Teacher Edition

McGraw-Hill Education

Integrated Science

United Arab Emirates Edition

GRADE **1** • VOLUME 1

Project: McGraw-Hill Education United Arab Emirates Edition Integrated Science Grade 1 Vol 1
FM. Front Matter, from Elementary Science NY, Grade 1 ©2016
1. Be A Scientist, from Elementary Science NY, Grade 1 ©2016
2. Plants are Living Things, Chapter 1, from Science, A Closer Look Grade 1 ©2011
3. Plants Grow and Change, Chapter 2, from Science, A Closer Look Grade 1 ©2011
4. All About Animals, Chapter 1, Lesson 1-4 from Elementary Science NY, Grade 1 ©2016
& Animals, Chapter 2, Lesson 2, from Science, A Closer Look Grade 2 ©2011
EM. End Matter, from Elementary Science NY, Grade 1, Student Edition ©2016

COVER: Zoltan Molnar/Alamy Stock Photo

mheducation.com/prek-12

Printed in the United Arab Emirates.

ISBN: 978-1-44-700526-1 *(Student Edition)*
MHID: 1-44-700526-0 *(Student Edition)*
ISBN: 978-1-44-700528-5 *(Teacher Edition)*
MHID: 1-44-700528-7 *(Teacher Edition)*

1 2 3 4 5 6 7 8 9 XXX 22 21 20 19 18 17

ePub Edition

ISBN: 978-1-44-700534-6 *(Student Edition)*
MHID: 1-44-700534-1 *(Student Edition)*
ISBN: 978-1-44-700536-0 *(Teacher Edition)*
MHID: 1-44-700536-8 *(Teacher Edition)*

"Extensive knowledge and modern science must be acquired. The educational process we see today is in an ongoing and escalating challenge which requires hard work.
We succeeded in entering the third millennium, while we are more confident in ourselves."

H.H. Sheikh Khalifa Bin Zayed Al Nahyan
President of the United Arab Emirates

Table of Contents

Program Authors

Dr. Jay K. Hackett
Professor Emeritus of Earth Sciences
University of Northern Colorado
Greeley, CO

Dr. Richard H. Moyer
Professor of Science Education and Natural Sciences
University of Michigan–Dearborn
Dearborn, MI

Dr. JoAnne Vasquez
Elementary Science Education Consultant
NSTA Past President
Member, National Science Board and NASA Education Board

Mulugheta Teferi, M.A.
Principal, Gateway Middle School
Center of Math, Science, and Technology
St. Louis Public Schools
St. Louis, MO

Kathryn LeRoy, M.S.
Chief Officer Curriculum Services
Duval County Schools, FL

Dr. Dorothy J. T. Terman
Science Curriculum Development Consultant
Former K–12 Science and Mathematics Coordinator
Irvine Unified School District
Irvine, CA

Dr. Gerald F. Wheeler
Executive Director National Science Teachers Association

Picture not available.

MaryJo Fante Milburn, M.Ed.
Instructional Technology Specialist
Jefferson County Public Schools
Louisville, KY

Bank Street College of Education
New York, NY

Contributors and Reviewers

Contributing Authors

Dr. Sally Ride
Sally Ride Science
San Diego, CA

Lucille Villegas Barrera, M.Ed.
Elementary Science Supervisor
Houston Independent School District
Houston, TX

American Museum of Natural History
New York, NY

Contributing Writer

Ellen C. Grace, M.S.
Consultant
Albuquerque, NM

Content Consultants

Paul R. Haberstroh, Ph.D.
Mohave Community College
Lake Havasu City, AZ

Timothy Long
School of Earth and Atmospheric Sciences
Georgia Institute of Technology
Atlanta, GA

Rick MacPherson, Ph.D.
Program Director
The Coral Reef Alliance
San Francisco, CA

Hector Córdova Mireles, Ph.D.
Physics Department
California State Polytechnic University
Pomona, CA

Charlotte A. Otto, Ph.D.
Department of Natural Sciences
University of Michigan–Dearborn
Dearborn, MI

Paul Zitzewitz, Ph.D.
Department of Natural Sciences
University of Michigan–Dearborn
Dearborn, MI

Editorial Advisory Board

Deborah T. Boros, M.A.
President, Society of Elementary Presidential Awardees
Second-Grade Teacher
Mississippi Elementary
Coon Rapids, MN

Lorraine Conrad
K–12 Coordinator of Science
Richland County School District #2
Columbia, SC

Kitty Farnell
Science/Health/PE Coordinator
School District 5 of Lexington and Richland Counties
Ballentine, SC

Kathy Grimes, Ph.D.
Science Specialist
Las Vegas, NV

Richard Hogen
Fourth-Grade Teacher
Rudy Bologna Elementary School
Chandler, AZ

Kathy Horstmeyer
Educational Consultant
Past President, Society of Presidential Awardees
Past Preschool/Elementary NSTA Director
Carefree, AZ and Chester, CT

Jean Kugler
Gaywood Elementary School
Prince Georges County Public Schools
Lanham, MD

Bill Metz, Ph.D.
Science Education Consultant
Fort Washington, PA

Karen Stratton
Science Coordinator K–12
Lexington District One
Lexington, SC

Emma Walton, Ph.D.
Science Education Consultant
NSTA Past President
Anchorage, AK

Debbie Wickerham
Teacher
Findlay City Schools
Findlay, OH

Teacher Reviewers

Barbara Adcock
Pocahontas Elementary
Powhatan, VA

Erma Anderson
Educational Consultant
Needmore, PA

Cathryn Beck-Potter
Chestatee Elementary
Gainesville, GA

Teri Warden Bickmore, M.Ed.
Science Consultant
Midland, MI

Jaime Breedlove
Jane D. Hull Elementary
Chandler, AZ

Jacqueline M. Brown
Cascade Elementary
Atlanta, GA

April M. Bruce
Supervisor for Instruction
Lynchburg City Schools
Lynchburg, VA

Patricia A. Cavanagh
Merrimac Elementary
Holbrook, NY

Meghan Ciacchella
L'Anse Creuse Public Schools
Chesterfield, MI

Gary L. Cooper
Science Department Chair, Biology Teacher
MSD of Pike Township Schools
Indianapolis, IN

Sarah M. D'Agostini
Joseph M. Carkenord Elementary
Chesterfield, MI

Dr. Kelly A. Decker
University of Richmond
Richmond, VA

Frances Pistone DeLuca
South Ozone Park, NY

Wendy DeMers
Hynes Charter School
New Orleans, LA

Kellie DeRango
Washington Elementary
Wauwatosa, WI

Sheri Dudzinski
Marie C. Graham Elementary
Harrison Township, MI

Delores Dalton Dunn
Curriculum Specialist (retired)
Virginia Department of Education
Hanover, VA

Laura A. Edwards
Vickery Creek Elementary
Cumming, GA

Mary Vella Ernat
District Elementary Science Content Leader
Wayne-Westland Community Schools
Westland, MI

Jenny Sue Flannagan
Elementary Science Coordinator
Virginia Beach City Public Schools
Virginia Beach, VA

Marjorie Froberger, M.A.
Anchor Bay Schools
New Baltimore, MI

Clara Mackin Fulkerson
Curriculum Resource Consultant
Nelson County Schools
Bardstown, KY

Lou Gatto
Hunterdon Central District School
Flemington, NJ

Lori Gehrman
Jane D. Hull Elementary
Chandler, AZ

Angela Geibel
Francis A. Higgins Elementary
Chesterfield Township, MI

Lori Gilchrist
Elementary School
Suwanee, GA

Connie Grubbs
Varner Elementary
Powder Springs, GA

Tasha Hamil
Cumming Elementary
Cumming, GA

Nancy Hayes
Educational Consultant
Lemont, IL

Carol Johnson
Jane D. Hull Elementary
Chandler, AZ

Jerry D. Kelley, Ed.S.
Chestatee Elementary
Forsyth, GA

Andrew C. Kemp
Jefferson County Public Schools
Louisville, KY

Heather W. Kemp
Middletown Elementary
Louisville, KY

Tricia Reda Kerr
Science Specialist, EXCEL Program
The Ohio State University
Columbus, OH

Barbara Kingston
Elementary School
Jackson Heights, NY

Gina Koger
Carroll County Public School
Westminster, MD

Bonnie Kohler
L'Anse Creuse Public Schools
Harrison Township, MI

Heather LeBlanc
Chestatee Elementary
Gainesville, GA

Larry Lebofsky
Senior Research Scientist
Lunar and Planetary Laboratory
University of Arizona
Tucson, AZ

Richard MacDonald
Science Curriculum Leader
Hampton City Schools
Hampton, VA

Brenda S. Martin
Coal Mountain Elementary
Cumming, GA

Rebecca Martin
Westridge Elementary
Frankfort, KY

Corinne Masters
Natoma Elementary
Natoma, KS

Tiah E. McKinney
Albert Einstein Fellow
National Science Foundation
Arlington, VA

Sharon Meyer
Barnesville Elementary
Barnesville, OH

Janiece Mistich
Tchefuncte Middle School
Mandeville, LA

Anthony Molock
Cascade Elementary
Atlanta, GA

Sandy Morris
Department of Learning Services
Wichita, KS

Terri Oatis-Wilson
Peyton Forest Elementary
Atlanta, GA

Brenda A. Oulsnam
Clayton County Schools (retired)
Jonesboro, GA

Jim Peters
Science Resource Teacher
Carroll County Board of Education
Westminster, MD

Sharon Pinion
Sawnee Elementary
Cumming, GA

Amy Quick
Elementary School
Chesterfield, MI

Stacey Race
Sharon Elementary
Suwanee, GA

Gloria R. Ramsey
Mathematics/Science Specialist
Memphis City Schools
Memphis, TN

Anna Reitz
Forsyth County Schools
Cumming, GA

Steve A. Rich
Science Coordinator
Georgia Youth Science & Technology Center
Carrollton, GA

Maureen Riordan
Fairway Elementary
Wildwood, MO

Richard Ruiz
Jane D. Hull Elementary
Chandler, AZ

Ruth M. Ruud
Millcreek Township School District
Erie, PA

Sarah Rybarczyk
Elementary School
Chesterfield, MI

Laura W. Schaefer
Coordinator, School Partnerships
Missouri Botanical Garden
St. Louis, MO

Rhonda Segraves
Settles Bridge Elementary
Suwanee, GA

Ursula M. Sexton
Senior Research Associate/
Educational Consultant
WestEd
San Ramon, CA

Rita Jane Shelton
Louisa Middle School
Louisa, KY

Matt Silberglitt
Science Assessment Specialist
Minnesota Department of Education
Roseville, MN

William L. Siletti
Packer Collegiate Institute
Brooklyn, NY

Georgia Ann Smith
Sunflower Elementary
Lenexa, KS

Victoria L. Thom
Baker Elementary
Acworth, GA

Shannon Tribble
Daves Creek Elementary
Cumming, GA

Shirley Whorley
Science Coordinator, K-12
Roanoke City Public Schools
Roanoke, VA

Laura Wilkowski
Science Consultant
Midland, MI

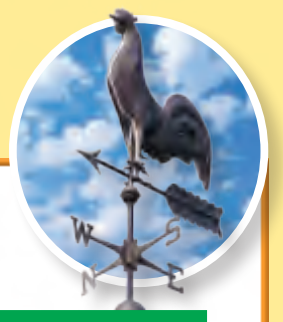
Dr. Sharon Wynstra
Science Coordinator
Rockford Public Schools
Rockford, IL

Brad Yohe
Science Supervisor
Carroll County Public Schools
Westminster, MD

Be a Scientist

Volume 1

LIFE SCIENCE



Volume 2

Chapter 7: The Sky

Volume 3

PHYSICAL SCIENCE

Be a Scientist

Some turtles can live to be 100 years old!

Science Skills

Objective

- Identify and apply the skills used for basic scientific inquiry.

1 Introduce

▶ Assess Prior Knowledge

Have students discuss what they know about science and scientists. Ask:

- **What do scientists do?**
- **How do scientists find out about things?**

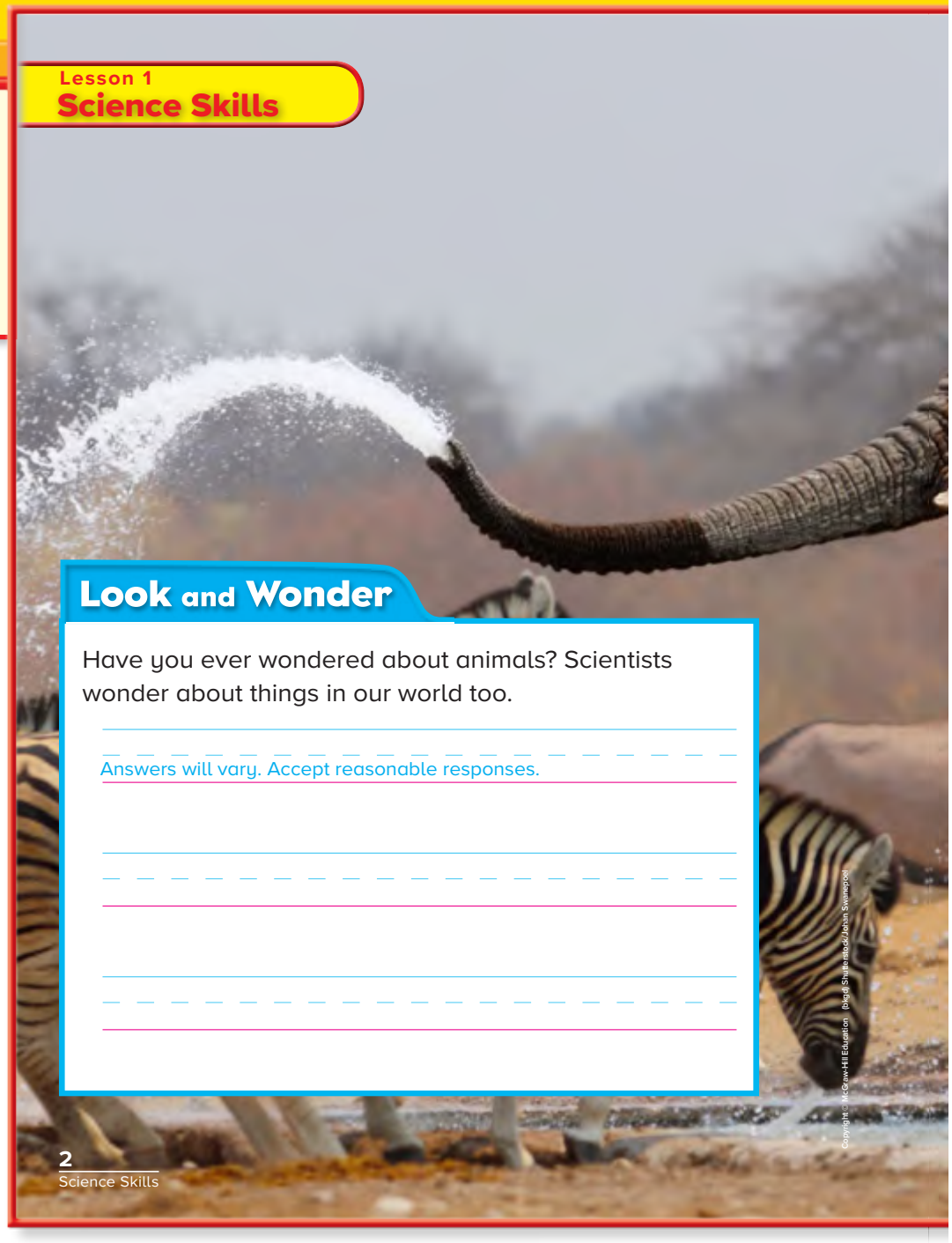
Record students' answers in the What We Know column of the class **KWL** chart.

Look and Wonder

Read the Look and Wonder box together. Discuss students' responses to the question. Have students look at the picture of the animals. Ask:

- **What can you not tell by looking at this picture?**
  Possible answers: what they eat; how they grow

Explain that all year, students will be learning how to ask questions, plan experiments, and use skills such as observing, drawing pictures, and writing about what they see. Explain to students that these are the same things that scientists do to answer questions in the real world.



Warm Up

Start with a Discussion

Provide a living thing for students to observe, such as a classroom pet, a plant, or some cut flowers. Ask:

- **What can you observe about this (plant)?**

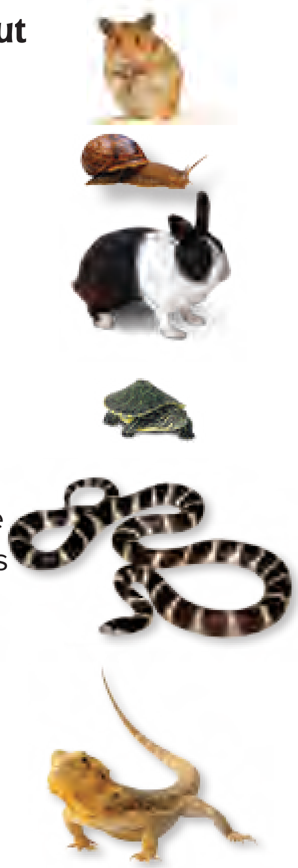
Allow students to look closely at, smell, and touch the subject (if it is safe to do so). Have students record their observations by drawing or writing what they see. Ask:

- **What did you do to observe the (plant)?**
- **How could you find out more about it?**

Tell students that in making observations and asking questions, they are acting like scientists. Explain that scientists look at the world around them in order to learn more about it.

Explore — Inquiry Activity

What do you notice about these animals?



What to Do ?

1. Look at the animals on this page.
2. How are the animals alike? How are they different?
3. Put the animals into groups. Tell a classmate why you put the animals in each group.

Explore More

4. Think of other animals that you could add to each group.

Alternative Explore

What can you learn from feet?

Show students pictures of animals in which the feet of each animal are visible. Invite students to sort these animals by what their feet look like. Ask:

- **How are animals' feet alike and different?**
- **How do you think these animals use their feet?** Possible answers: to walk; to swim; to climb trees

Explore

whole class | 40 minutes

Plan Ahead Make a large animal classification chart, with a labeled row for each animal, and display it for the class.

Purpose Students use their observational skills to identify animal features. They are introduced to the science skills of comparing and classifying animals and communicating results.

Structured Inquiry

What to Do?

1. Encourage students to observe features of the animals. To extend students' thinking beyond color, size, and shape, ask: **Are their body coverings hairy or smooth? Are they hard or soft? What body parts do they have? How do you think these animals move?**

   Record students' responses on the class animal classification chart.

2. Ask students to record similarities and differences between the animals on a piece of paper they have folded in half and labeled *Alike* on one side and *Different* on the other. Allow students to use pictures and words. If students are having trouble comparing all the animals, let them choose two to compare.
3. Allow students to draw or write the names of the animals as they group them. They may use the class chart for support. Ask students to communicate how they grouped the animals.
4. If students have trouble thinking of animals to add to their groups, provide them with animal pictures.

2 Teach

What do scientists do?

▶ Discuss the Main Idea

Main Idea Scientists observe, compare, and classify to find out more about the world.

Read the text together with students. Have them observe and then compare the bird and the butterfly. Ask:

- **What do you notice about each animal?**
- **How are these animals alike?** Possible answers: They both have wings; they both fly.
- **How are these animals different?** Possible answers: The butterfly is orange, does not have feathers, and is small; the bird is green, has feathers, and is big.

What do scientists do?

You observed animals to see what they were like. Scientists observe things too. You can be a scientist!

Underline the senses that help you observe things.

When you **observe** something, you carefully look, hear, taste, touch, or smell it.

Observe What can you observe about these animals?


cat


fish


Parrot


butterfly

LA Support

Show and Tell Provide small groups of students with a variety of animal pictures. Invite students to observe the pictures, and encourage them to identify each animal. Have them observe details about each animal, such as size, color, and skin covering and communicate their observations to group members.

BEGINNING Guide students to use single words to describe an animal, such as *bear, big, brown, furry*.

INTERMEDIATE Encourage students to use short sentences to describe one characteristic of an animal. For example: *The bear is brown*.

ADVANCED Ask students to describe more than one characteristic of an animal, such as *The bear is big, brown, and furry*.

Scientists compare and classify animals to learn more about them.

Compare means to see how things are alike or different. **Classify** means to group things by how they are alike.

Compare and Classify

Sort these animals into groups.


koala


flamingo


ladybug


snake

Use the Visuals

Have students look at the pictures of the animals on the student pages. Ask:

- **What can you tell about the animals by looking at these pictures?** Possible answers: what color they are; how many legs they have; where they are
- **Why does looking at pictures help you compare these animals?** Possible answer: Looking at pictures helps me see how the animals look alike and different.
- **What are some ways you could group these animals?** Possible answers: animals that fly and ones that don't; animals with wings and animals without wings; small animals and big animals

Explore the Main Idea

ACTIVITY Cover a picture of an animal with sticky notes or small pieces of paper, so that it is impossible to tell what kind of animal it is. Distribute paper and pencils to students.

Ask students to write what animal they think is pictured.

Uncover part of the animal, such as a foot or a nose, and again ask students to identify the animal. Repeat until all students have figured out which animal is pictured.

Discuss with students how they came to determine what the animal was. Talk about how observing can give them the information they need to make a decision about something.

Differentiated Instruction

Leveled Questions

EXTRA SUPPORT Ask questions such as these to check students' understanding of the material.

- **What are some ways to observe things?** looking, listening, touching, smelling, tasting
- **What do scientists do?** Possible answers: They compare; they classify; they observe.

ENRICHMENT Use these types of questions to develop students' higher-order thinking skills.

- **Why do scientists observe things?** Possible answers: to learn more about them; to answer questions
- **How do scientists classify things?** Possible answer: They group them by how they are alike.

ENGAGE EXPLORE **EXPLAIN** EVALUATE EXTEND

How do scientists work?

▶ Discuss the Main Idea

Main Idea Scientists measure, put things in order, record data, make models, and communicate.

Read the text together. Discuss students' experiences with measuring. Ask:

- **Why do you measure things?** Possible answers: to find out how big something is; to find out how many of something there is; to find the amount of something
- **If we had six books, what are some ways we could order them?** Possible answers: biggest to smallest; thinnest to thickest; heaviest to lightest
- **How could you tell what order to put them in?** Possible answers: I could measure how big they are; I could measure how heavy they are.
- **How could we communicate to others how we put the books in order?** Possible answers: by making a list of the titles; by drawing a picture of the books in order; by making a chart of titles and measurements

How do scientists work?

Scientists also measure things. **Measure** means to find out the size or amount of something.

Measuring can help scientists **put things in order**, or tell which comes first, next, and last.

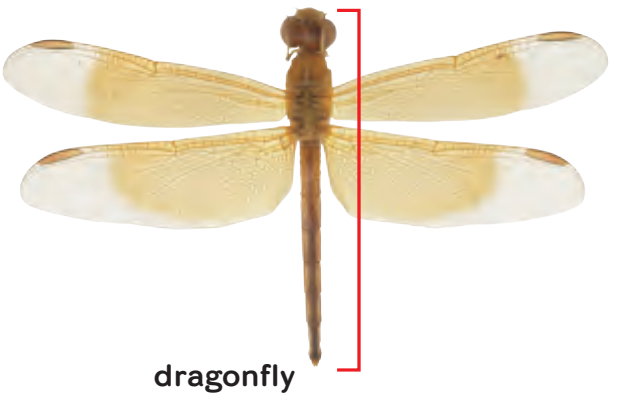
butterfly

Measure Use a ruler to measure these insects.

bee

beetle

fly



dragonfly

LA Support

Put Things in Order Review the meanings of *smallest*, *largest*, *first*, *next*, and *last* with students, and write the words on the board. Distribute three different-sized objects to pairs of students. Have them use cubes to measure the objects and then put their objects in order by size. Have students explain the order of their objects. Encourage them to use the words on the board if necessary.

BEGINNING Guide students to use single words to explain the order of their objects.

INTERMEDIATE Encourage students to use short phrases or sentence fragments to explain the order of their objects.

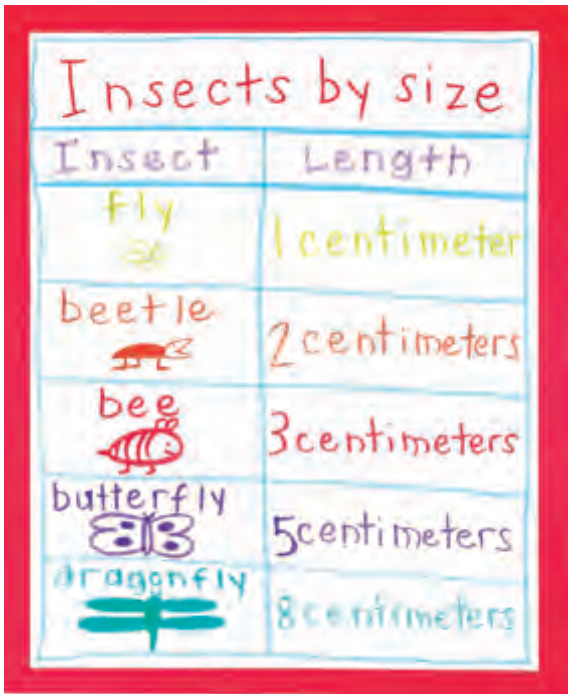
ADVANCED Direct students to use full sentences to identify the order of their objects.

Scientists can make a chart to **record data**, or write down what they observe. They can also **make a model** to show how something looks or works.

When you write or tell your ideas to others, you **communicate** what you have learned.

Make a Model
What does this model show?

Communicate
What does this chart tell you about insects?



Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Place students in small groups and ask them to put themselves in order from shortest to tallest. When they are done, have them draw a picture of the ordered group and label it with their names.

ENRICHMENT Write the following insect information on index cards: *butterfly 7 cm*, *ant ½ cm*, *grasshopper 4½ cm*. Give the cards to students. Ask students to explain how they would add the information to the chart on page 7. Have them create a new chart with the three new insects added.

Use the Visuals

Have students use a ruler to measure the insects on the student page. Students unfamiliar with rulers may place paper clips or counting cubes end-to-end to measure. Remind them to use the same unit of measurement to measure all of the insects.

Have students use their measurements to put the insects in order from smallest to largest. Encourage them to record their data in a chart.

Look at the chart on the student page together. Ask:

- **What kind of information does this chart communicate?** insect sizes
- **Why would a scientist make a chart?** Possible answers: to show other people what she found out; to remember information
- **How does the chart on the student page compare to the one you made based on your own measurements?** Possible answers: The insects are in the same order; I measured in millimeters but the chart shows centimeters.

Explore the Main Idea

ACTIVITY Tell students that sometimes scientists want to know about things that are difficult to study because they are too big, too far away, or too small (for example, mountains, clouds, or insects). Explain that a model can help communicate details that are difficult to see.

Have students make a model of an insect. Provide them with pictures that show details that cannot easily be seen with the eye. Encourage students to show the hard-to-see details in their models.

How do scientists learn new things?

▶ Discuss the Main Idea

Main Idea Scientists infer, predict, investigate, and draw conclusions to learn new things.

Read the text together. Review what it means to infer. Ask:

- **If you look out the window and see that it is raining, what does that tell you about what it feels like outside?** Possible answers: that it is wet; that it might be cold
- **How is that helpful?** Possible answer: It tells me what kind of clothes I should wear.

▶ Use the Visuals

Encourage students to study the pictures on the student page. Ask:

- **What can you infer about what is happening in the pictures on this page?** Possible answers: It is cold; it is winter; the bird is hungry.

Discuss the reasoning behind students' inferences.

▶ Explore the Main Idea

ACTIVITY Give clues and ask students to practice inferring and predicting. For example, say: *There is a room decorated with balloons, a cake with candles, and students singing*. Ask:

- **What is happening?** Possible answer: a party
- **What might happen next?** Possible answer: Someone will blow out the candles.

How do scientists learn new things?

Scientists **infer**, or use what they know to figure something out.

Scientists also **predict**, or use what they know to tell what they think will happen.

Infer
It is winter. You can infer that there is not much food for the bird to eat.

Predict
The bird is hungry. You can predict that it will eat the food in the feeder.

LA Support

Use Descriptive Words Give students pictures of small animals, such as ladybugs, caterpillars, or ants. Have students describe their animal.

BEGINNING Ask students to use single words to describe the animal, such as *small, caterpillar,* or *green*.

INTERMEDIATE Have students use short sentences to describe one animal characteristic, such as *The caterpillar has many legs*.

ADVANCED Encourage students to use full sentences to describe more than one characteristic of their animal.

Then scientists **investigate** by making a plan and following it.

They can **draw conclusions**, or use what they observe to explain what happens.

Investigate

To investigate, you can try to feed the bird different seeds.

Draw Conclusions

If there are no sunflower seeds left, you can draw the conclusion that the bird liked them best.

Think, Talk, and Write

Describe what scientists do to learn more about our world.

Scientists observe, compare, and classify things; they measure, record data, and communicate their findings; they can use clues to infer and predict; they investigate and draw conclusions.

3 Close

Using the KWL Chart

Review with students what they learned about what scientists do, how they work, and how they learn new things. Record their responses in the What We Learned column of the class **KWL** chart.

Scientific Method

Objectives

- Apply the method that scientists use to study the natural world.

1 Introduce

▶ Assess Prior Knowledge

Create a class **KWL** chart and record what students already know about how scientists investigate questions. Ask:

- **What kinds of things do scientists wonder about?**
- **How do scientists find answers to their questions?**

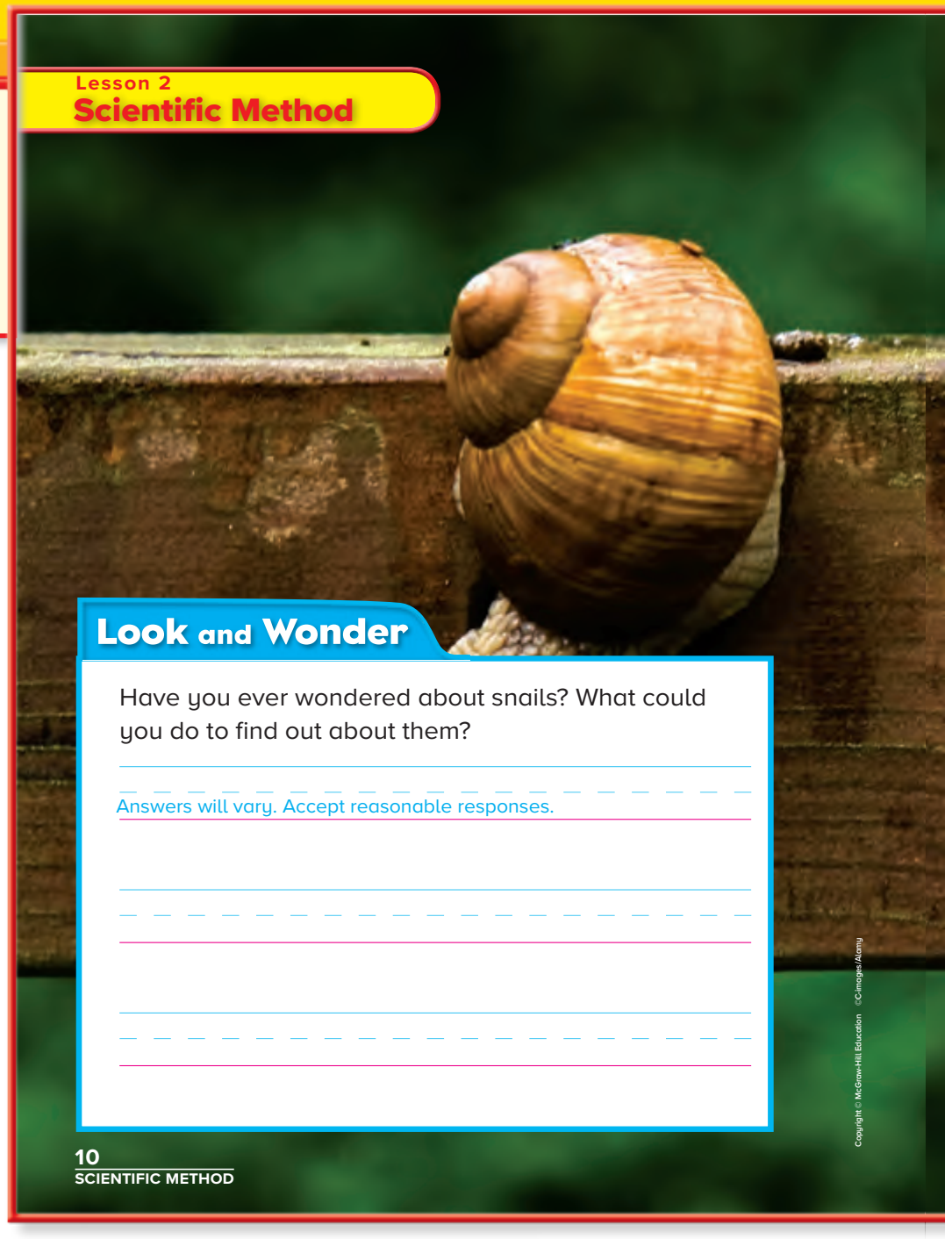
Record students' answers in the What We Know column of the class **KWL** chart.

Look and Wonder

Read the Look and Wonder questions about snails. Ask:

- **What can you tell about where this snail lives?**
  Possible answers: There are many plants; it is near water.
- **How could you find out where snails live?**
  Possible answers: I could go to the library; I could look for snails; I could investigate.
- **What do you think the snail eats?**

Write all responses on a piece of chart paper. Reference students' ideas as they do the Explore activity on the next page.



Warm Up

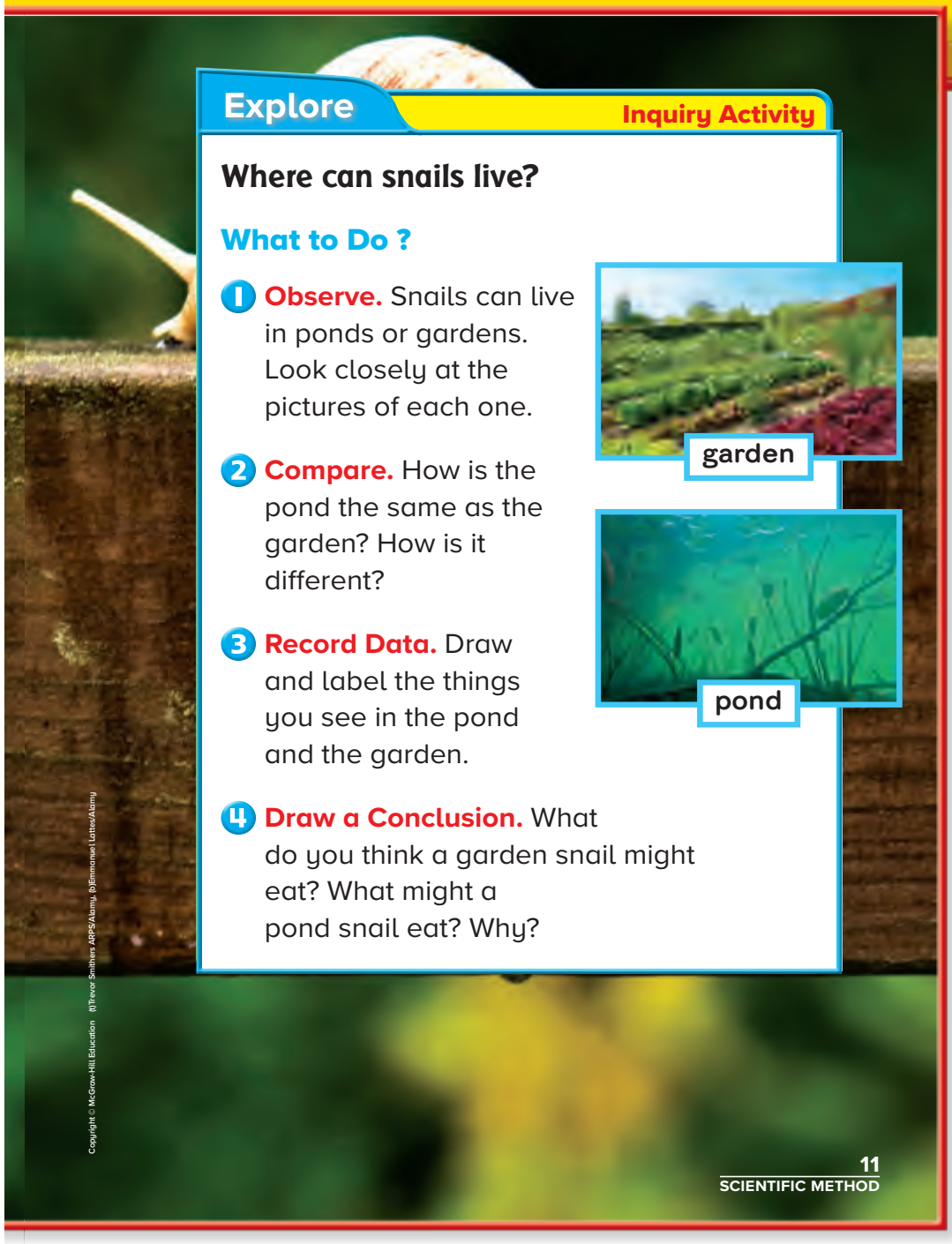
Start with a Book

Prompt students' inquiry and introduce them to unusual animals by reading a book about unusual animals.

After reading the book, ask:

- **What did you notice about the animals in this book?**
- **What else would you like to know about these animals?**
- **How could you find the answers to your questions?**

Have students discuss the materials they would need and what they would do to find out more about the animals. Discuss how they might learn more by observing, comparing, and investigating.



Explore

Inquiry Activity

Where can snails live?

What to Do ?

1. **Observe.** Snails can live in ponds or gardens. Look closely at the pictures of each one.

2. **Compare.** How is the pond the same as the garden? How is it different?

3. **Record Data.** Draw and label the things you see in the pond and the garden.

4. **Draw a Conclusion.** What do you think a garden snail might eat? What might a pond snail eat? Why?

Explore

individual or pairs

40 minutes

Purpose Students hone their observational skills by describing environments. They employ elements of the scientific method by comparing habitats, communicating results, and drawing conclusions based on their observations.

Structured Inquiry

What to Do?

Discuss students' familiarity with snails.

1. **Observe** Remind students that observing is using their senses to see, smell, feel, and hear things around them.

2. **Compare** Write the words *Alike* and *Different* in two columns on the board. Tell students that when they compare, they tell how things are alike and different. Record students' comparisons on the board.

3. **Record Data** Remind students that scientists record data by drawing and writing about their observations. Encourage students to include details about what they see, so that another person could feel like they had seen the pond and the garden themselves.

4. **Draw a Conclusion** To prompt students to use their observations to explain their ideas, ask questions such as **What in the picture would lead you to think that garden snails eat leaves?**

2 Teach

What do snails like to eat?

▶ Discuss the Main Idea

Main Idea Scientists make and follow a plan to find answers to questions.

Before reading, have students think of a time when they had a question that they wanted to answer. Ask:

- **What did you do to find the answer?**

Read the text together. Ask:

- **What did the students want to find out?** what snails like to eat
- **How will the students answer their question?** Possible answers: They will make and follow a plan; they will act like scientists; they will observe snails.

What do snails like to eat?

Scientists make a plan. Their plan is called the **scientific method**. You can use this plan too!

Mr. Ahmad's science class made a plan to find out what snails eat.

Underline the sentence that tells you what the children are trying to learn.

Observe

Ask a Question
What do garden snails eat?

Make a Prediction
Garden snails eat garden plants.

LA Support

Ask Questions Display a set of objects from the classroom and allow students to touch and explore them. Have students practice asking simple questions about the objects.

BEGINNING Model how to ask questions for students. Ask: **Which objects are blue?** Have students point to the blue objects and name them. Repeat with other colors.

INTERMEDIATE Have students ask their own questions about the objects. Give other students a chance to answer the questions by pointing and naming.

ADVANCED Play 20 Questions with students. Have one child pick an object and whisper its name to a partner. Have the rest of the class ask questions to find out which object the first child picked.

Like scientists, the student wrote their plan down so others could follow it.

The plan was to give the snails garden plants and jelly beans. Then the student observed the snails and recorded what they ate.

Make a Plan

Follow the Plan

Record the Results

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Copy the plan on the student page. Cut the steps of the plan into strips. Have students reassemble the steps in order and glue them to a piece of paper.

ENRICHMENT Have students make a set of cards listing their plan for what they will do at recess. Have them share their cards with a partner and challenge the partner to put the plan in the proper order. Have them discuss whether or not the order of the plan was correct.

Use the Visuals

Look at the plan the students made. Ask:

- **What is the order of their plan?** First, they give the snails different foods; next, they observe; last, they record their results.
- **Why is it important to write out your plan?** Possible answers: So others can follow the plan; so I don't forget what I need to do; so that I do the steps in the right order.
- **What will tell the students which foods the snails like and don't like?** The snails will eat the foods they like and will not eat the foods they don't like.

Explore the Main Idea

ACTIVITY Have each child create a science journal. A science journal helps students stay organized and remember what they did. By reviewing their journals, students will think more carefully about what they observe.

Have students decorate the front of their journals. Tell students that they can write questions they have about science, make observations, write plans for investigations, record results of experiments, and communicate what they learn in their journals.

Set aside a specified place in the classroom for students' science journals so that they are easily accessible.

What did the students find out?

▶ Discuss the Main Idea

Main Idea Scientists repeat experiments and communicate what they learn.

Read the text together. Ask:

- **Why is it a good idea to try the plan a second time?** Possible answers: to double-check the results; to be sure I did not make a mistake the first time
- **What would you do if the results of a second try were different from the first try?** Possible answers: try the plan again; ask someone else what results they got from the same experiment
- **What would you do if the results never came out the same?** Possible answer: make a new plan and start over

▶ Use the Visuals

Have students look at the chart on the student page showing the scientific method. Have them match each step to the relevant picture or caption on the student pages.

What did the students find out?

The students found out that snails eat garden plants.

Like scientists, they wanted to be sure. They tried their experiment again. They got the same results.

Try the Plan Again

Draw a Conclusion

Snails do eat garden plants!

LA Support

Respond to Guided Questioning Review the scientific method with students. Use guided questions and the photographs on the student pages to help students understand each step.

BEGINNING Have students point to and name the correct photograph or step of the scientific method when prompted.

INTERMEDIATE Ask students to use gestures and short sentences to describe the scientific method.

ADVANCED Have students use full sentences to explain how the students in the book used the scientific method to learn more about snails.

The students shared what they learned about snails with their classmates.

This can lead to new questions and investigations.

Fill in the missing steps of the scientific method below.

Scientific Method

- Observe
- Ask a Question
- Prediction
- Make a Plan
- Follow the Plan
- Record the Results
- Try the Plan Again
- Draw a Conclusion

Think, Talk, and Write

Describe what the students did to find out what snails ate.

Possible answer: The children gave the snails different foods each week for three weeks and observed what they ate.

3 Close

▶ Using the KWL Chart

Review with students what they have learned about the scientific method. Record their responses in the What We Learned column of the class **KWL** chart.

Safety Tips

Objective

- Identify important safety procedures.

▶ Talk About It

Encourage children to share their experiences with rules and discuss as a class why rules are made. Ask:

- **What kinds of rules do you have at home?**
- **What are some rules for playing outside?**

Write children's responses on chart paper. Ask:

- **Why do people make rules?**

Children should grasp that rules are created to keep people safe.

▶ Learn About It

Have a volunteer read the first sentence. Ask children to list other safety symbols they know, such as stop signs, poison indicators, or a circle with a line through it. Invite them to look through their books and find **Be Careful** notations. Ask:

- **Why do you need to be careful when doing the activity on that page?**

Discuss the types of science activities children may do in class, and encourage them to propose safety procedures. Have volunteers read the rest of page. For each safety tip, ask children to explain the rationale behind the rule. Ask:

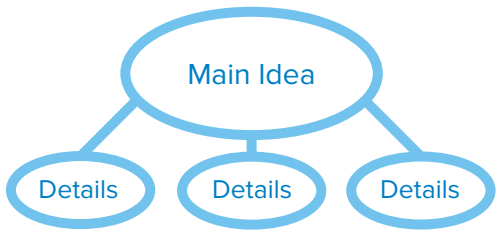
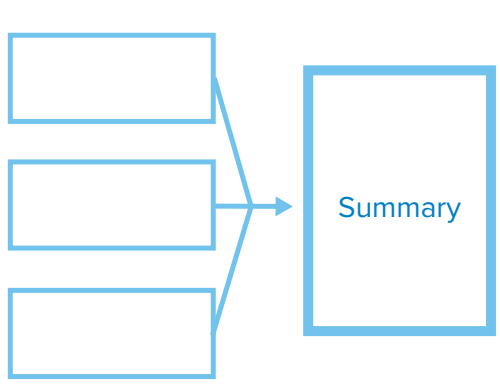
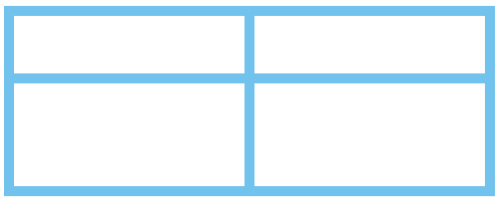
- **How does this rule help us stay safe?**

▶ Try It

Divide the class into five groups and assign one safety tip to each group. Have each group create a poster to explain and illustrate their safety tip, and encourage them to present their posters to the class.

Life Science

CHAPTER 2 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
1 Learning About Living Things PACING: 4 days *FAST TRACK:* 2 days	■ Compare and classify living and nonliving things. ■ Explain what plants need to live and grow.  **Reading Skill** Main Idea and Details	living nonliving nutrient
2 Parts of Plants PACING: 4 days *FAST TRACK:* 2 days	■ Identify plant parts such as leaves, stems, and roots. ■ Describe what different parts do for the plant.  **Reading Skill** Summarize	leaves stem root
3 Different Plants PACING: 4 days *FAST TRACK:* 2 days	■ Classify and compare different plants. ■ Identify some edible plant parts.  **Reading Skill** Classify	trunk

PACING Assumes a day is a 40 minute session.

Activity Planner

EXPLORE Activities

Explore

PACING: 40 minutes

Objective Observe that living things grow and change and nonliving things do not.

Skills compare, observe, infer, classify

Materials rock, plant, water, clear bin

PLAN AHEAD Choose a fast-growing plant or a plant with flower buds so that children can easily see growth and change.

Explore

PACING: 40 minutes

Objective Identify the main parts of a plant.

Skills observe, communicate, infer

Materials plants, hand lenses

PLAN AHEAD Provide one or more small, loosely potted plants for children. **Be Careful!** Make sure to avoid plants that could be poisonous or have thorns or other dangerous parts.

Explore

PACING: 40 minutes

Objective Identify and compare how plants are alike and different.

Skills observe, record data, compare, communicate

Materials paper, crayons

PLAN AHEAD **Be Careful!** Look for any poisonous plants or other dangers before taking children outside.

QUICK LAB Activities

Quick Lab

PACING: 10 minutes

Objective Identify living and nonliving things in the classroom.

Skills observe, classify

Materials paper, crayons, magazines, paste

PLAN AHEAD Make sure there are living things—such as house plants, potted flowers, or animals—available in the classroom.

Quick Lab

PACING: 15 minutes

Objective Observe the structure and function of stems.

Skills observe, communicate, infer

Materials celery stalks, plastic cups, water, food coloring

PLAN AHEAD Have children wear gloves when handling dye to avoid allergic reactions, messy hands, and the transfer of dye to other surfaces.

Quick Lab

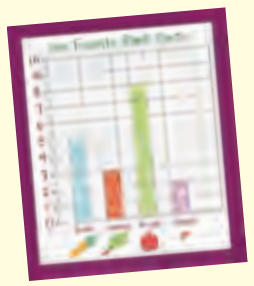
PACING: 15 minutes

Objective Identify commonly eaten plant parts.

Skills communicate

Materials paper, crayons, pencils

PLAN AHEAD Have graph paper available for students to create bar graphs.



Language Acquisition Support

Academic Language

When learning, students need help in building their understanding of the academic language used in daily instruction and science activities. The following strategies will help to increase students' language proficiency and comprehension of content and instruction words.

Strategies to Reinforce Academic Language

- **Use Context** Academic language should be explained in the context of the task. Use gestures, expressions, and visuals to support meaning.
- **Use Visuals** Use charts, transparencies, and graphic organizers to explain key labels to help students understand classroom language.
- **Model** Use academic language as you demonstrate the task to help students understand instruction.

Academic Language Vocabulary Chart

The following chart shows chapter vocabulary and inquiry skills. **Vocabulary** words help students comprehend the main ideas. **Inquiry Skills** help students develop questions and perform investigations.

Vocabulary	Inquiry Skills
living nonliving nutrient leaves stem root trunk	compare observe infer classify communicate record data

Vocabulary Routine

Use the routine below to discuss the meaning of each word on the vocabulary list. Use gestures and visuals to model all words.

Define: Something *living* grows and needs food, air, and water to survive.

Example: A girl is a *living* thing.

Ask: What are some other *living* things?

Students may respond to questions according to proficiency level with gestures, one-word answers, or phrases.

Vocabulary Activities

Help students understand the differences between living and nonliving things.

BEGINNING Show the photograph of the dairy farm in Lesson 1. Name the things that are shown as you point to them. Have students repeat after you. Then challenge them to name one living thing and one nonliving thing in the picture.

INTERMEDIATE Have students look at the photograph of the dairy farm in Lesson 1. Ask them to name a living thing and complete the sentence frame *This is a* _____. *A* _____ *is a living thing because* _____. Repeat with *a nonliving thing*.

ADVANCED Ask students to name living and nonliving things in the classroom. Write responses on a two-column chart. Have students explain why each thing listed is living or nonliving. Encourage students to name other living and nonliving things that they would like to have in the classroom.

CHAPTER 2

Plants Are Living Things

THE BIG IDEA **What do you know about plants?**

Chapter Preview Have students take a chapter picture walk and predict what the lessons will be about.

▶ Assess Prior Knowledge

Before reading the chapter, create a **KWL** chart with students. Ask the Big Idea question: **What do you know about plants?**

Ask:

- **How do you know plants are living things?**
- **What parts do plants have?**
- **How are plants alike and different?**

Answers shown represent sample student responses.

Follow the **Instructional Plan** below after assessing students' prior knowledge of chapter content.

CHAPTER 2

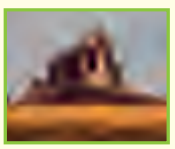
Plants are Living Things

What do you know about plants?

Answers will vary. Accept all reasonable responses.

Vocabulary

living a thing that grows, changes, and needs food, air, and water to survive



nonliving a thing that does not grow and change, or need food, air, or water to survive

leave the plant parts that use sunlight and air to make food

root a plant part that keeps the plant in the ground

Differentiated Instruction

Instructional Plan

Chapter Concept Plants have parts that are used for meeting their needs.

EXTRA SUPPORT Students who are not yet able to distinguish living from nonliving things should cover **Lesson 1** before continuing through the chapter.

ON LEVEL Students who can distinguish living from nonliving things may review that plants are living things from **Lesson 1**, then go to **Lesson 2** to focus on the chapter concept.

ENRICHMENT Students who understand how plants meet their basic needs may explore differences in plants, **Lesson 3**.

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

Plants are Living Things		
What I **Know**	What I **Want** to Know	What I **Learned**
Plants grow in the ground.	Do all plants grow in the ground?	Roots hold plants in the ground and get nutrients from soil.
Plants have leaves.	What do leaves do?	Leaves use sunlight and air to make food.
Some plants are green.		

Vocabulary

- Have a volunteer read the **Preview Vocabulary** words aloud to the class. Add these words and their definitions to a class Word Wall.
- Encourage students to use the illustrated glossary in the Student Edition's reference section.

Stop Here to

Plan Your Lesson

Lesson 1 Learning About Living Things

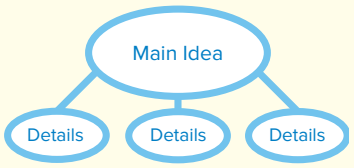
Essential Question

How are living and nonliving things different?

Objectives

- Compare and classify living and nonliving things.
- Explain what plants need to live and grow.

Reading Skill Main Idea and Details



You will need a main idea and details graphic organizer.

FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

1 Introduce
Look and Wonder

2 Teach
Discuss the Main Idea

3 Close
Think, Talk, and Write

Teacher Notes

Lesson 1 Learning About Living Things

Objectives

- Compare and classify living and nonliving things.
- Explain what plants need to live and grow.

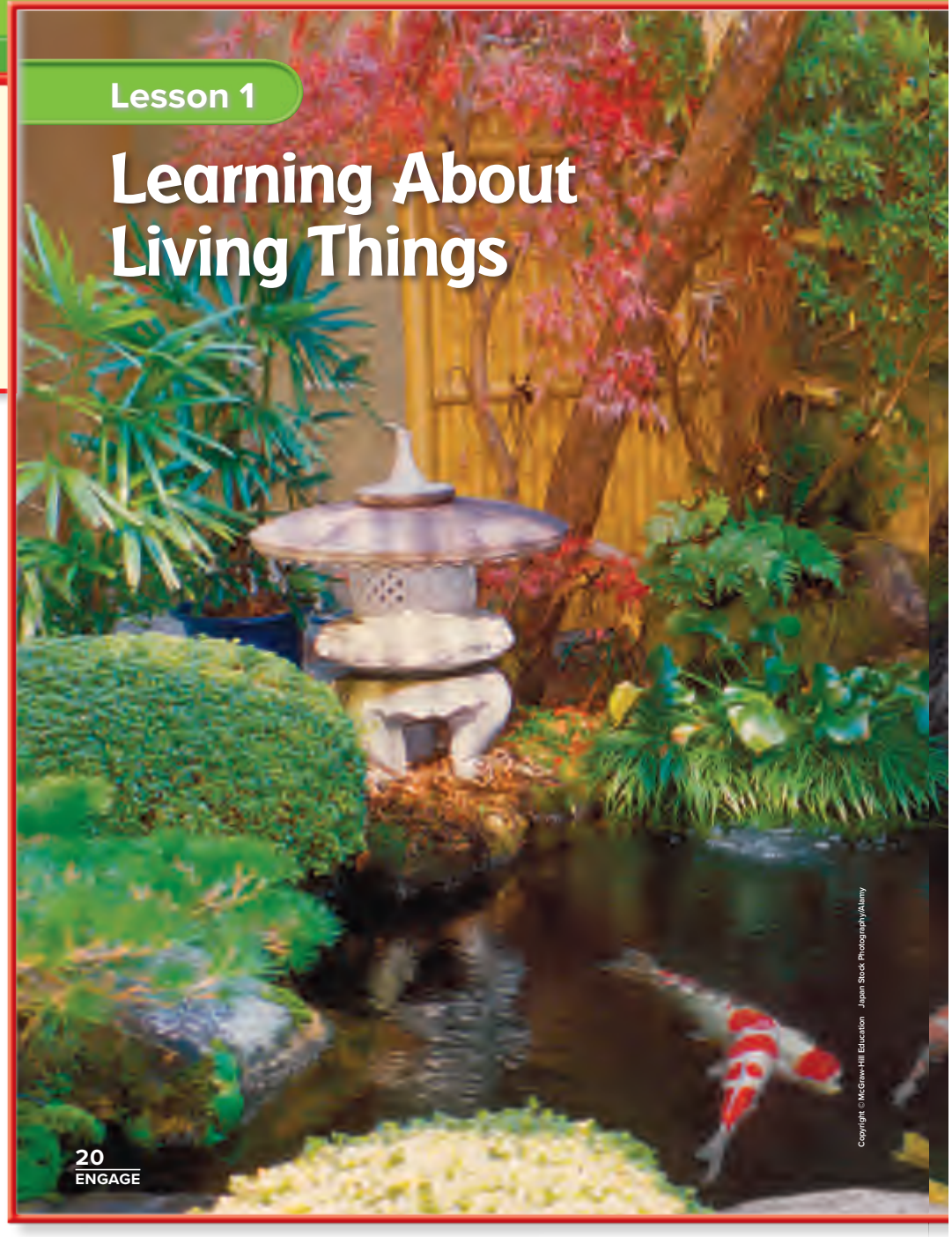
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about living and nonliving things. Ask:

- **How do you know if something is alive?**
- **Why are plants living things?**

Record students' answers in the What We Know column of the class **KWL** chart.

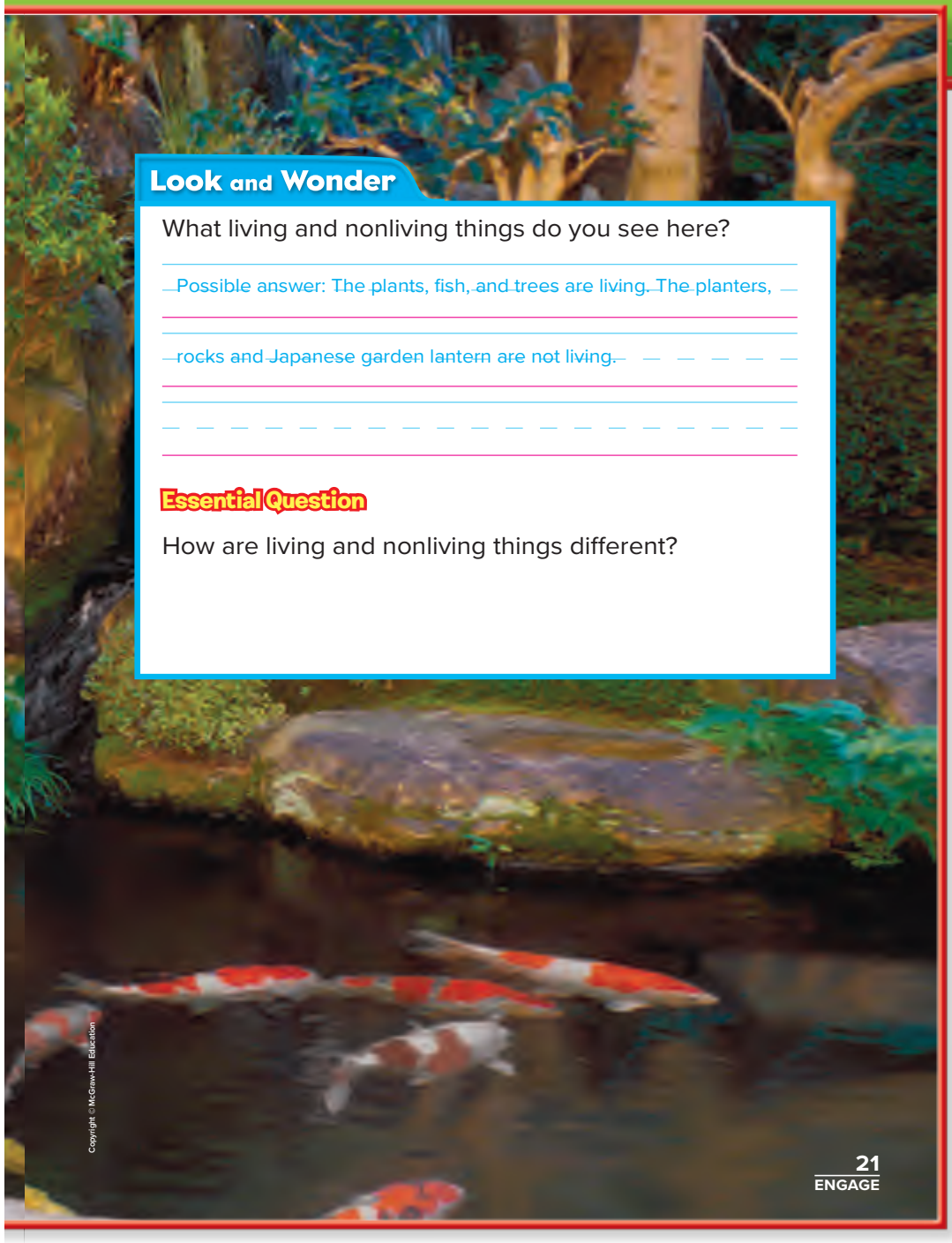


Warm Up

Start with a Discussion

Invite students to share stories about plants or pets that they have or would like to have. Discuss how they would care for the plants and animals. Ask:

- **How do you know plants and animals are living?** Possible answers: They grow and change; they drink water.
- **What do plants and animals need to live?** Possible answers: water, sunlight, food, a place to grow, air
- **What would happen if plants and animals did not get the things they need to live?** Possible answers: They would not grow; they would die.



Look and Wonder

Read the Look and Wonder question about living and nonliving things. Ask:

- **How do you know which things are living and which are nonliving?**
- **What clues in the picture help you identify living things?**

Write students' responses on the board and note any misconceptions they might have.

Essential Question

Have students read the Essential Question. Tell them to think about it as they read through the lesson. Advise students that they will return to this question at the end of the lesson. Possible answer: Living things need food, water, and air to survive. Nonliving things can live without food, water, and air.

ENGAGE | **EXPLORE** | EXPLAIN | EVALUATE | EXTEND

Explore

whole class | 40 minutes

Plan Ahead Choose a fast-growing plant or a plant with flower buds so that students can easily see growth and change. This activity will require five minutes every day for one week for students to make observations.

Purpose This activity demonstrates what happens when living and nonliving things are watered.

Structured Inquiry

What to Do

Have students name and describe living and nonliving things. Ask: **How do you know something is living?** Possible answers: It grows; it needs water.

1. **Compare** Have students use their senses to see, feel, and smell the plant and rock. Encourage them to write down what they notice.
2. Water the plant and rock equally.

Explore

What is living and nonliving?

You need


rock


plant


water


clear bin

What to Do ?

1. **Compare.** Look at a rock and a plant. Write about how they are alike and different.

Similarities	The differences
A rock is hard and is nonliving.	A plant is green and has leaves and roots. It is also living.

2. Put the rock in a bin. Water the rock and the plant for a week. Record what you observe.

Inquiry Activity

3 Observe. What happens? Write what you observe.

Possible answer: The plant is growing. The rock does not change.

4 Infer. How do you know if something is living or nonliving?

Possible answer: Something that is living can grow or change. Nonliving things do not change.

Explore More

5 Classify. Sort living and nonliving objects.

Open Inquiry

Investigate other living things.
My question is:

Possible answer: What other things do living things need?

3 Observe Have students look at the flowers and leaves for signs of growth. Encourage students to observe the rock. Invite students to write down their observations each day.

4 Infer Tell students that to *infer* means to use what they know to figure something out. Have students use what they learned about the plant and the rock to describe other living and nonliving things.

Explore More

5 Classify Help students put living and nonliving things into groups using the need for water as a criterion.

Encourage students to explore further by asking: **What other things, besides water, do living things need? How could you find out what something needs to live?**

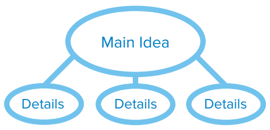
Check the class **KWL** chart to see whether students were confused about whether something was living or nonliving. Ask: **How can you find out whether something is alive?**

Teacher Notes

2 Teach

Read and Respond

Reading Skill Main Idea and Details The main idea is the most important idea in the reading selection. Details give more information about the main idea.



What are living and nonliving things?

▶ Discuss the Main Idea

Main Idea Living things grow and change. Nonliving things do not grow and change.

After reading together, ask:

- **How could you tell if something is living or nonliving?** Possible answers: Living things grow and change; they need food, water, and air. Nonliving things do not grow and change; they do not need food, water, or air.

Read and Respond

What are living and nonliving things?

You are a living thing. Plants and animals are too. **Living** things grow and change.

Living things need food, water, and air to live. They make new living things like themselves.

Quick Check

1. What do living things need to survive?

Living things need food,

air, and water to survive.

Living and Nonliving Things

24
EXPLAIN

Science Background

Living and Nonliving Things Living things are made of one or many cells. They breathe and use energy. They grow, reproduce, and die. Living things respond to stimuli and adapt to their environment. Nonliving things may do some of these things, but only living things do them all.

LA Support

Compare and Contrast Write the words *living* and *nonliving* on the board. Use picture cards or magazine clippings showing living and nonliving things. Ask each child to pick a picture and tape it under the correct heading on the board. Have students draw their own examples of living and nonliving things and add them to the board. Encourage students to describe their drawings and explain why the things in the pictures are living or nonliving.

BEGINNING Have students use the words *living* and *nonliving* to describe the pictures.

INTERMEDIATE Ask students to use short phrases to describe the pictures.

ADVANCED Have students use sentences to describe living and nonliving things.

Nonliving things do not grow and change.

They do not need food, water, or air to survive. They do not make new things like themselves.

Quick Lab

Find living and nonliving things in your classroom.

Consider the picture

What living and nonliving things do you see here?

Living things	Nonliving things
camel, trees, and grass	rocks, soil, wall, scarf, seat cushion, ropes, well

Read a Photo

Encourage students to study the picture on the student pages. Ask:

- **Are camels living? How do you know?** Possible answer: Yes; camels grow, eat, drink, breathe, and make new camels.

Develop Vocabulary

living ***Scientific vs. Common Use*** Write these two sentences on the board: *The plant is living. She makes a living as a police officer*. Discuss how the word *living* can be used to describe how someone makes money. Help students make sentences using both the scientific and common uses of *living*.

nonliving ***Word Origin*** Explain to students that the prefix *non-* means "not." Have students infer the meanings of other words that have the prefix *non-*, such as *nonstop* and *nonpoisonous*.

Quick Lab

individual or small groups | 10 minutes

Objective Identify living and nonliving things in the classroom.

You need paper, crayons, magazines, paste

1. Have students observe items in the classroom. Ask: **What things are living? What things are nonliving?**
2. Ask students to draw or find clippings of what they see. Have them classify the images into *living* and *nonliving* categories.
3. Have students divide a piece of paper in half, then label one side *Living* and the other side *Nonliving*. Encourage them to paste their drawings and clippings on the appropriate side of the paper.

ENGAGE EXPLORE **EXPLAIN** EVALUATE EXTEND

Why are plants living things?

▶ Discuss the Main Idea

Main Idea Plants are living things.

Discuss how plants are like other living things. Ask:

- **What do plants need?** Plants need air, water, nutrients, sunlight, and space.
- **How do plants get food?** Plants make their food.

▶ Use the Visuals

Discuss how plants get what they need. Ask:

- **What would happen if rice was planted in a dry place, such as a desert?** Possible answer: It would not grow because it needs lots of water.

FACT **A cactus plant can hold enough water inside it to last a whole year.** Use pictures to discuss the adaptations of desert plants.

Why are plants living things?

Draw a circle around the things that plants need to live.

Plants need air, water, nutrients, sunlight, and space to live and grow. **Nutrients** help plants grow, just like food helps you grow.

Plants grow where they can survive.

▲ **A rice plant needs a lot of water to survive.**

▲ **A cactus does not need a lot of water to survive.**

FACT A cactus plant can hold enough water inside it to last a whole year.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Have students draw a picture of a place where they have seen plants, such as a garden, a park, or a forest. Beneath the picture, have them complete the sentence *Plants need ____ to live*. *Plants need* water *to live.*

ENRICHMENT Give students a collection of objects that includes rocks, plastic toys, cotton, paper, wood blocks, cork, and paper clips. Have students classify the items into two groups: *Nonliving things that once were living or came from living things* and *Nonliving things that were never living*. Ask: **Which of these things came from plants?** wood blocks, cotton, paper, cork

Plants use water, air, and sunlight to make their own food.

Plants grow and change. They make new plants like themselves.

Sunflowers need a lot of sunlight to live. ▶

Quick Check

2. How are you different from plants?

Possible answer: I eat food, but some plants make their own food.

▶ Address Misconceptions

Students may think that no plant can live for a long time without water. Some cacti, such as the barrel cactus, have large root systems to collect lots of water when it rains and stems that swell up like a sponge to hold the water. The plants use the water they store during dry periods.

▶ Develop Vocabulary

nutrient ***Word Origin*** Write the words *nurse* and *nutrient* on the board. Explain that these words come from the Latin root *nutrire*, meaning "to nourish." Ask: **What does a nurse do?** Tell students that, like a nurse, nutrients help give plants the things they need to stay healthy.

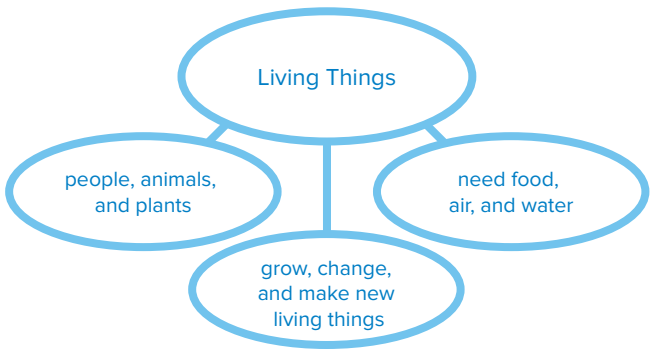
3 Close

Using the KWL Chart

Review with students what they have learned about plants. Revisit the Big Idea question: **What do you know about plants?** Help students add new information to the What We Learned column of the class **KWL** chart.

Using the Reading Skill
Main Idea and Details

Use the reading skill graphic organizer to identify the main idea and details of the lesson.



LESSON 1
Lesson Review

Visual Summary

Write about what you learned.

Living and Nonliving Things

Possible answer: Living things grow and change; they need food, water, and air. Nonliving things do not grow and change; they do not need food, water, or air.

Plant Needs

Possible answer: Plants need air, water, nutrients, sunlight, and a space to live and grow. Plants make their own food and grow where they can get what they need to live.

Formative Assessment

Describe Living Things

Have students write as many words as they know to finish the sentence *When something is living, it* ____. Ask students to decorate their paper with pictures of living things.

Think, Talk, and Write

1 **Vocabulary** Why are nutrients important for plants?

Nutrients help plants grow.

2 **Main Ideas and Details.** Is a car living or nonliving? Why?

Possible answer: Nonliving; cars do not grow, breathe, or make new cars.

Essential Question How are living and nonliving things different?

Possible answers: Living things grow and change. They need food, water, and air to live. Nonliving things do not grow and change. They do not need food, water, or air to live.

Essential Question

Remind students that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Students should demonstrate that they have an understanding of the lesson material.

Art Link

Have students draw a picture with living and nonliving things in it. Ask them to label their picture. Encourage students to write a sentence about their picture using the words *living* and *nonliving*. Have students put their pages together to make a class book.

Stop Here to

Plan Your Lesson

Lesson 2 Parts of Plants

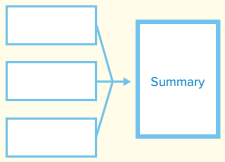
Essential Question

How do plant parts help plants?

Objectives

- Identify plant parts such as leaves, stems, and roots.
- Describe what different parts do for the plant.

Reading Skill Summarize



You will need a summarizing graphic organizer.

FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

1 Introduce
Look and Wonder

2 Teach
Read a Diagram

3 Close
Think, Talk, and Write

Teacher Notes

Lesson 2 Parts of Plants

Objectives

- Identify plant parts such as leaves, stems, and roots.
- Describe what different parts do for the plant.

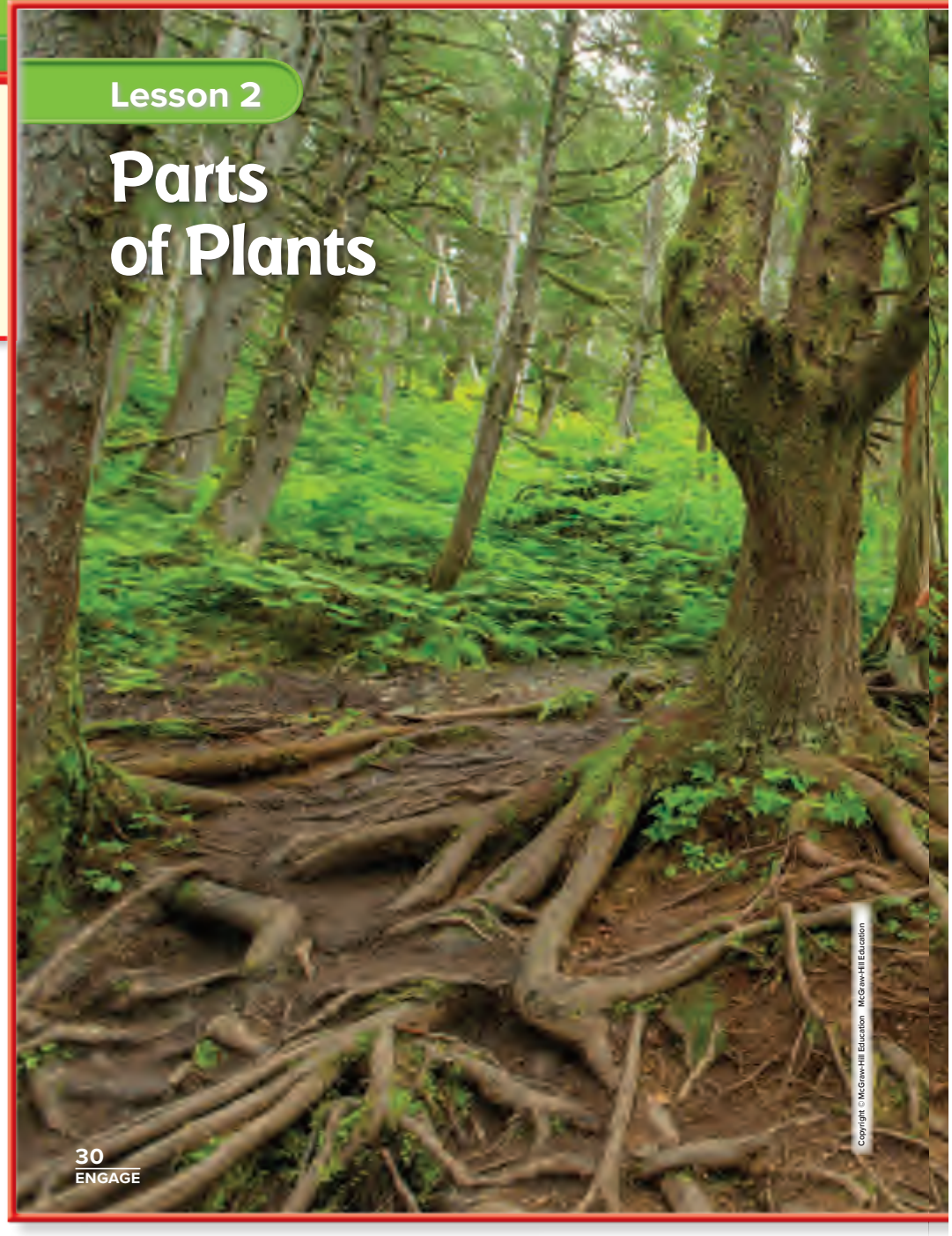
1 Introduce

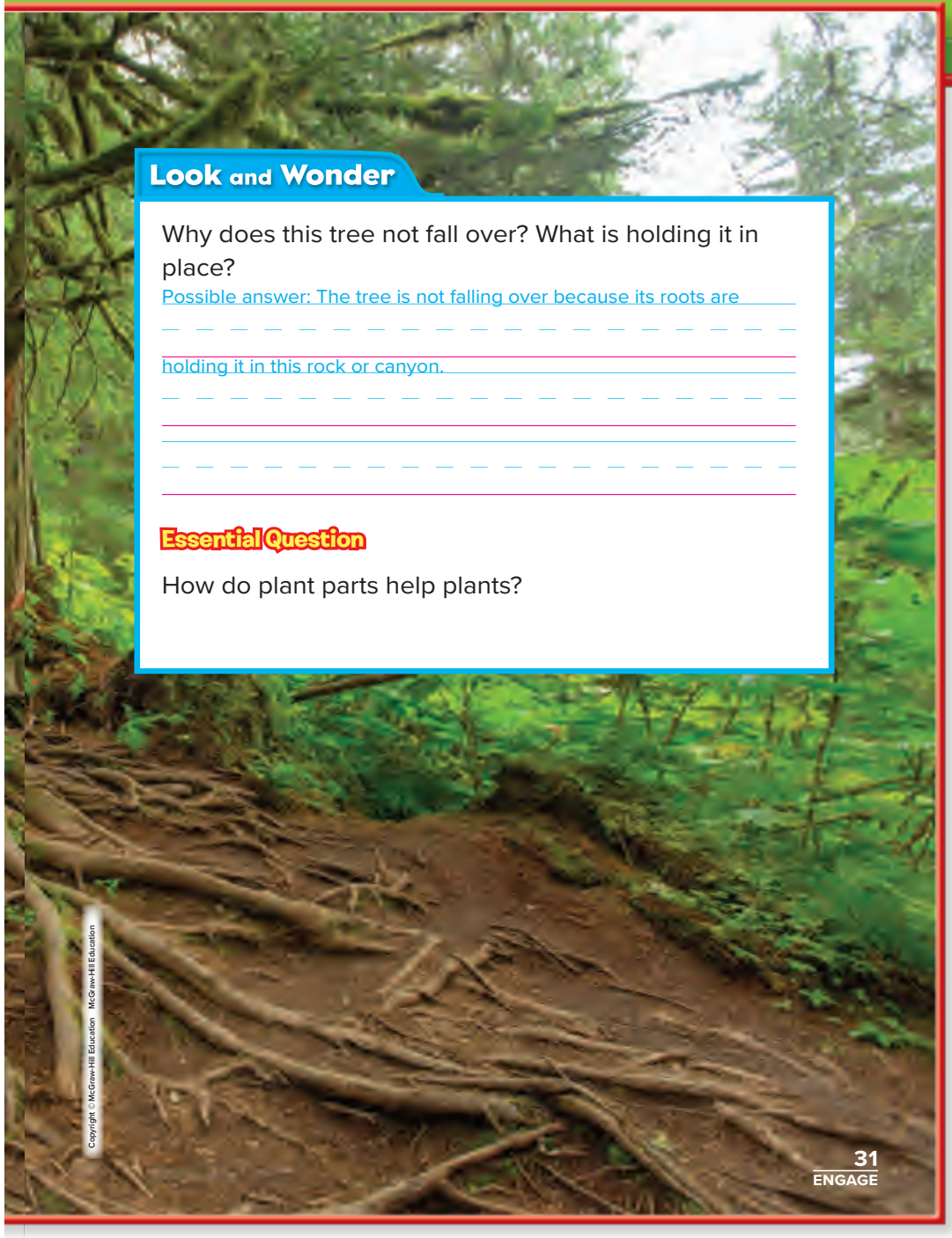
▶ Assess Prior Knowledge

Have students share what they know about the parts of plants. Write the parts they name in a word bank for them to use throughout the lesson. Ask:

- **What parts do plants have?**
- **What do these parts do for the plant?**
- **How do plants make new plants?**
- **Why do plants make flowers?**

Record students' answers in the What We Know column of the class **KWL** chart.





Look and Wonder

Why does this tree not fall over? What is holding it in place?

Possible answer: The tree is not falling over because its roots are holding it in this rock or canyon.

Essential Question

How do plant parts help plants?

Look and Wonder

Read the Look and Wonder statement and questions, and show students Bryce Canyon on a map. Ask:

- **What do you see in the picture that might keep the tree from falling over?**
- **Do you know the name for this part of the tree?**
- **What other parts does this tree have?**

Write students' responses on the board and note any misconceptions they might have.

Essential Question

Have students read the Essential Question. Tell them to think about it as they read through the lesson. Advise students that they will return to this question at the end of the lesson. Possible answer: Plant parts help plants grow.

Explore

small groups or whole class

40 minutes

Plan Ahead Provide one or more small, loosely potted plants for students. **Be Careful!** Avoid using plants that could be poisonous or have thorns or other dangerous parts. Cover desks with plastic tablecloths or newspaper to collect loose soil.

Purpose This activity allows students to observe the whole plant, including roots. Students will sharpen their observational skills by using a hand lens to study the stems, leaves, and roots of a plant.

Structured Inquiry

What to Do?

Remind students that plants are living things and that they will replant them after the activity.

1. Show students how, before pulling, they should gently loosen the soil around the roots of the plants to keep them from breaking.
2. Observe Have students identify the stems, leaves, and roots. Remind them to hold the hand lens at different distances from the plant to help them see the different parts.
3. Communicate Encourage students to include details in their drawings. Ask: **What words would you use to describe the stems, leaves, and roots?**

Explore

What are the parts of a plant?

You need

plant

hand lens

What to Do ?

1. Gently pull a plant from the soil.
2. **Observe.** Use a hand lens to look at the plant's stems, leaves, and roots. Describe what you see.

Possible answers: I see green leaves and a green stem. I see brown roots.

Step 2

Inquiry Activity

3 **Communicate.** Draw a picture of the plant and its parts.

Explore More

4 **Infer.** Why do you think the plant has different parts?

Possible answer: The different parts help the plant get the different things it needs to live.

Open Inquiry

Investigate the parts of other plants.

My question is:

Sample question: How are plant parts different?

Guided Inquiry

Explore More

4 **Infer** Remind students that plants need water, air, sunlight, and space to grow. Ask: **How do the plant's parts help it get these things?** Possible answer: Leaves are flat and above ground to get sunlight. Ask: **How do the roots help the plant?** Possible answer: They hold the plant in the soil.

Open Inquiry

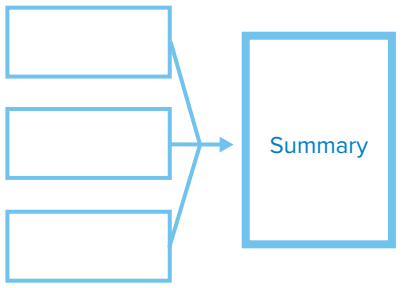
Encourage students to investigate the parts of other plants. Provide them with plants such as carrots, dandelions, and beets. Invite them to observe and compare different plant parts.

Teacher Notes

2 Teach

Read and Respond

Reading Skill **Summarize** Retell the most important ideas from the reading selection.



What are the parts of plants?

▶ Discuss the Main Idea

Main Idea Plants have leaves, stems, and roots to help them get what they need.

Before reading, ask:

- **What would happen if you were rooted in the ground like a plant?** Possible answer: I couldn't move to get what I need.

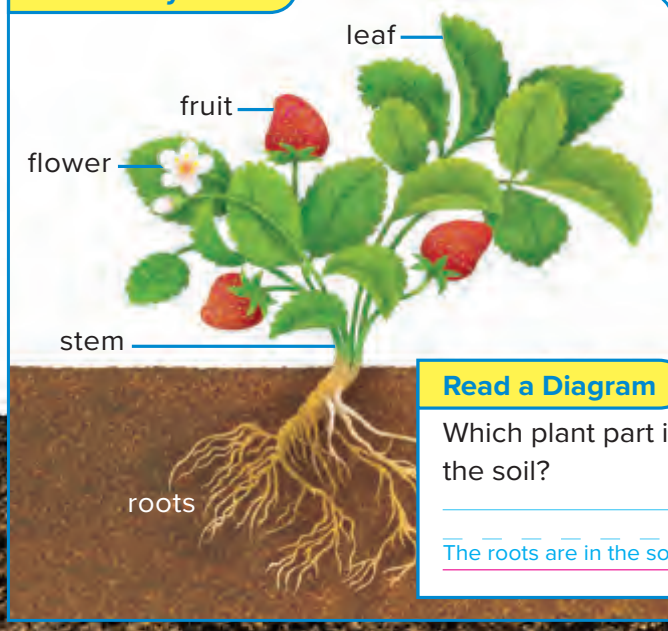
After reading, discuss how plant parts help the plant get the things it needs.

Read and Respond

What are the parts of plants?

Plants cannot walk around like you. They have to get everything they need from the space around them.

Strawberry Plant



Read a Diagram

Which plant part is in the soil?

The roots are in the soil.

Classroom Equity

Some students are less likely to participate in classroom discussions than others. Foster participation from all students by having each child write their name on an index card at the beginning of the year. Shuffle the cards and place them on a desk. When asking a science question, randomly pull a card from the deck. Don't replace the cards until all students have answered a question about science.

LA Support

Use a Diagram Show students a diagram of a plant. As a class, label the plant parts on the diagram. Tell students that the parts of different plants can look very different from one another. Show students pictures of leaves, stems, and roots. Have them identify the plant part in each picture.

BEGINNING Have students point to the plant parts on the diagram.

INTERMEDIATE Ask students to use names and short phrases to describe plant parts.

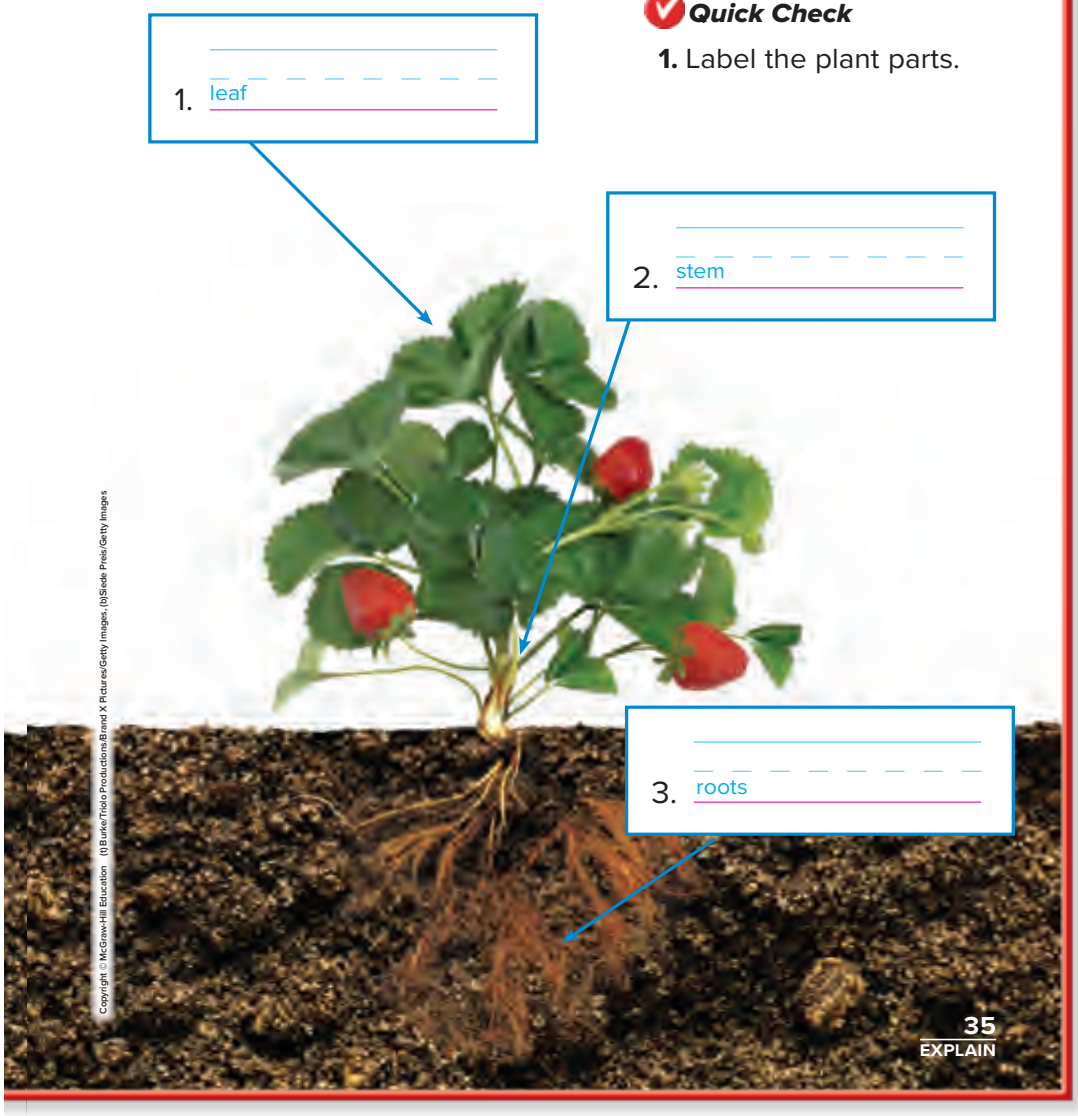
ADVANCED Have students compare and describe two pictures of the same plant part.

Plants have parts to help them get what they need. Most plants have leaves, stems, and roots.

These parts can look different on different kinds of plants.

Quick Check

1. Label the plant parts.



Read a Diagram

Have students look at the diagram on the student page. Ask:

- **What are the parts of the plant?** leaves, stems, roots, flowers, fruit
- **What might these parts do?**

▶ Address Misconceptions

Plants are rooted in the ground and do not walk around as animals do. This does not mean, however, that they don't move at all. Flowers open and close at different times of the day. Some plants, like the Venus Flytrap, close their leaves around prey. Sunflowers turn to follow the Sun during the day.

▶ Develop Vocabulary

Review chapter vocabulary words *living* and *nonliving* with students. While reading together, ask students to listen for reasons why plants are living things.

Differentiated Instruction

Leveled Questions

EXTRA SUPPORT Ask questions such as these to check students' understanding of the material.

- **What do the leaves of a strawberry plant look like?** Possible answers: green, flat, oval
- **Where are the roots of a plant?** at the bottom; in the ground

ENRICHMENT Use these types of questions to develop students' higher-order thinking skills.

- **In what ways do plants move?** Possible answers: They grow; they turn toward the Sun.
- **Why might the same plant parts look different on different kinds of plants?** Possible answer: Plants live in different places and have different needs.

▶ Develop Vocabulary

leaves ***Scientific vs. Common Use*** The plural form of *leaf* is *leaves*, which looks like the common verb that means "to go." Stress the difference between *leaves* as a thing and *leaves* as an action.

stem Explain to students that the stem of a plant can be fat or thin, depending on the type of plant. Show students a variety of plant pictures, and have them identify the stems of each plant.

root ***Scientific vs. Common Use*** The phrase *putting down roots* is commonly used to mean "settling into a new place." Discuss with students how this is similar to a plant establishing itself with real roots.

What do plant parts do?

▶ Discuss the Main Idea

Main Idea Plant parts get food, water, and nutrients for the plant.

After reading the student pages together, ask:

- **What do leaves, stems, and roots do?** Possible answers: Leaves make food; roots get water and hold the plant in the ground; stems carry water and food through the plant.

▶ Use the Visuals

Have students observe the leaves, stems, and roots on the student pages. Ask:

- **How are the parts of plants alike and different?** Possible answer: Plant parts have different shapes, colors, and sizes, but all parts help the plant survive.

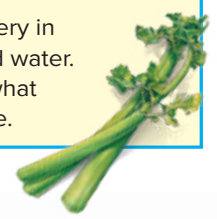
What do plant parts do?

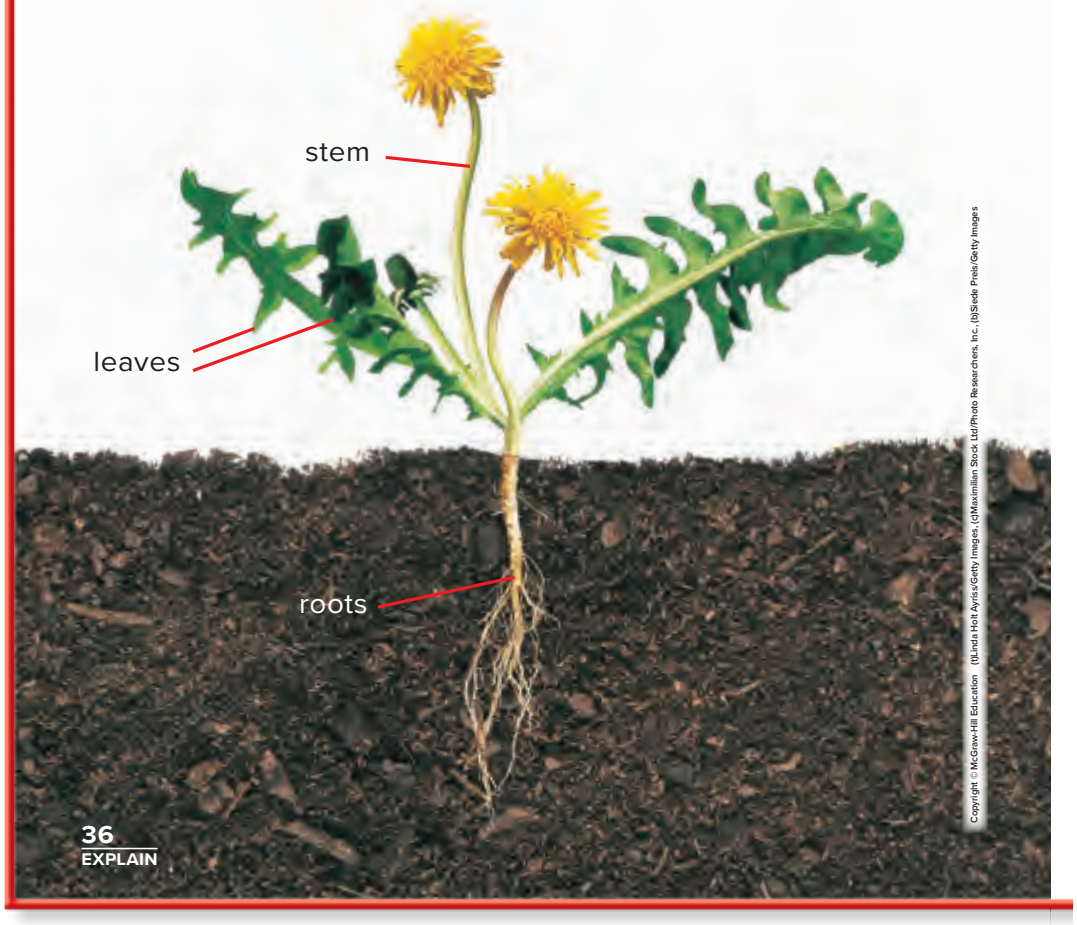
Leaves use sunlight and air to make food. Food and water move through the **stem** to other plant parts.

The stem holds up the plant. **Roots** keep the plant in the ground and take in water and nutrients from the soil.

Quick Lab

Put celery in colored water. Draw what you see.





Quick Lab

small groups 15 minutes

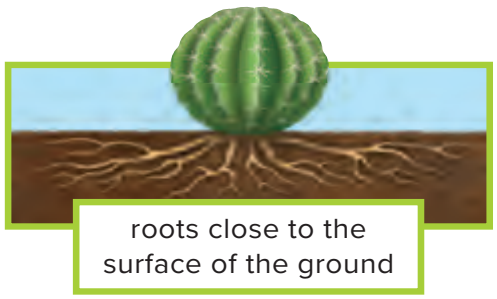
Objective Observe the structure and function of stems.

You need celery stalks, plastic cup, water, food coloring

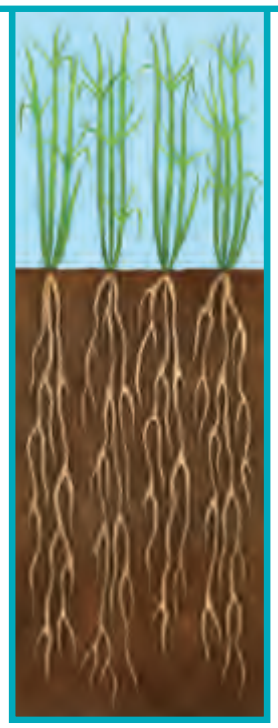
1. Have students observe the celery stalk. Ask: **What parts of the plant do you see?** stem, leaves
2. Cut the stalk and have students look at the end. Ask them to communicate by drawing what they see.
3. Place the stalk in colored water. Ask: **What will happen to the celery stalk?** Have students observe changes the next day.
4. Have students use their observations to infer the function of stems.

Plants have roots that take in water and nutrients from the soil.

Some plants have roots close to the surface of the ground. Others have long and deep roots.



roots close to the surface of the ground



long and deep roots

Quick Check

2. Why are roots important?

Possible answers: Roots keep the plant in the ground; roots take in water and nutrients from the soil.

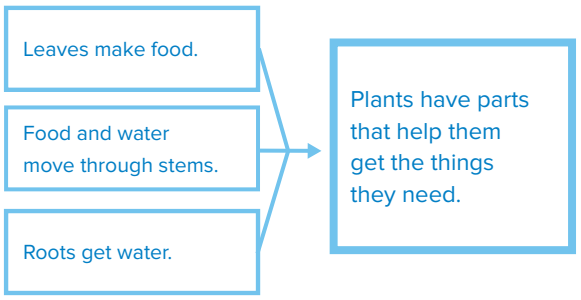
3 Close

Using the KWL Chart

Review with students what they have learned about the parts of plants. Revisit the Big Idea question: **What do you know about plants?** Record students' responses in the What We Learned column of the class **KWL** chart.

Using the Reading Skill
Summarize

Use the reading skill graphic organizer to summarize the lesson.



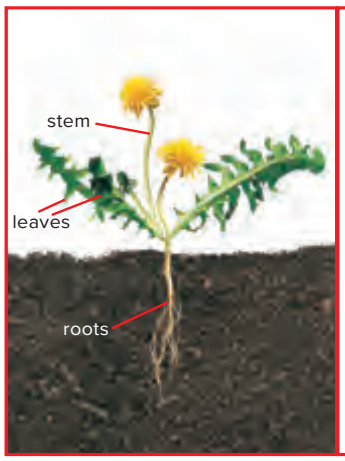
LESSON 2
Lesson Review

Visual Summary

Write about what you learned.

Plant Needs

Possible answer: Plants need water, air, and light to make their own food. Nutrients also help plants grow. Plants live in an environment where they can get what they need.



Plant Parts

Possible answer: Plants have parts that help them get what they need. Leaves make food for the plant. Food and water move through the stem. Roots take in water and nutrients from the soil.

Formative Assessment

Draw a Plant

Have students draw a plant and label its parts. Have them explain verbally, pictorially, or in writing what the parts do and how they work together to help the plant get the things it needs.

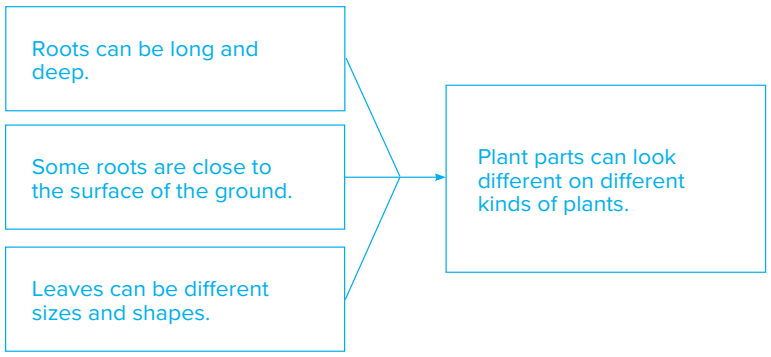
LESSON 2
Lesson Review

Think, Talk, and Write

1 Vocabulary What are roots?

Roots keep the plant in the ground.

2 Summarize. Describe plant parts.



Essential Question How do plant parts help plants to survive?

Possible answers: Leaves make food for the plant; water and food move through stems; roots take in water and nutrients from the soil and keep the plant in the ground.

Essential Question

Remind students that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Students should demonstrate that they have an understanding of the lesson material.

Math Link

If possible, take students outside to measure two different plants. Provide measuring tape and, if necessary, help students measure the stems.

Create a class chart titled *Stem Length*, and encourage students to record the name of their plant and its measurements on the chart.

Writing in Science

Objective

- Write a description of a plant.

The World's Tallest Tree

Talk About It

Tell students that the world's tallest tree is named General Sherman. Explain that a *general* is an important person in the army that leads many other people and makes important decisions. Ask:

- **What does the name General Sherman tell you about this tree?** Possible answer: that General Sherman is an important tree
- **How can you tell General Sherman is tall?** It is much bigger than the person standing in front of it.

Learn About It

Read the text on the page. Have students think about how much taller and bigger General Sherman is than other trees they have seen.

Read the Remember box. Remind students that to describe a picture, they should focus on their sense of sight. Have students share words that describe General Sherman. Make a list of their responses on the board.

Ask students what they might hear, smell, and feel if they were standing in front of General Sherman. Add their responses to the board.

Writing in Science

The World's Tallest Tree

A sequoia tree in the United States is said to be the tallest tree in the world.

It is 84 meters tall. That is as tall as a building with 27 floors!

Extended Reading

Visit the Library

Read aloud a story about trees. Discuss why the tree is important to all of the animals in it.

After reading, have students use descriptive words to tell about the animals they might find in the trees around school or home. Encourage them to write their own story or poem about a tree and the animals in it.

Write About It

Write about a tall plant that you have seen. Draw it and label its parts.

Remember
Use words that describe the plant.

Answers will vary.

Write About It

Have students select a tall plant, and invite them to write two sentences about it. Encourage students to include words from the board in their sentences. Ask them to draw a picture of the plant and label its parts.

Stop Here to

Plan Your Lesson

Lesson 3 Different Plants

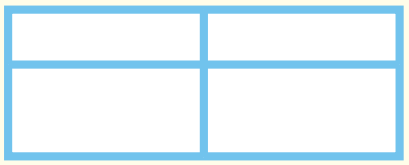
Essential Question

How are plant parts different?

Objectives

- Classify and compare different plants.
- Identify some edible plant parts.

Reading Skill Classify



You will need a classify graphic organizer.

FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

1 Introduce
Look and Wonder

2 Teach
Discuss the Main Idea

3 Close
Think, Talk, and Write

Teacher Notes

Lesson 3 Different Plants

Objectives

- Classify and compare different plants.
- Identify some edible plant parts.

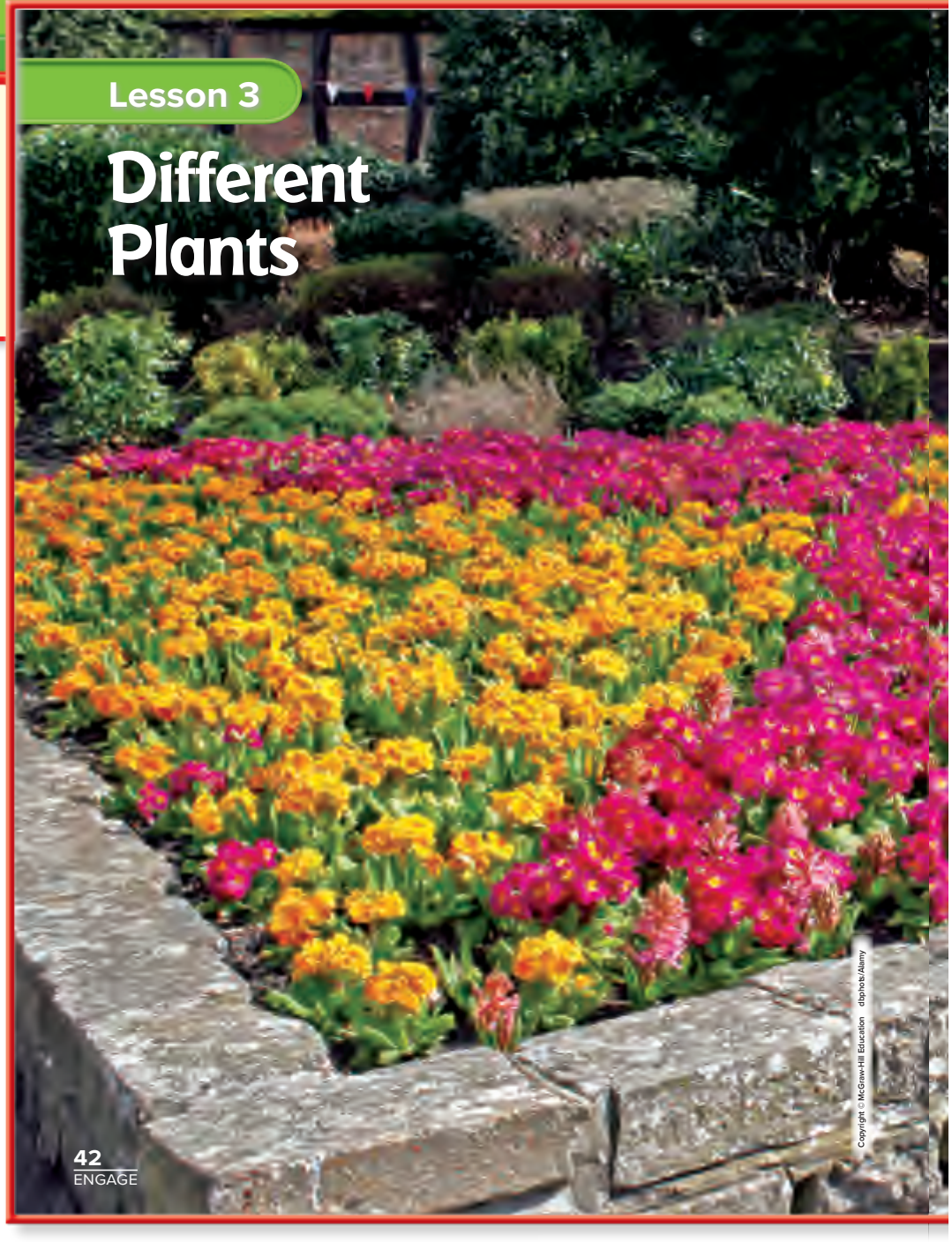
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about how plants are different. Ask:

- **How are trees different from other plants?**
- **What plants can you eat?**

Record students' answers in the What We Know column of the class **KWL** chart.



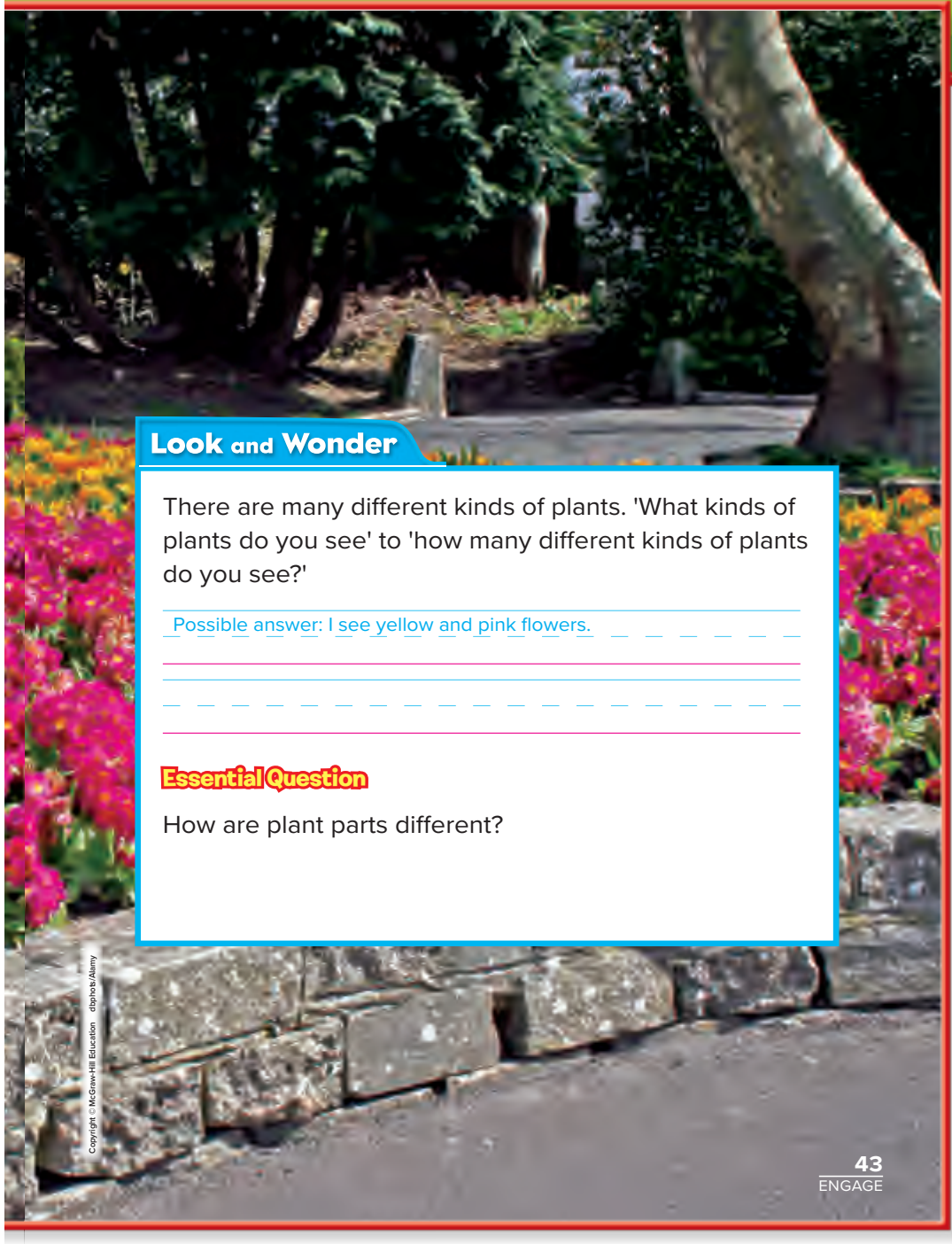
Warm Up

Start with a Book

Before reading a book about plants, show students the cover of the book and flip through its pages. Invite students to share their predictions about the book.

After reading this book, help students discuss how trees and people are alike and different.

Ask students to draw a picture of a tree and label the parts. Have them share their drawings with a partner.



Look and Wonder

Read the Look and Wonder statement and question about plants. Ask:

- **What colors do you see?** Possible answers: green, yellow, purple, pink
- **What parts of plants do you see?** Possible answers: flowers, leaves, stems
- **How might plants in a desert look different?** Possible answer: They might have sharp needles.

Write students' responses on the board and note any misconceptions they might have.

Essential Question

Have students read the Essential Question. Tell them to think about it as they read through the lesson. Advise students that they will return to this question at the end of the lesson. Possible answer: Some plants have flowers with different colors. Other plants only have green leaves.

Explore

individual or pairs

40 minutes

Plan Ahead Be Careful! Look for any poisonous plants or other dangers that students should avoid. If necessary, obtain permission to take students outdoors and arrange for adult chaperones.

Purpose This activity will sharpen students' observational skills and help them learn more about plants in their area.

Structured Inquiry

What to Do

Before going outside, explain safety rules and boundaries. Tell students they will be observing the plants around the school. Ask: **How do you know that something is a plant?**

1. **Observe** Encourage students to look closely at the plants they find. Help them think of specific questions to ask, such as **What is the shape of the leaves? How do they feel? Are there any flowers or fruit?** Remind students to keep track of how many different kinds of plants they find.

2. Record Data Encourage students to label their drawings. Ask: **How many leaves does each plant have? What is the name of each plant?**

Explore

How are plants different?

You need

paper

crayons

What to Do ?

1. **Observe.** Find some plants around your school. How many different plants can you find?

2. **Record Data.** Draw two different plants that you find.

Step 2

Inquiry Activity

3 **Compare.** How are the plants alike? How are they different?

Students' answers may vary depending on the types of plants they find.

Students may list color, flowers, and other parts that make them different.

Explore More

4 **Communicate.** How could you find out more about the plants you saw?

Possible answer: I can read books about plants or visit a garden center.

Open Inquiry

What other questions do you have about plants?
My question:

Sample Question: Why do some plants grow back each year and others do not?

3 **Compare** Have students identify the plant parts they know. Encourage them to write a sentence about how the plants are alike and different.

Guided Inquiry

Explore More

4 **Communicate** Encourage students to research one or more of the plants they saw. Provide age-appropriate plant identification books and Internet resources to help students learn more about plants. Invite them to share what they learn with a partner.

Open Inquiry

Have students think about what else they might want to know about plants. Refer to the class **KWL** chart for possible questions to explore. Work with students to find answers to some of their questions.

Teacher Notes

2 Teach

Read and Respond

Reading Skill Classify Put things that are alike into groups.

How do plants look different?

▶ Discuss the Main Idea

Main Idea There are many different types of plants and plant parts.

Discuss how plants are different. Ask:

- **What makes trees different from other plants you know?** Possible answers: They have one thick stem called a trunk; they can grow much taller than other plants.
- **What different colors can plants be?** Possible answers: Leaves can be green, purple, red, or white; trunks can be brown, gray, or white; flowers can be all different colors.

Read and Respond

How do plants look different?

Not all plants look the same. Some plants have colorful flowers. Other plants are only green.

Different plants can have different types of leaves.

lily of the valley

Quick Check

1. How are these plants alike? How are they different?

All of the plants have green parts. The flowers are different colors, and the leaves are different shapes.

morning glory

gerbera daisy

Science Background

Plant Classification Plants are grouped into simple plants and seed-bearing plants. Seed-bearing plants are categorized into those with naked seeds, such as conifers and evergreens, and those that flower and produce fruit with seeds. Plants within these groups are classified by attributes such as the number of stems, arrangement of leaves, and leaf shape.

LA Support

Create a Graphic Organizer Draw Graphic Organizer 11 on the board. Show different categories of plants, such as *tall, short, and flowering* or *trees, bushes, and grasses*. Use magazine clippings to show students examples of each category. Encourage students to find pictures of plants and add them to the graphic organizer. Discuss how the categories are alike and different.

BEGINNING Have students choose a picture and place it in a category.

INTERMEDIATE Ask students to use words and phrases to describe each category.

ADVANCED Have students discuss plants that were difficult to group.

Stems can be thin or thick. The thick stem of a tree is called a **trunk**.

Some plants are tall. Other plants, like grass, spread out along the ground.

Tall Trees

Consider the picture

How are these trees different from the grass?

Possible answer: The trees are taller than the grass. The grass is spread out along the ground.

Read a Photo

Use the photo to discuss how plants can look very different from each other. Ask:

- **Which of these plants are tall?** trees
- **Which plants are short?** grass, bushes

Develop Vocabulary

trunk ***Scientific vs. Common Use*** Ask students to describe what *trunks* are. They may know that the word *trunk* means the back part of a car or the nose of an elephant. Write the sentence frame: *A trunk is the ____ of a ____.* Explain that the word *trunk* is also used to describe the thick stem of a tree. Have volunteers fill in the sentence frame using both the scientific and common uses of *trunk*.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Show students pictures of a tree and a flower. Help them identify each plant's stem. Explain that the tree's stem is thicker and harder than the flower's stem. Both carry food and water up and down the plant. Have them draw their own pictures of a flower and a tree and label the stem and the trunk.

ENRICHMENT Have students observe the trunks of different trees. If possible, take students outside and show them how to make bark rubbings by covering the bark with paper and rubbing the paper gently with a crayon or pencil. Have them draw and write about the trees. Have students use their work to make a tree identification book.

Which plant parts can you eat?

▶ Discuss the Main Idea

Main Idea Some plants have edible parts.

After reading together, discuss the importance of plants as a food source. Ask:

- **Which parts of plants can people eat?** Possible answers: seeds, trunks, leaves, roots

Explain that some plant parts are healthy food for people, but other plant parts are very dangerous and should never be eaten. Ask:

- **How can you find out if a plant part is safe to eat?** Possible answers: I can ask an adult; I can do research.

▶ Use the Visuals

Look at the photos on the student pages and read the captions together. Ask:

- **Which of these plant parts have you eaten?**
- **What are your favorite plant parts to eat?**

Which plant parts can you eat?

You can eat different plant parts. Some plant parts are safe to eat.

Others are not. Eating parts of some plants can make you sick.

Quick Lab

Find out which plant parts your classmates ate today.

▲ **When you eat a coconut, you eat the seed of a plant.**

▲ **When you eat cinnamon, you eat a part of a tree trunk.**

Quick Lab

whole class 15 minutes

Objective Identify commonly eaten plant parts.

You need paper, crayons, pencils

1. Have small groups make a list of plant parts they ate today. Have groups share their data by writing it on the board.
2. Model how to make a bar graph to communicate the class data.
3. Ask: **Which plant part was the most common food? Which was the least common?** Encourage students to write a sentence describing the results.

Quick Check

2. How do these plant parts look different?

Possible answer: They are different colors and shapes.

When you eat lettuce, you eat the leaves of a plant. ▲

When you eat a carrot, you eat the root of a plant. ▼

Develop Vocabulary

Review lesson vocabulary with a word study activity. Provide students with a variety of plant pictures including trees, flowers, and grasses. Write *trunk* on the board and encourage volunteers to hold up pictures of plants that have trunks.

Explore the Main Idea

ACTIVITY Show students pictures of other plants that have edible parts, such as asparagus, cauliflower, beet and corn plants, and apple and walnut trees. Have students guess which parts are edible.

3 Close

Using the KWL Chart

Review with students what they learned about the ways plants are different. Revisit the Big Idea question: **What do you know about plants?** Record students' responses in the What We Learned column of the class **KWL** chart.

Using the Reading Skill
Classify

Use the reading skill graphic organizer to identify plant categories.

Trees	Plants We Can Eat
tall plants trunks	carrots (roots) broccoli (flowers) lettuce (leaves)

LESSON 3
Lesson Review

Visual Summary

Write about what you learned.

Plant Differences

Possible answer: Different plants can have different types of leaves. Some have colorful flowers, and others are only green. Plants come in different sizes.

Plants You Can Eat

Possible answer: Some plants and plant parts are safe to eat. Some roots, leaves, seeds, and trunk parts can be eaten. Cinnamon is part of a tree trunk. Lettuce leaves are part of a plant that we can eat.

Formative Assessment

Classify Plants

Have students classify pictures of different plants into two groups. Ask them to show, either verbally or in writing, how they chose their groups. Encourage students to compare how the groups are alike and different.

LESSON 3
Lesson Review

Think, Talk, and Write

1 **Vocabulary** What is a trunk?

The thick part of a tree is called a trunk.

2 **Classify.** Describe parts of a tree.

Possible answer: Some trees are tall. Trees have a thick stem called a trunk.

Essential Question How are plant parts different?

Possible answer: Plant parts can be different shapes, sizes, and colors. Different plant parts have different jobs to help the plant survive.

Essential Question

Remind students that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Students should demonstrate that they have an understanding of the lesson material.

Art Link

Encourage students to collect leaves and bring them to the classroom. Press the leaves under a heavy object for several days before using them.

Help students think about whether they want to create a pattern or a random design with the leaves they choose for their collage.

Reading in Science

Objective

- Identify the main idea in an article about date palm trees.

Date Palm Trees

Genre: Nonfiction Stories or books about real people and events.

Direct students' attention to the picture and have them read the title aloud. Ask:

- **What kind of plant do you think you will learn about?**
- **What does a date tree look like?**

Before Reading

Ask students to describe the plants that grow near their homes. Ask:

- **What do plants need to grow?** Possible answers: water, air, sunlight, space, soil

Have students describe the date palm trees in the photographs. Ask:

- **Which part of the plant do you think a date is?**

Write students' responses on the board.

During Reading

As students read, have them look for details that tell what date palm trees need to grow. Ask:

- **What special needs do date palm trees have?** Possible answers: lots of sunlight; warm air; sandy soil; lots of water

Real World Reading in Science

Date Palm Trees

The date palm tree needs warmth, sun, daytime, and nighttime coolness. It needs water and grows better when in sandy soil. The UAE has everything the palm tree needs to grow from sandy soil and sunny weather throughout the year, so people grow palm trees in the country more than other trees. The date palm tree provides people in the United Arab Emirates with many benefits such as: dates, fiber and frond, which is used in many industries, including houses of Arish, baskets, carpets and others.

Date palm leaves are also rich in cellulose, whose crystals are characterized by distinctive chemical and mechanical properties that make them suitable for use in several applications, the most important of which are plastics.

Two students, Nour Al Hossani and Aya Al Masri, from the Petroleum Institute, worked on the project "Extraction of Plastic from Palm Dates", which took them to the first place in the second round of the "Thinking Science" competition in August 2014.

52
EXTEND

LA Support

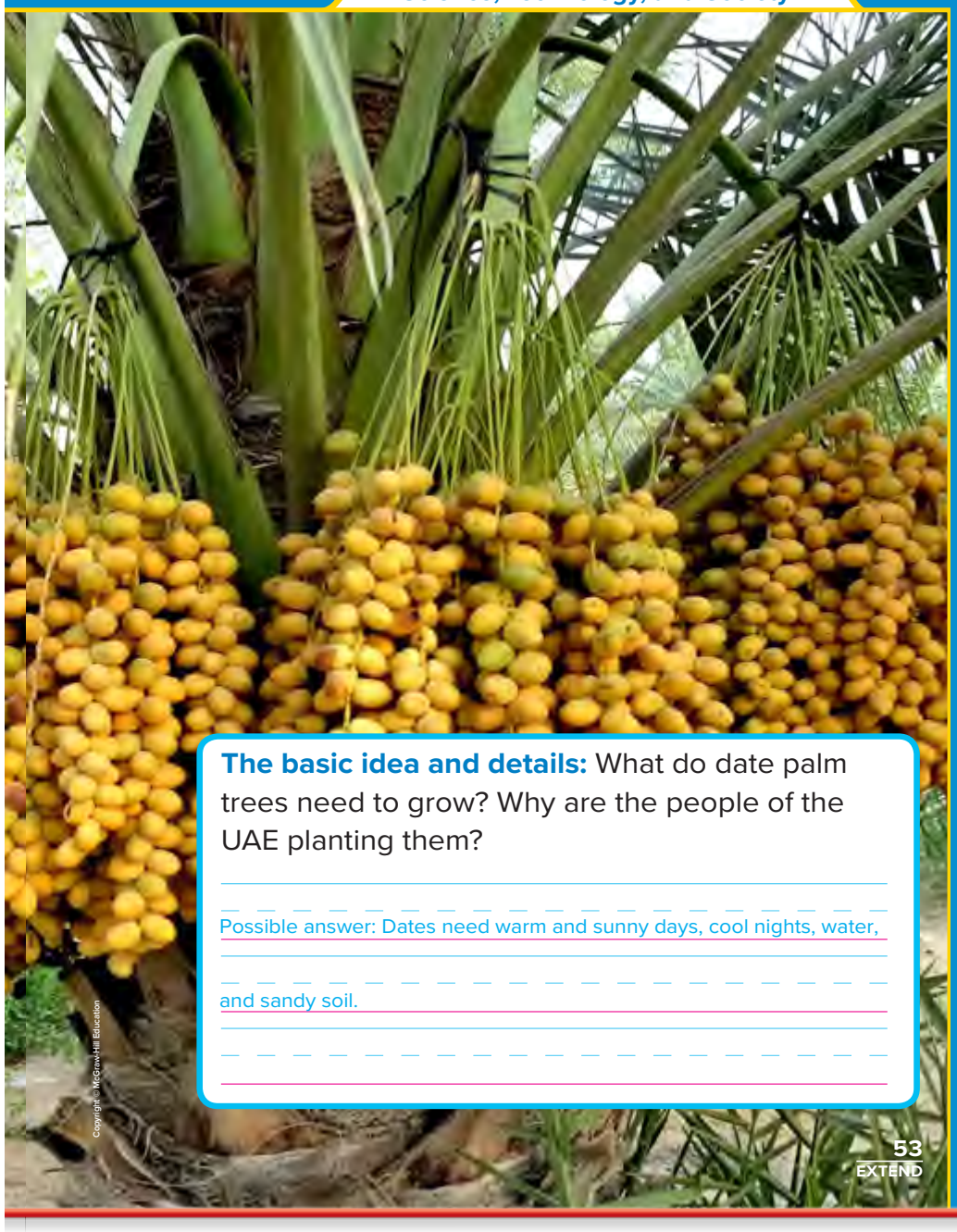
Ask Questions Have students read the student page with a partner and find three things that dates need to grow. Ask comprehension questions such as *Can dates grow in cold weather? What kind of weather does the United Arab Emirates have?* Let students find answers in the text.

BEGINNING Students can make a simple, labeled drawing of one thing date palm trees need to grow.

INTERMEDIATE Students can use short phrases to explain what date palm trees need.

ADVANCED Students can use sentences to describe why more date palm trees are planted in the United Arab Emirates than in other countries.

Science, Technology, and Society



The basic idea and details: What do date palm trees need to grow? Why are the people of the UAE planting them?

Possible answer: Dates need warm and sunny days, cool nights, water, and sandy soil.

Address Misconceptions

Students may think that the foods they eat are made at the grocery store or are all produced locally. Explain to students that the fruits and vegetables they eat must be grown on a farm, and some of them might come from far away. Since many fruits, like dates, require very specific environments in order to grow, not all foods can be grown In each region Encourage students to investigate produce labels at home or in grocery stores and report to the class the many places in which their food was produced.

After Reading

Tell students that thinking about and talking about an article they've read will help them understand the information better.

Call on volunteers to tell about the ideas in the article. Write their responses on the board.

Invite students to look back through the article with a partner. Have one child describe the ideas in the article. Then have partners change places.

Draw a main idea and details graphic organizer on the board or on chart paper. As a class, organize the ideas to show the main idea—that plants need specific conditions to thrive—and details of the article.

Encourage students to think about why date palm trees grow well in the United Arab Emirates. Ask:

- **What does the UAE have that makes it a good place for date palm trees to grow?**

If students have difficulty understanding why date palm trees grow well in the UAE but not in other places, remind them that although plants need many of the same things to grow, they need different amounts of those things. Ask:

- **Why would date trees not grow in a cold place?** Possible answer: They need warm days.

CHAPTER 2 Review

▶ Use the KWL Chart

Review the **KWL** chart that the class made at the beginning of the chapter. Help students compare what they know about plants now with what they knew then. Add any additional information to the What We Learned column of the **KWL** chart.

CHAPTER 2 Review

Vocabulary

Use each word once to complete the sentences.

leaves
nutrients
roots
stems

1. These are both leaves.

2. These are both stems.

3. Plants have roots that take in water from the soil.

4. Plants get nutrients from the soil.

Science Skills and Ideas

Answer the questions below.

5. Describe something that is living.

Answers will vary.

6. Describe something that is nonliving.

Answers will vary.

7. **Observe.** How are these plants getting what they need to live?

These plants are outside and can get sunlight and water from rain. They get nutrients from soil.

Science Skills and Ideas

5. Students should describe a living thing.
6. Students should describe a nonliving thing.

CHAPTER 2 Review

10. Students should address concepts taught in each lesson: describing plants as living things; identifying parts of plants; comparing different plants.

CHAPTER 2 Review

8. **Main Idea and Details.** Name the parts of plants and what they do.

Roots help plants get water and nutrients. Leaves absorb sunlight. Stems carry water and nutrients to the leaves.

9. Write about the plant parts that you ate today.

Possible answers: Accept all foods derived from plants.

10. What do you know about plants?

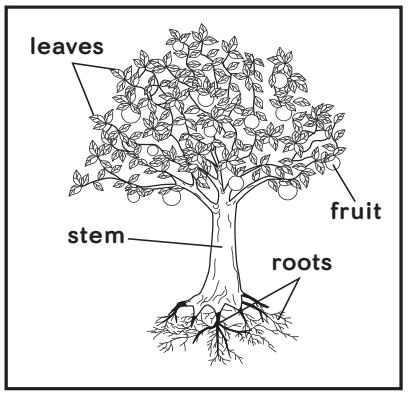
Accept all reasonable responses.

Training for testing

1. Which picture does not show a living thing?

A butterfly
B truck
C mouse
D plant

2. Look at this picture.



Which part of a plant holds it up?

A fruit
B roots
C stem
D leaves

Depth of Knowledge

Level 1 Recall Level 1 requires memory of a fact, a definition, or a procedure. At this level, there is only one correct answer.

Level 2 Skill/Concept Level 2 requires an explanation or the ability to apply a skill. At this level, the answer reflects a deep understanding of the topic.

Level 3 Strategic Reasoning Level 3 requires the use of reasoning and analysis, including the use of evidence or supporting information. At this level, there may be more than one correct answer.

Level 4 Extended Reasoning Level 4 requires the completion of multiple steps and requires synthesis of information from multiple sources or disciplines. At this level, the answer demonstrates careful planning and complex reasoning.

Training for testing

1. Butterflies, mice, and plants are living things. Trucks are nonliving things.
2. The stem holds the plant up. Fruit protects the seeds. Roots keep the plant in the ground. Leaves make food for the plant.