can live for hundreds of years. A daisy usually lives from three to ten years.



*An oak tree has a longer life span than a daisy.*



## Life Cycles of Plants

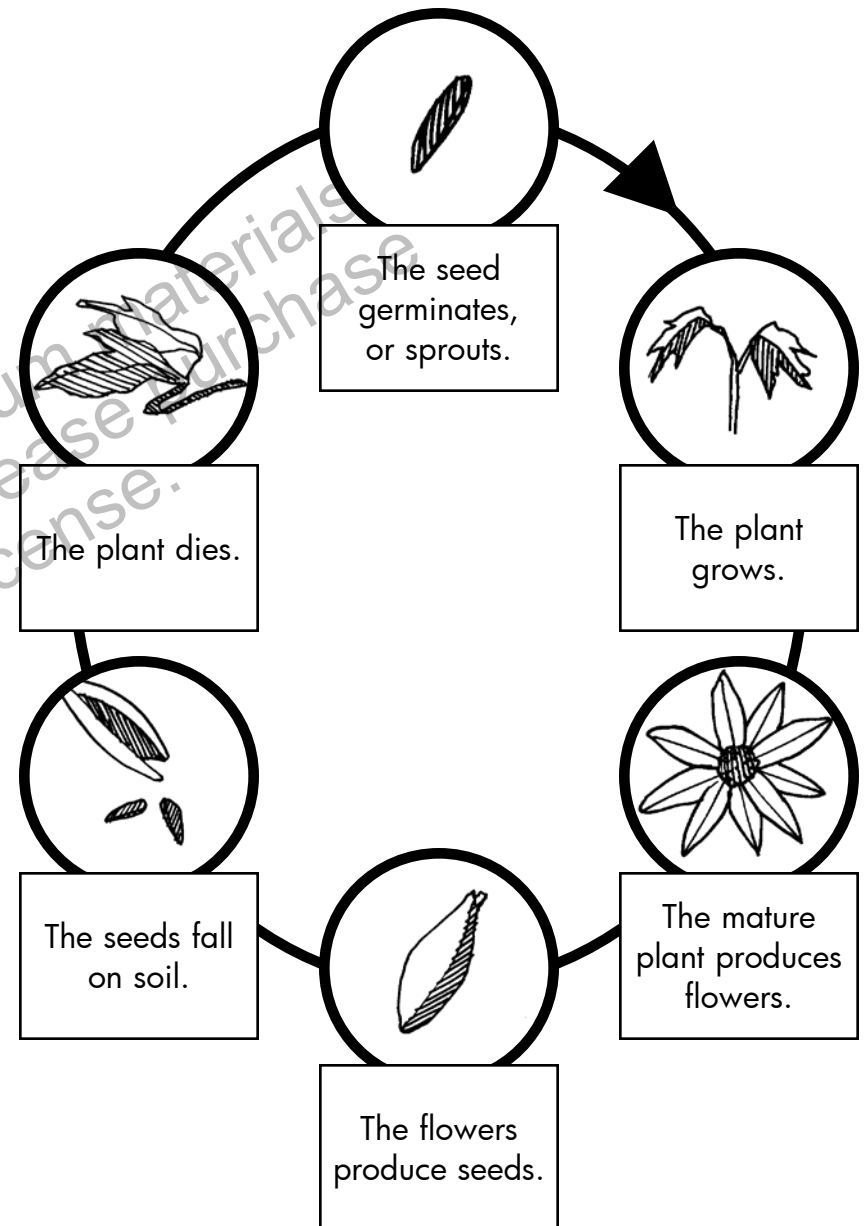
People and other animals have life cycles. They are born or hatch, grow into adults, often reproduce, and die.

Plants have life cycles, too. Instead of being born, they sprout from seeds, spores, or parts of a parent plant. Young plants grow until they **mature**, and then they reproduce by creating seeds or young plants. Some plants die at the end of summer, while other plants live for years. Whenever plants die, their seeds or new parts of the plant continue the cycle. The diagram on the next page shows the life cycle of a plant that reproduces from seeds.

Plant populations reproduce in ways that help them survive in their habitat. On the following pages, you will learn four ways that plants reproduce.

**mature:** the adult stage in the cycle of a living thing

### Life Cycle of a Seed Plant



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## Plants That Grow from Seeds

A seed might look dead on the outside, but inside its hard coating is stored food and a tiny plant called an **embryo**. When the conditions are right, moisture causes the seed covering to swell and crack open. The seed **germinates**, and the stored food is used as the embryo starts to grow.

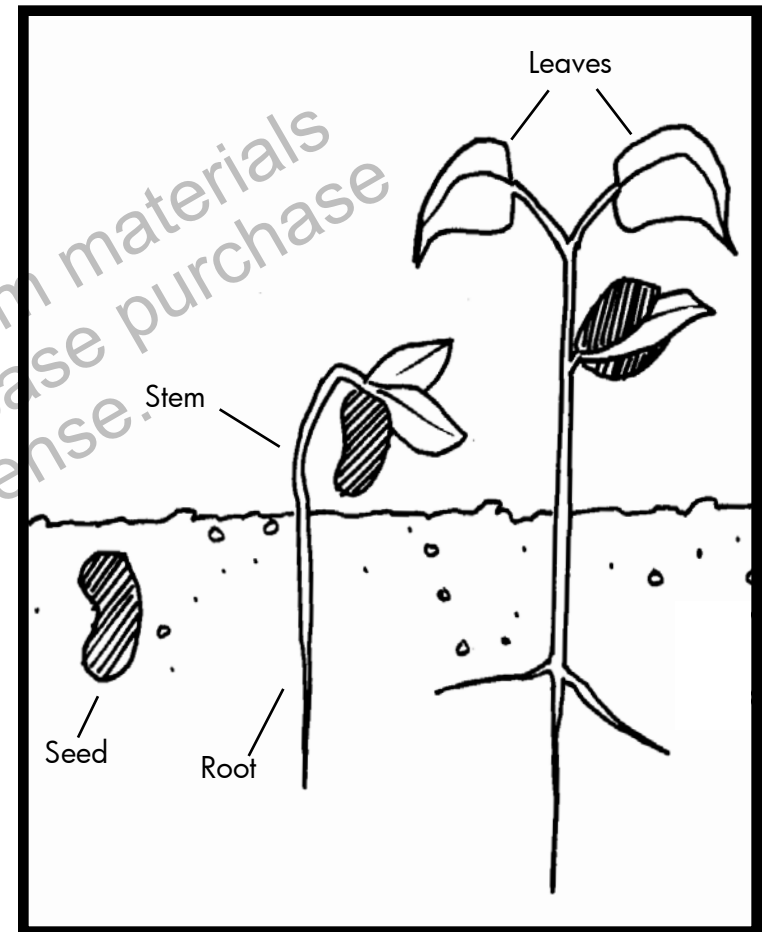
Next, the seed sends tiny roots into the soil. Soon a tiny stem pushes out of the soil and grows leaves. The plant begins to use soil, sunlight, water, and carbon dioxide from the air to make food.

The seedling keeps growing until it reaches its mature size. Plants grown from seeds can be as small as a blade of grass or as large as a redwood tree. Sunflowers, pumpkins, apple trees, and beans are other examples of plants that reproduce from seeds.

**embryo:** a tiny plant inside a seed  
**germinate:** to sprout; to start to grow

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### Germination of a Seed



*Moisture causes a seed to crack open. A tiny root then grows into the soil. Soon a stem pushes out of the soil. As the seedling grows, more leaves appear.*

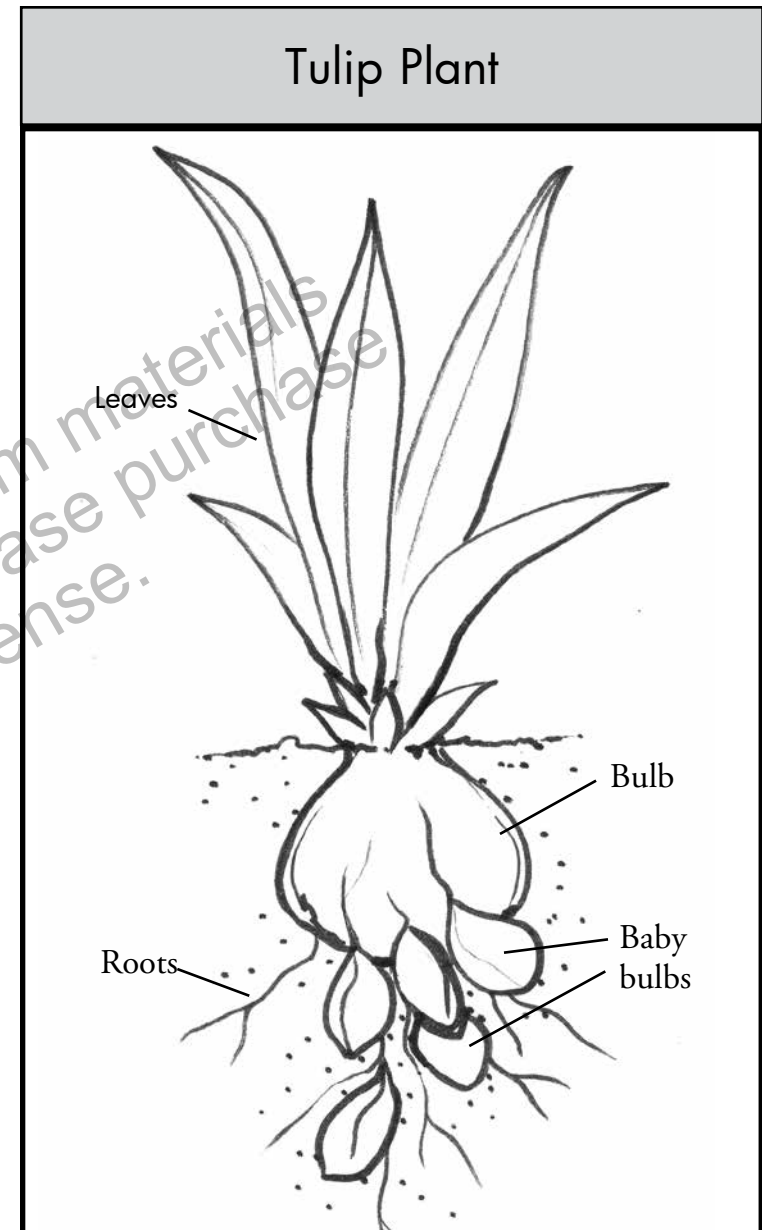
## Plants That Grow from Bulbs

Some plants, such as tulips and daffodils, grow from bulbs. Roots emerge from under the base of the bulb. Shoots and leaves emerge from the top of the bulb. This root and shoot system forms the plant.

Plants that grow from bulbs produce seeds to reproduce. They also grow “baby” bulbs attached to the parent bulb. After growing for a while, the baby bulbs separate from their parent. When these bulbs are mature, they produce the same plant as the parent bulb. In this way, a group of six tulip bulbs can increase to a dozen or more in a year. Onions also reproduce from baby bulbs. A small bulb on the side of an onion bulb grows into a new plant.

– Explain –

*How could you prove that tulips do not need seeds to reproduce?*



*Some plants, such as tulips and daffodils, grow from bulbs.*

---

## Plants That Grow from Other Parts of a Plant

Some plants can be grown without seeds through cuttings. A cutting can be from any part of a fully-grown plant. When it is placed in soil, the cutting grows new roots and becomes a new plant. To grow a new African violet plant, just put a leaf in soil. In time, it will produce a new plant.

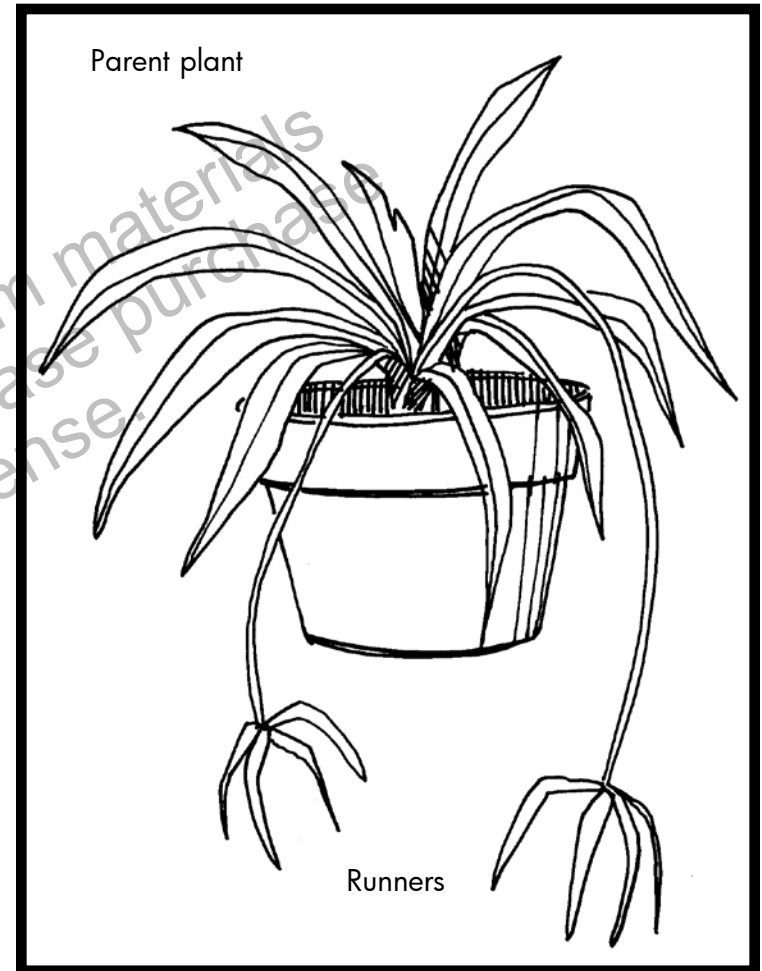
Other plants grow by using **runners**, long stems that send roots into the soil. New plants grow from these runners. Strawberry plants, spider plants, and some types of grass also grow from runners.

New potato plants grow from the “eyes” on a potato. If you cut a potato up and plant each eye, you will get many new potato plants.

**runners:** stems that grow from a parent plant and can become a new plant

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## Reproducing by Runners



*Runners from a parent plant grow into new plants.*

## Plants That Grow from Spores

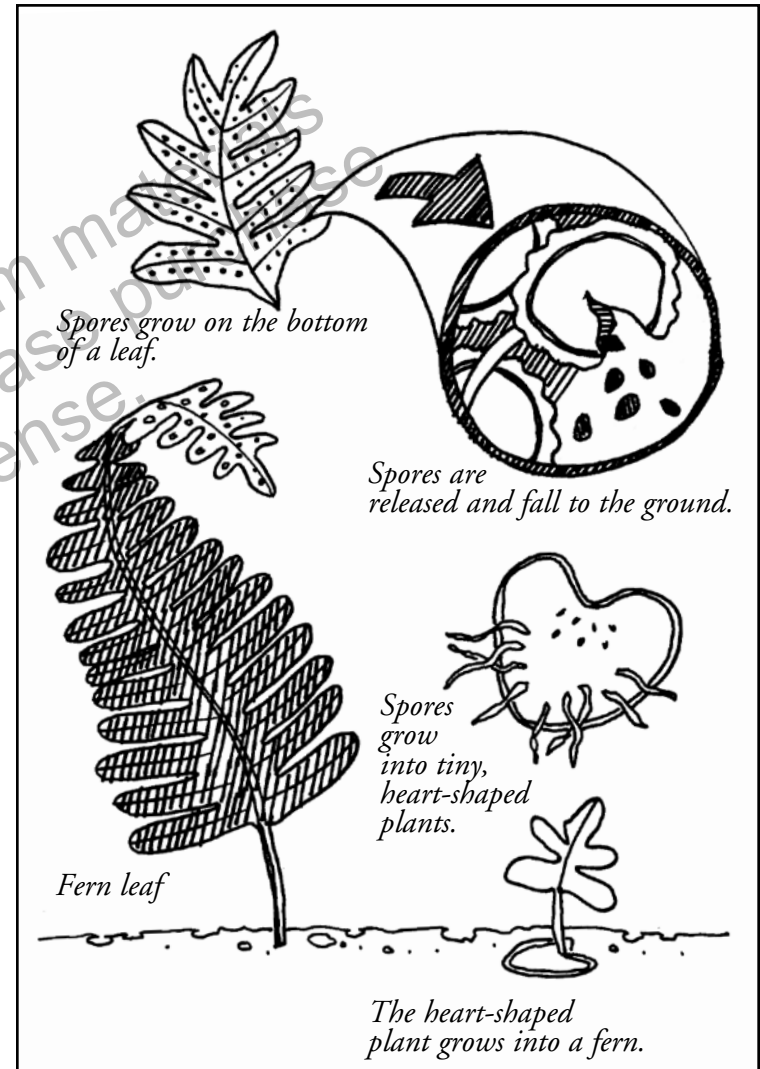
Ferns and mosses reproduce without growing flowers or seeds. If you turn over a fern leaf, you will see rows of spore clusters on the bottom of it. When these clusters break open, the spores that fall on moist soil grow into tiny, heart-shaped plants. These small plants then grow into mature ferns. When they are mature, they will produce more clusters of spores. The diagram on the next page shows the life cycle of a spore.

## Real Plants Are Alive

Now you know that real plants are alive. They grow, reproduce, and die. They also reproduce in different ways so their life cycles continue.

– Compare –  
What is the difference between  
reproducing with seeds and with spores?

## Life Cycle of a Spore



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## Glossary

**embryo**—a tiny plant inside a seed

**environment**—the things that surround living things

**germinate**—to sprout; to start to grow

**mature**—the adult stage in the cycle of a living thing

**organism**—any living thing

**reproduce**—to produce offspring—new plants or animals

**runners**—stems that grow from a parent plant and can become a new plant

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## To Find Out More . . .

Want to learn more about the life cycles of 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](http://www.urbanext.uiuc.edu/gpel/index.html)

Biology of Plants: Missouri Botanical  
Garden  
[www.mbgnet.net/bioplants/main.html](http://www.mbgnet.net/bioplants/main.html)

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# Assessments

*Life Cycles 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 answer on the lines provided.**

Note that question 1 has only three choices.

1. A student is examining the plants in her house and yard. She creates a list of all the plants she can identify.

apple trees	daffodils
dandelions	orchids
spider plants	ferns

What is one example of a plant that reproduces without seeds?

- Ⓐ The ferns produce spores.
- Ⓑ The apple trees produce apples.
- Ⓒ The dandelions produce flowers.

2. Identify **three** things that a seed needs in order to germinate.

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_

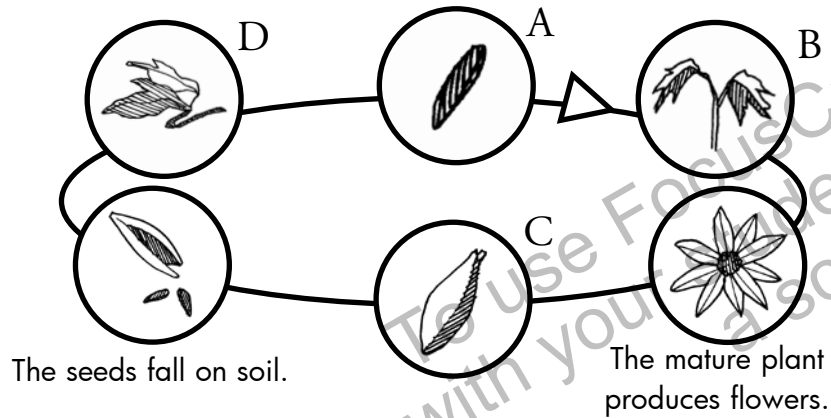
3. A great oak tree and a blade of grass are both

- Ⓐ organisms
- Ⓑ seedlings
- Ⓒ runners
- Ⓓ embryos

# Check Understanding

Shade the circle next to the correct answer or write your answer in the space provided.

4. The diagram below shows the life cycle of a seed plant. Four stages of the cycle are labeled A, B, C, and D. In the chart below, write the letter that represents each stage of the life cycle shown.



Stage	Letter
The flowers produce seeds.	
The seed germinates.	
The plant grows.	
The plant dies.	

5. What is true about the plant shown in this diagram?

- Ⓐ It dies in the fall.
- Ⓑ It needs water, sunlight, and carbon dioxide.
- Ⓒ It has a life span of several years.
- Ⓓ It reproduces through cuttings.

6. Some plants live for one year. Others live for hundreds of years. The amount of time a plant remains alive is called its

- Ⓐ germination
- Ⓑ reproduction
- Ⓒ life cycle
- Ⓓ life span

# Assessment Scoring Guidelines

1. Answer A is correct.
2. Moisture; warmth; air
3. Answer A is correct.

4.

Stage	Letter
The flowers produce seeds.	C
The seed germinates.	A
The plant grows.	B
The plant dies.	D

5. Answer B is correct.
6. Answer D is correct.

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# English Language Arts Activities

*Life Cycles of Plants*

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



# Make Inferences

## TRY THE SKILL

When you make inferences, you use what you already know and what you have just learned to reach a decision.

For example, when you see your neighbor smile, you make the inference that he is happy about something.

### Read this paragraph.

Have you seen “fake” plants and flowers made of plastic, paper, or silk? These plants are not alive. Some people decorate with them because they require no care and cannot wilt or die. You can usually tell that a plant is not real by how it looks or how it feels.

### What can you infer about fake plants?

*People might use fake plants where real plants can't grow.*

### Read this paragraph.

Real plants grow and react to changes around them. For example, many flowers and leaves turn to face the sunlight. When the days become shorter in the fall, the leaves on oak and maple trees change colors. Real plants wilt when they don't get enough water and die if that continues. Fake plants just sit there, whether it's sunny, dark, or raining.

### Make an inference about fake plants.

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# Compare and Contrast

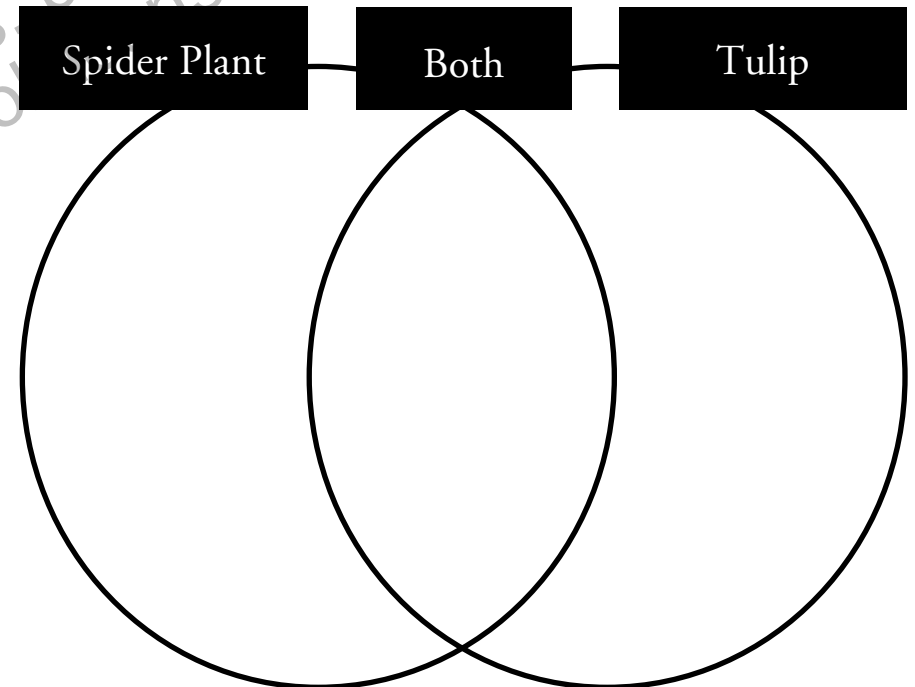
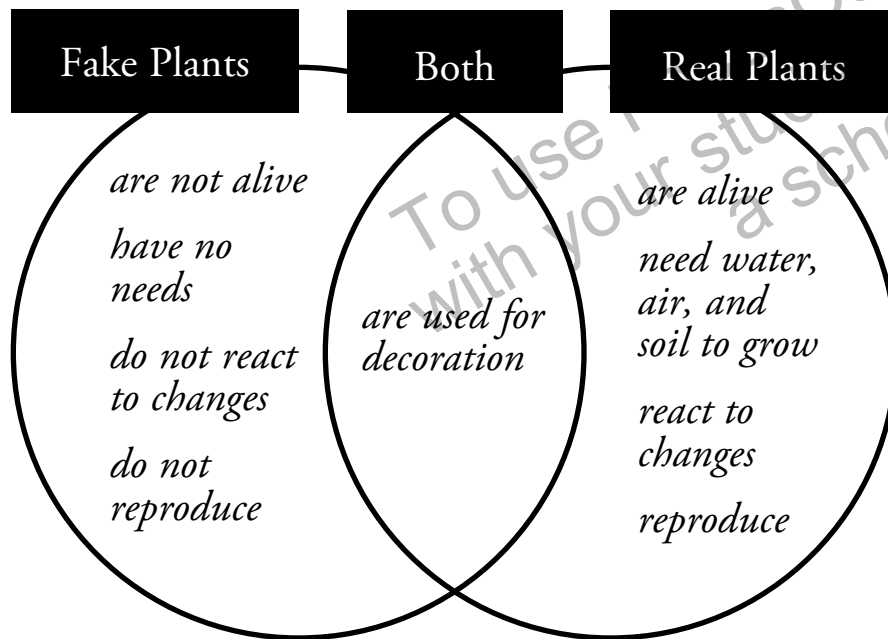
## TRY THE SKILL

When you compare two things, you tell how they are alike. When you contrast them, you tell how they are different.

A Venn diagram uses overlapping circles to help you compare and contrast. This Venn diagram compares and contrasts fake plants and real plants.

**Read the phrases in the box. Put the phrases in the correct circle.**

starts with parent plant      sends out runners  
needs air, water, and light      produces baby bulbs



# Write Steps Clearly

## TRY THE SKILL

Did you ever write steps that tell how something happens? You must put the steps in the right order, and you must include all of them. For example, these steps show how plants reproduce with runners.

1. A plant sends out runners.
2. Runners send roots into the soil.
3. New plants grow.

**Could you put these steps in any other order?**

*No, they make sense only in this order.*

**Are all of the important steps included?**

*Yes, they are.*

**These steps describe how plants reproduce with spores. However, they are in the wrong order and one important step is missing. Write the steps in the correct order and add the missing step in the correct place.**

1. Spores grow into tiny, heart-shaped plants.
2. The heart-shaped plant grows into a fern.
3. Spores grow on the bottom of a leaf.

**This is the correct order, including the missing step.**

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# Answer Key

## Synonyms and Antonyms

1. mature
2. shrink
3. produce
4. mature
5. swell
6. produce

## Make Inferences

1. Fake plants do not reproduce.

## Compare and Contrast

**Spider Plants:** sends out runners

**Tulips:** produces baby bulbs

**Both:** starts with parent plant, needs air, water, and light

## Write Steps Clearly

1. Spores grow on the bottom of a leaf.
2. Spores are released and fall to the ground.
3. Spores grow into tiny, heart-shaped plants.
4. The heart-shaped plant grows into a fern.