UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

YEAR OF
ZAYED

TEACHER EDITION

SCIENCE
2018 - 2019

McGraw-Hill Education

Integrated Science

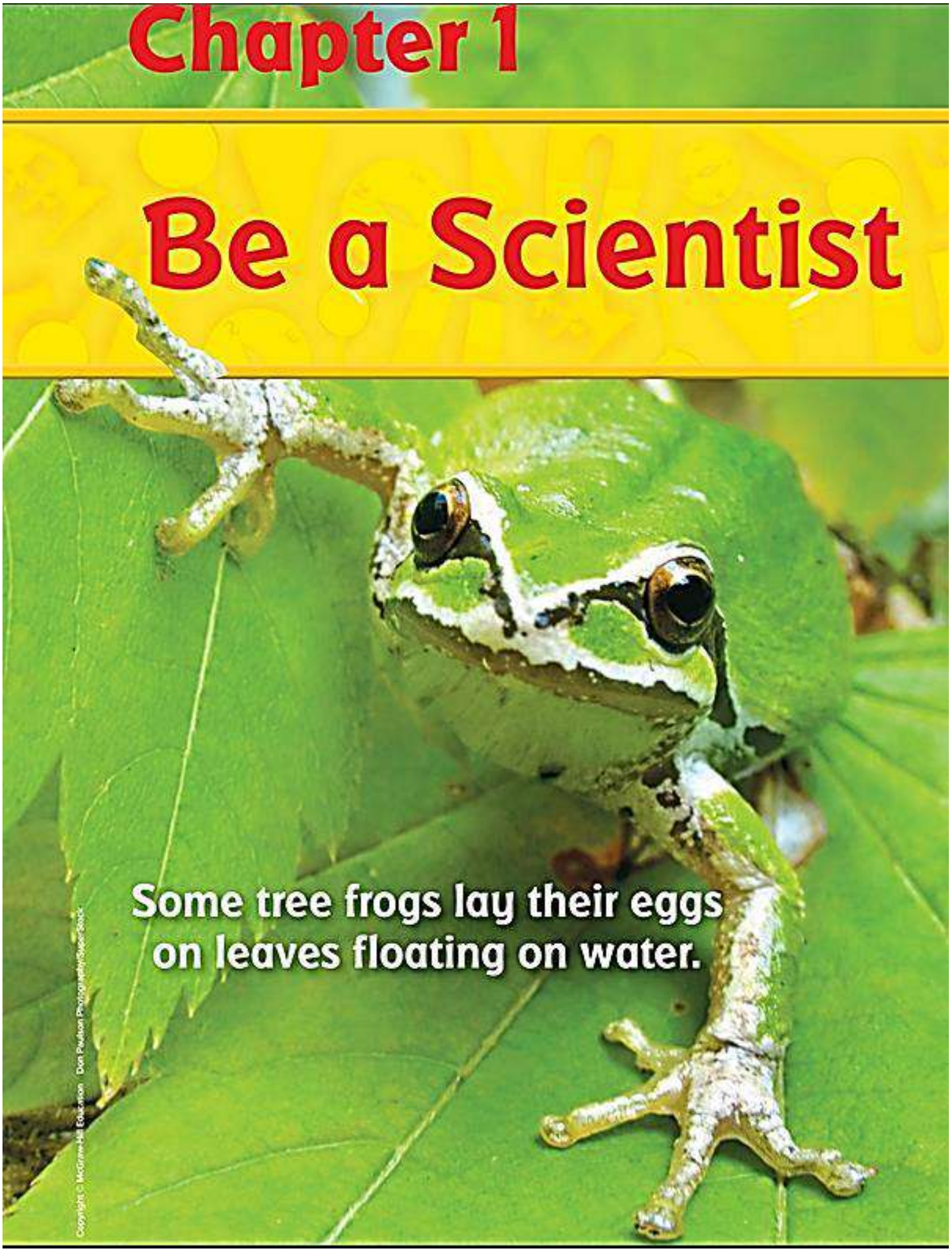
United Arab Emirates Edition

2

Mc
Graw
Hill
Education

Chapter 1

Be a Scientist



Some tree frogs lay their eggs on leaves floating on water.

Science Skills

Objective

- Identify skills scientists use to investigate questions.
- Explain how science skills are used to learn about pond animals.

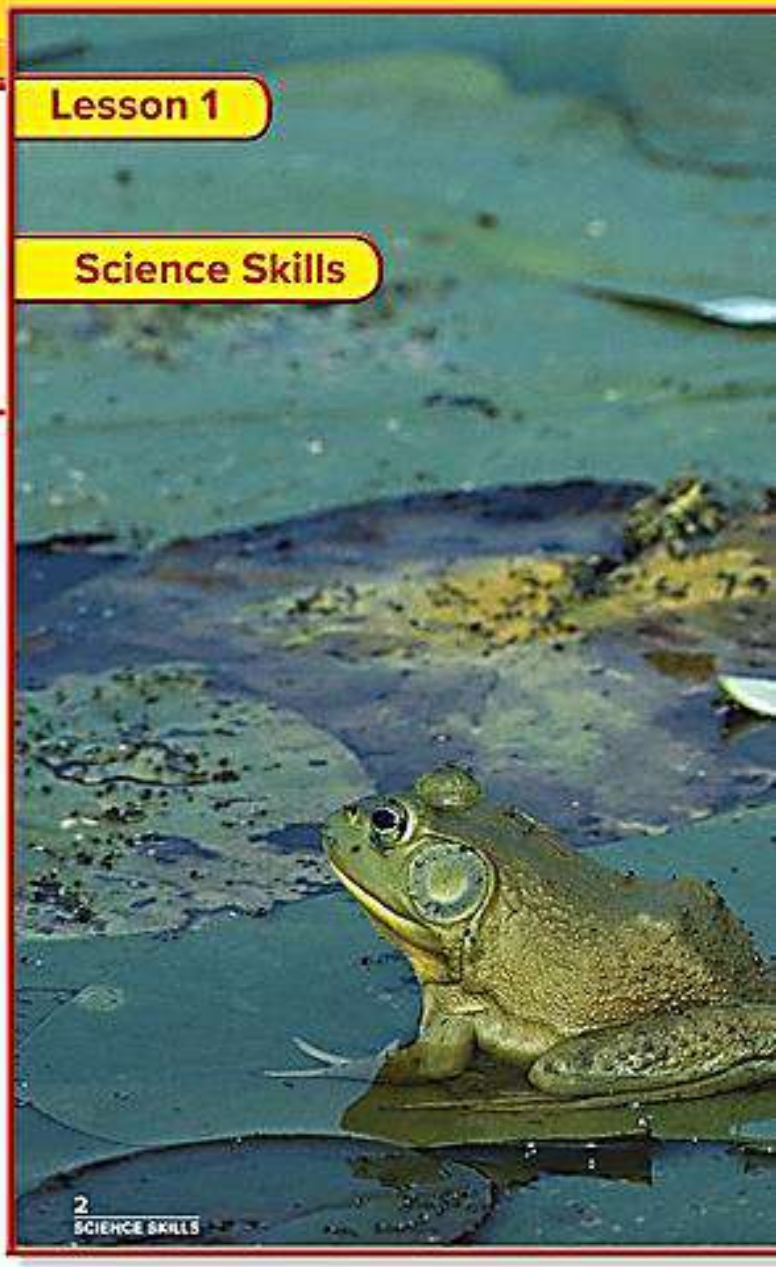
1 Introduce

▶ Assess Prior Knowledge

Create a KWL chart with students to determine what they already know about scientists and what they want to know. Ask:

- What do scientists do?
- How do scientists work?
- How do scientists learn?

Record students' answers in the What We Know column of the class KWL chart and note any misconceptions that they may have.



Warm Up

Start with a Discussion

Open the discussion by explaining to students that doctors, nurses, veterinarians, and astronomers all study science. Ask:

- **What kind of things might a doctor have to study?**
  Possible answers: how blood flows through the body; what makes people cough; how bones are connected to muscles
- **What kind of science does an astronomer study?**
  Possible answers: the planets and stars

Have students draw a picture of a scientist at work. Encourage students to write a caption for their drawings. Have students share their work with classmates.

Look and Wonder

Before You Read

Do you see the frog? How does it stay on the lily pad?

Possible answer: A frog is lighter than a lily pad, so the lily pad doesn't sink.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder questions with students.

Invite students to share their responses about the frog on the lily pad. Ask:

- **How would a scientist investigate how a frog stays on a lily pad?**

Write students' responses on the class KWL chart.

Explore

pairs 20 minutes

Plan Ahead Fill the pans with water and cut 15 centimeter strings for all of the pairs beforehand. Students may need to take turns using the toy frog.

Purpose Support students' understanding about how scientists use models to investigate questions.

Structured Inquiry

What to Do

Ask students whether they have seen lily pads, and, if so, to describe them. Ask: **How does a lily pad stay in its place in the water?** It is rooted in the soil.

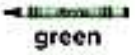
1. **Predict** Encourage students to discuss the different locations to place the frog with their partner. Ask the students how they decided where to place the frog.
2. **Make a Model** Ask students to color the plates completely. Have them look closely at the picture of lily pads in their books and describe how their plates are similar to and different from the pictured lily pads.
3. Show students how to poke a hole at the edge of the paper plate with a pencil point. **Be Careful!** The pencil will be sharp. Have students make a knot at the end of the string and then pull the string through the plate hole. The knot should be at the top of the plate so the string falls below the plate to simulate roots hanging down. Students may need assistance doing this part of the activity.

Explore

How can a frog float on a lily pad?

You need


paper plate


green crayon


scissors


string


pan of water


toy frog

What to Do

1. **Predict.** Where should you place the frog on the lily pad so that the frog stays dry?

   Possible answer: I predict that the middle of the lily pad is the best place to put the frog so it will stay dry.

2. **Make a Model.** Color a paper plate green with a crayon. This will be the lily pad.
3. △ **Be Careful.** Poke a small hole near the edge of the lily pad. Tie a 15 centimeter piece of string through the hole.

Alternative Explore

What can carry clay on water?

Provide students with a small ball of clay and materials that will float and materials that will not float, such as corks, paper, coins, craft sticks, and pattern blocks.

Have students make an object that will float while carrying the clay.

Ask students to record what they used and how they made their floating object.

4 Place the lily pad (paper plate) with the frog in a pan of water with the string below it.

5 **Record Data.** Draw a picture to show where you placed the frog. Explain what you drew.

Possible answer: I placed the frog in the middle of the lily pad.

4 Remind students to keep the water inside of the pans. If the pans are clear, encourage them to look through the side of the pan and describe the positions of the plate and string.

5 **Record Data** Have students share their work with classmates and compare where they placed the frog.

2 Teach

What do scientists do?

▶ Discuss the Main Idea

Main Idea Scientists make models and observe, compare, and classify their subjects of study to learn more about them.

Before reading, ask:

- **What kinds of things do you do to find an answer to a question?** Possible answer: Look up the answer in the encyclopedia.

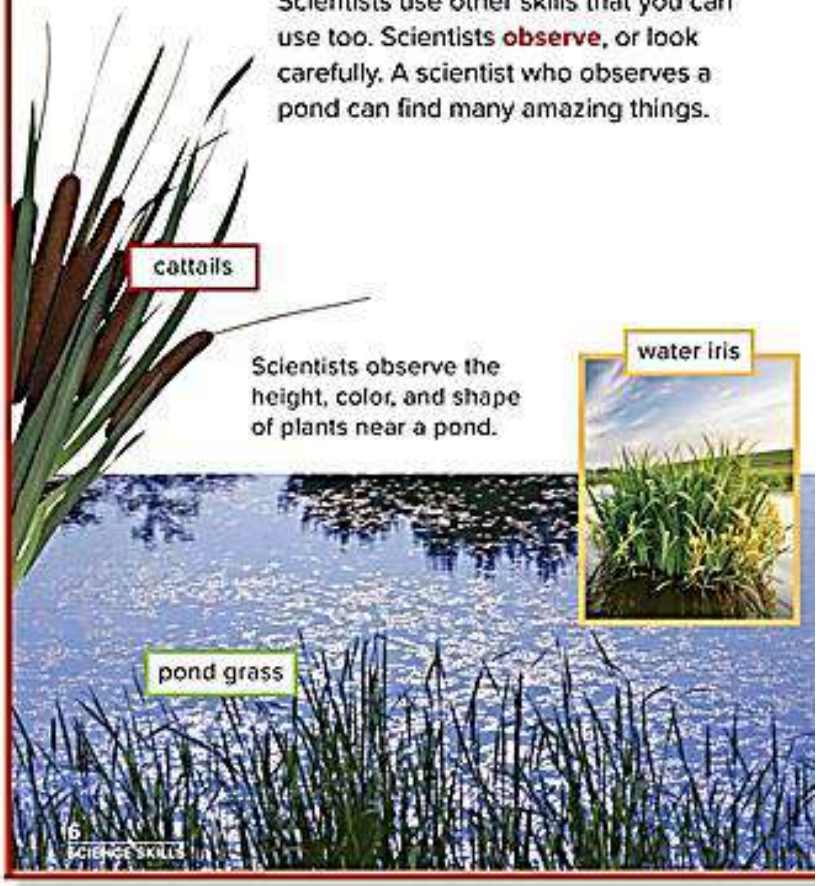
Read the text with the students. Ask:

- **Why is making a model helpful?** Possible answer: It can show how something works.
- **How does observing something help a scientist to learn more about it?** Possible answer: A scientist can see what happens, notice details, and compare changes.
- **Why do scientists compare and classify things?** Possible answers: They can find out a lot about things by knowing how they are the same and different. Putting things in order makes it easier to study them.

What do scientists do?

Scientists use many skills when they work. You wondered about the frog on a lily pad. Just as you did, a scientist might **make a model**. A model shows how something in real life looks.

Scientists use other skills that you can use too. Scientists **observe**, or look carefully. A scientist who observes a pond can find many amazing things.



Scientists observe the height, color, and shape of plants near a pond.

LA Support

Use Pictures Show students pictures of two different animals. Have students describe and compare the animals, using descriptive words and complete sentences.

BEGINNING Have students observe each animal. Students can use single words to describe them.

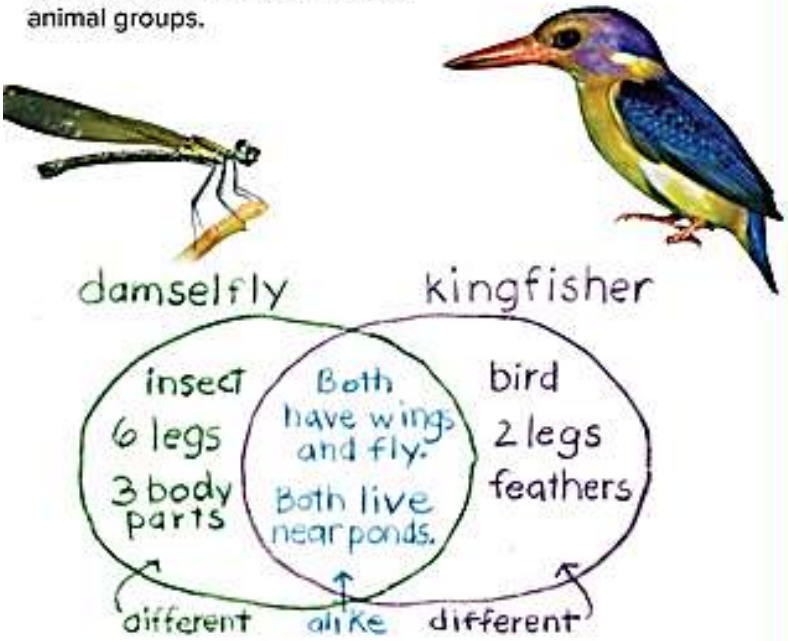
INTERMEDIATE Students can describe each animal in short phrases. Using two pictures, ask the students how they are the same and how they are different.

ADVANCED Students can compare the animals using complete sentences. Encourage them to make a Venn diagram to show the similarities and differences.

Scientists **compare** things by telling how they are alike or different. Look at the two pond animals on this page. How might a scientist compare them?

Circle in the text the words that describe how the damselfly and kingfisher are alike.

Look closely. Both animals have wings. They both live near ponds. They are also different in many other ways. Scientists find ways to **classify** things, or put them in groups. Insects and birds are in different animal groups.



ENGAGE EXPLORE **EXPLAIN** EVALUATE EXTEND

▶ Use the Visuals

Have students look at the pictures of the plants and ask them to describe what they see. Ask:

- **How are the plants the same and different?** Possible answer: Some plants have flowers, others do not.
- **How can observing the plants over a long time help scientists?** Possible answers: Scientists can observe changes in the plants. They can observe which things help plants grow.
- **If a scientist observed changes in the plants, what might the scientist try to find out?** Possible answer: If there were changes in the water of the pond.

Have students look at the pictures and Venn diagram. Explain to students that a Venn diagram is a way to compare things and show how things are different and the same.

Tell students that in a Venn diagram, the items that are different are written in the circles under the titles, and the items that are the same are written in the space where the two circles intersect. Ask:

- **How is the damselfly different from the kingfisher?** Possible answer: The damselfly has six legs and the kingfisher has two legs.
- **How are they the same?** Possible answer: They have wings, can fly, and live near ponds.
- **How does it help a scientist to compare animals?** Possible answers: They can see many different ways that animals do the same things. They can group the animals.

▶ Explore the Main Idea

ACTIVITY Have students work in pairs. Ask them to observe and describe what their partner is wearing. Have partners make a Venn diagram to compare how their clothes are the same and different.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Display two objects that are the same and different in various ways, such as two different plants or writing utensils. Ask students to **observe** the objects and describe them. Have students **compare** how the objects are the same and different. Repeat this activity with other objects.

ENRICHMENT Ask students to find two objects in the classroom. Have them create a Venn diagram comparing how the objects are the same and different. Encourage students to share their Venn diagrams with a partner.

ENGAGE EXPLORE **EXPLAIN** EVALUATE EXTEND

How do scientists work?

▶ Discuss the Main Idea

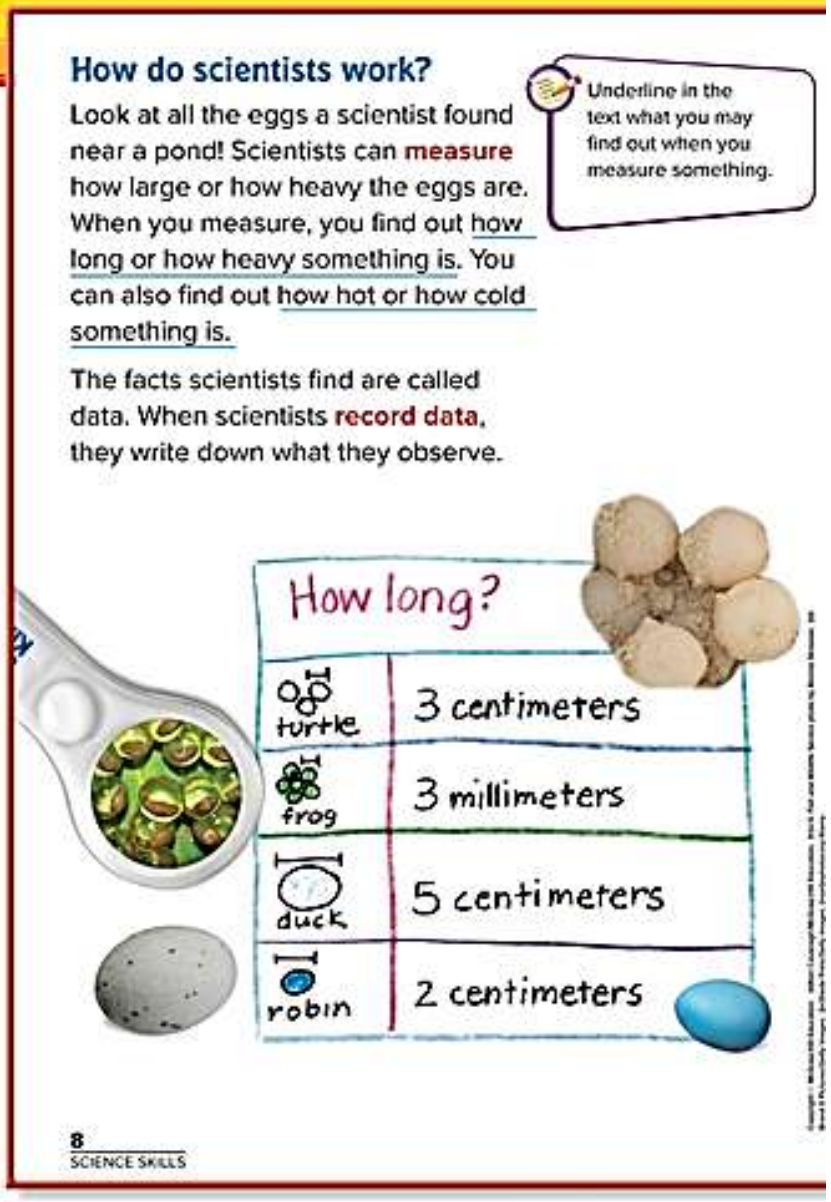
Main Idea Scientists measure, record data, put things in order, and infer to find out more about the things they are studying.

Read the text with students. Ask:

- **What are some things people measure?** Possible answers: ingredients, temperature, lengths of wood
- **Why is it important for scientists to record data?** Possible answer: so they do not forget information; they can compare data later on; to use the data again

Read the text together. Invite students to answer the questions. Ask:

- **Why do scientists put things in order?** Possible answers: It is easier to read the information. It helps them compare information. It organizes the data.
- **What things do you use that are put in order?** Possible answers: The telephone book is in alphabetical order. The pages of a story are in the order in which the story takes place. Nesting dolls are arranged from smallest to largest.
- **How can you infer what the weather might be like tomorrow?** Possible answers: by observing the weather today; finding out the temperature



LA Support

Demonstrate Provide different-sized objects to students. Label each one. Measure each object with students. Write the name of each object and its length on the board.

BEGINNING Students can point to the longest object and shortest object. Have students put them in order from longest to shortest.

INTERMEDIATE Students can use short sentences to answer questions about the objects. Explain that they are providing data about the objects.

ADVANCED Students can explain the chart on the board. Students can explain in what order the blocks should be placed if they were to go from shortest to longest.

After scientists collect data, they can put their data in order. To **put things in order** means to arrange them in some way. For example, you can order the eggs by their size. Which egg is smallest? Which is largest?

Another skill scientists use is to **infer**. When you infer, you use what you know to figure something out. Can you infer which eggs belong to the animals on this page?

frog

duck

turtle

robin

▸ Use the Visuals

Review the chart with students. Ask students to read the title and labels. Ask:

- **How is a chart helpful?** People can see the information clearly.
- **What information does the chart give?** Possible answer: the length of the eggs of different animals
- **Which animal has the shortest eggs?** frog
- **Which animal has the longest eggs?** duck

Have students look at the photographs of the different animals' eggs. Ask students to describe the eggs and explain how they are different. Ask:

- **Which eggs would be easiest for another animal to eat? Why?** Possible answer: The frog eggs would be easiest to eat because they do not have a hard shell.

▸ Explore the Main Idea

ACTIVITY Provide students with different size boxes, and objects that fit in each box. Have students match each object to a box. Ask:

- **How did you match the boxes with the correct objects?** Possible answer: I put the boxes and the objects in size order.
- **What did you infer?** Possible answer: The largest object matches the largest box.

Have students use a ruler to measure each box. Encourage them to make a chart to record their data.

Differentiated Instruction

Leveled Questions

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

- **What do scientists do?** Possible answer: They observe, measure, record data, put things in order, and infer.
- **What is data?** facts

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

- **How does using what you know help you to figure out a problem?** Possible answer: Using what I know helps me identify the part of the problem I need to figure out.
- **Why is it important for scientists to record measurements?** Possible answer: They will remember what they measured.

ENGAGE EXPLORE **EXPLAIN** EVALUATE EXTEND

How do scientists learn new things?

▶ Discuss the Main Idea

Main Idea Scientists investigate, predict, draw conclusions, and communicate their ideas about the results of their investigations.

Read the text together. Ask:

- **What investigations have you done at school?** Possible answers: grown plants; made games
- **How do scientists predict what the answer might be to a question?** They use what they know to guess what will happen next.
- **How does a wrong prediction help a scientist?** Possible answer: They learn from mistakes and can rule out a possible answer.

Have students predict what the young frog will look like next. Ask:

- **What helped you to predict what the frog will look like next?** Possible answer: looking at the other frog pictures

▶ Use the Visuals

Look at the illustrations. Explain to students that scientists record information in science journals similar to the one shown. Point out the date and labels. Then have students read the sequence of events in the notes. Ask:

- **Which words in the frog notes tell you about the order in which the frog grew?** *first, then, now*
- **What do the illustrations show?** how a frog grows
- **Why is it important for scientists to communicate their investigations?** Possible answers: Other people can learn from the investigation. Other scientists can redo the investigation to see if they get the same results.

How do scientists learn new things?

Scientists learn new things by investigating. When you **investigate**, you make a plan and try it out.

Scientists start by asking a question. They predict what the answer might be. When you **predict**, you use what you know to tell what you think will happen.

Look at the pictures of the tadpole and the young frog. What do you predict the young frog will look like next?


tadpole


young frog


adult frog

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Provide each student with a cup of water and red and yellow food coloring. Tell students they will investigate what happens when yellow and red colors are mixed together. Make a plan together. For example, decide how much water and drops of each food coloring to use. Ask students to predict what will happen. Have students draw conclusions and communicate what happens.

ENRICHMENT Ask students to write a plan to investigate what happens when oil is mixed with water. Have students make a prediction and then supply them with cups of water and teaspoons of cooking oil for the experiment. Encourage students to record their observations, check their predictions, draw conclusions, and communicate their results.

When you **draw conclusions**, you use what you observe to explain what happens. Scientists draw conclusions. They conclude tadpoles live in the water, grow legs, and climb onto land.

Scientists communicate their ideas to other people. When you **communicate**, you write, draw, or tell your ideas.

Think, Talk, and Write

What kinds of skills do scientists use to learn about the things they study?

Possible answers: Scientists make models, observe, compare, and classify things; they measure, record data, put things in order, and infer to figure something out; they investigate and predict, draw conclusions, and communicate their ideas about the results of their investigations.

3 Close

▶ Using the KWL Chart

Review with students what they have learned about science skills and how they are used. Record their responses in the What We Learned column of the class KWL chart.

ENGAGE EXPLORE EXPLAIN EVALUATE EXTEND

Scientific Method

Objectives

- Explain the steps scientists use to investigate questions.

1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about how scientists investigate questions. Ask:

- **What are some things a scientist needs to do to find out answers to a question?**
- **What steps do you take when you have a problem or question to solve?**

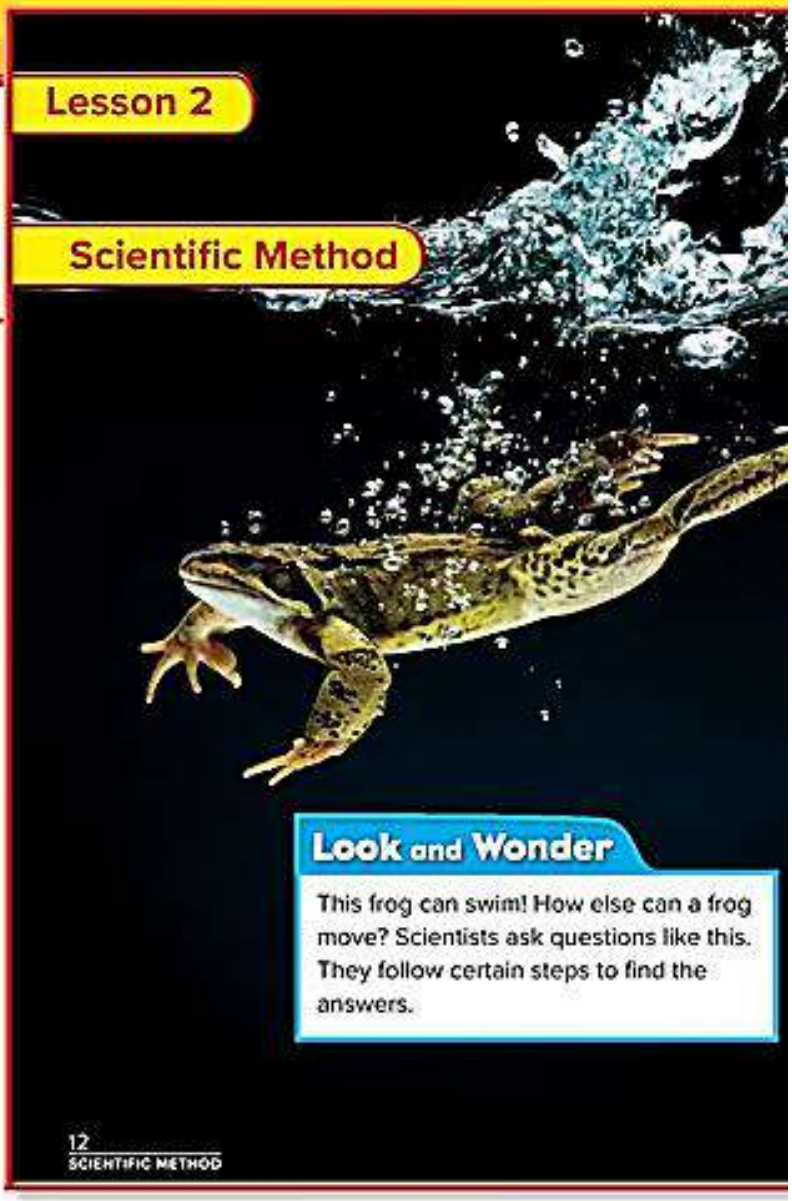
Record students' answers in the What We Know column of the class KWL chart.

Look and Wonder

Read the Look and Wonder section. Invite students to share their responses to the question about how frogs move. Ask:

- **How would a scientist investigate other ways frogs move?** Possible answer: Carefully watch frogs.

Write students' responses on the KWL chart and note any misconceptions they may have.



Warm Up

Start with a Demonstration

Ask students to think about the different ways they can move their bodies. Have volunteers demonstrate specific movements, such as walking, hopping, jumping, crawling, and rolling.

List the movements on the board. Ask:

- **How can you find out which movements will take you across the classroom faster than others?**

Help students develop a plan to test which movements will get them across the classroom most quickly. For example, identify which movements to test, determine which route students will use to move from one part of the classroom to another, find a method to measure how quickly students move, and determine a way to record the results.

Explore — Inquiry Activity

How does a frog move?

What to Do

1. **Observe.** Look at the pictures on this page. Think about how the frogs are moving.
2. **Record Data.** Make a list of the different ways you see the frogs moving.
3. **Draw Conclusions.** Add to your list. Write the body part the frogs use to move in each way.
4. **Communicate.** How do frogs move?

Explore

Individual | 15 minutes

Plan Ahead Provide students with paper and pencils to record their observations.

Purpose Support students' understanding of the steps of the scientific method.

Structured Inquiry

What to Do

1. **Observe** Remind students that observing means to look carefully.
2. **Record Data** Have students make a chart for their lists. Ask them to label the columns: *Picture 1*, *2*, *3*, and *4*. Encourage them to give details about the movements.
3. **Draw Conclusions** Have students describe the action in the body part, such as *legs are bent* or *legs are stretched*. Encourage students to act out the movements that they see, so they can better identify the body parts that are used.
4. **Communicate** Ask students to share their conclusions with their classmates. They should identify that frogs jump, sit, climb, and dive.

Alternative Explore

What lives in or near a pond?

Display pictures of ponds. Ask students to observe the pictures. Have them record the plants and animals that they see.

Encourage students to draw conclusions about why certain plants and animals live in or near a pond.

Have students compare how ponds can be the same and different.

2 Teach

How high can a frog jump?

▶ Discuss the Main Idea

Main Idea The scientific method includes observing, asking questions, predicting, and making plans to learn more about something.

Before reading, ask students how they would investigate the question: *How high can a frog jump?*

After reading together, ask:

- **Why is observing important?** Possible answer: you can learn new things
- **How did Walaa come up with her prediction?** Possible answer: she observed the frog's leg lengths.
- **What do you notice about Walaa's plan?** Possible answers: It has numbered steps; it is written clearly so other people can understand it; she used writing and illustrations to communicate the plan.
- **What can Walaa do if her plan doesn't work?** Possible answer: She can change the plan.

How high can a frog jump?

Scientists investigate by following steps called the **scientific method**. Here is how one student scientist follows the scientific method.

Underline the sentence that describes why Walaa predicts one frog will jump farther than the other.

Observe

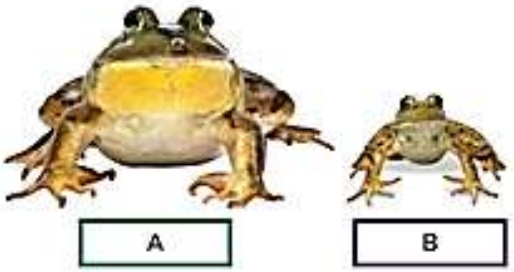
Walaa uses her science skills to observe the frogs in her classroom.

Ask a Question

Walaa's question is:

Make a Prediction

Walaa predicts the answer is yes. She thinks *frog* A will jump farther because it's legs are longer.



LA Support

Explain Have students read Walaa's question. Ask questions to check for understanding, such as: **Can a big frog jump far? Can a small frog jump far? Which frog can jump farther?** Write the scientific steps on the board. Prompt students to show or explain how they would use each step to answer Yasmin 's question.

BEGINNING Students can use gestures and one or two words to answer questions about each step used.

INTERMEDIATE Students can use short phrases and sentences to explain each step.

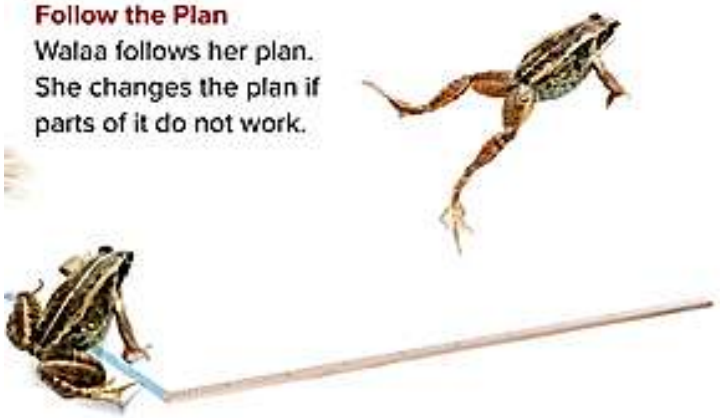
ADVANCED Students can use full sentences to explain how Walaa used the steps to answer her question, and what they would do differently or the same.

Make a Plan

Walaa writes down a plan to test her idea. When she writes the plan, other people can follow it too.

Follow the Plan

Walaa follows her plan. She changes the plan if parts of it do not work.



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

▶ Use the Visuals

Have students read Walaa's plan. Explain to students that it is easier to read steps when they are numbered. Ask:

- **What is Walaa measuring in her plan?** how far the frogs jumped
- **How does Walaa make the frog jump?** She claps.
- **Why does Walaa repeat step 2?** She needs to test the other frog.
- **Why is the drawing helpful?** It shows the idea of the plan.

▶ Explore the Main Idea

ACTIVITY Have students work in small groups. Distribute pictures of animals to each group. Ask each group to choose a picture and think of a question about the animal that they would like to research.

Have students predict an answer to their question, and make a plan about how they can find out the answer. Remind students to develop a plan that has clear steps that can be easily followed.

Differentiated Instruction

Leveled Questions

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

- **What do you call the steps that scientists use to investigate questions?** the Scientific Method
- **What are some of the steps of the scientific method?** observe, ask a question, make a prediction, make a plan

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

- **Why do scientists change their plans?** to make a plan work
- **Why do scientists want others to follow their plans?** Possible answer: to see whether other scientists get the same results

What did you find out?

▶ Discuss the Main Idea

Main Idea The Scientific Method also includes recording data, trying plans again, drawing conclusions, and communicating ideas.

Before reading, ask:

- **What do you think needs to happen after you make a plan for an investigation?** You need to follow the plan.

Read the text together. Ask:

- **Where did Walaa record her results?** on a chart
- **How else can results be recorded?** Possible answers: diagram, bar graph
- **How was Walaa able to draw a conclusion?** Possible answer: from the results of her plan

▶ Use the Visuals

Have students look at the chart. Ask:

- **How did Walaa organize her chart?** Possible answer: frogs listed in rows, each jump attempt listed in a different column
- **Which frog jumped farther?** *frog* B **How much farther?** 5 cm
- **What does the first try tell us about Walaa's prediction?** Possible answer: It might be wrong.
- **Why will it help Walaa to test the frogs two more times?** Possible answer: If she gets the same results, she can make a stronger conclusion.

What did you find out?

Record the Results

Walaa makes a chart to show how far each frog jumps.

How far can each frog jump?

frog	1st try	2nd try	3rd try
 A	20 cm		
 B	25cm		

Try the Plan Again

Walaa tests each frog three times. This helps her know if her results are correct.

Draw a Conclusion

Walaa explains what her results mean.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Ask students to predict whether people with longer legs can jump farther. Have two students of different heights volunteer to do a broad jump. Record the data in a chart on the board. Ask students to jump two more times.
Have students draw a conclusion from the data and explain it.

ENRICHMENT Have students do an activity to gather data, such as tossing a coin, to find out how many times it lands on heads or tails. Ask students to record the data, draw a conclusion, and explain what the results mean.

Walaa talks to her classmates about what her results mean. This can lead to new questions and new investigations.

Scientific Method

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

Think, Talk, and Write

Why do you think it is important for scientists to make a plan?

Possible answers: The plan is important for other scientists to follow and see if they get the same results; for other people to know how the scientists got the results; for scientists to know how to change the plan if it doesn't work.

3 Close

▶ Using the KWL Chart

Review with students what they have learned about the steps of the Scientific Method. Record their responses in the What We Learned column of the class KWL chart.

ENGAGE EXPLORE EXPLAIN EVALUATE **EXTEND**

Safety Tips

Objective

- Identify important safety procedures.

▸ Talk About It

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

- **What kinds of safety rules do you have at home?**
- **How are rules for the kitchen and playing outside the same?**

Write students' responses on chart paper. Ask:

- **Why do people make rules?**

Students should understand that rules are created to keep them safe.

▸ Learn About It

Have a volunteer read the first sentence. Ask students to list other safety symbols they know, such as stop signs. 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 students may do in class, and encourage them to propose safety procedures. Have a volunteer read the rest. For each safety tip, ask students to explain the rationale behind the rule. Ask:

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

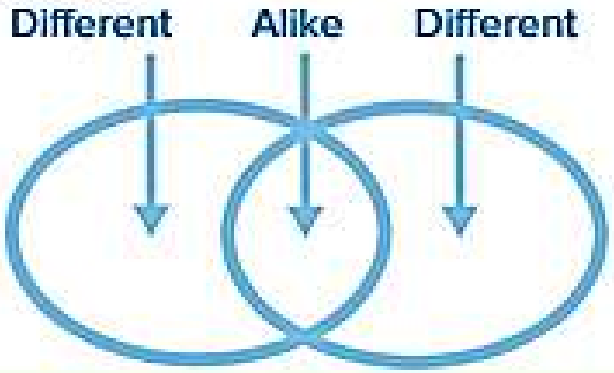
▸ Try It

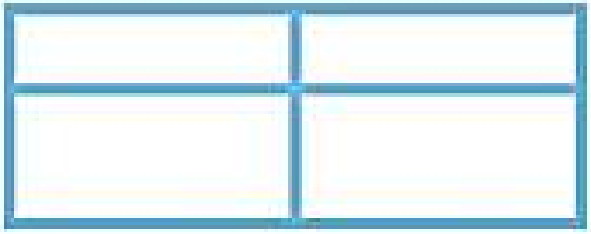
Divide the class into five groups and assign one safety tip to each group. Have each group create a poster to explain and illustrate their safety tip, and encourage them to present their posters to the class.

Life Science

CHAPTER 2 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
1 What Plants Need PACING: 2 days *FAST TRACK:* 1 day	▪ Identify what plants need to live and grow. ▪ Explain how plants make their food. Reading Skill Compare and Contrast	nutrients oxygen
2 How Plants Are Alike and Different PACING: 2 days *FAST TRACK:* 1 day	▪ Recognize that plants look and act like their parent plants. ▪ Describe ways that plants change to meet their needs. Reading Skill Classify	trait





Activity Planner

EXPLORE Activities

Explore

PACING: 20 minutes

Objective Learn what plants need in order to survive.

Skills predict, record data

Materials two potted plants, aluminum foil, water, pencils, paper

PLAN AHEAD Choose two similar leafy plants, such as geraniums. Requires five minutes every day to make observations.

Explore

PACING: 20 minutes

Objective Observe how roots change the direction of growth based on gravity.

Skills observe, draw conclusions, investigate

Materials three lima bean seeds per grouping, paper towels, masking tape, self-sealing plastic bags, hand lenses, water

PLAN AHEAD Have materials available in stations throughout the room. Put pieces of tape on the board for students to use.

QUICK LAB Activities

Quick Lab

PACING: 10 minutes

Objective Observe how plants take in water.

Skills observe, compare

Materials two small potted plants, water, sponges, hand lenses

PLAN AHEAD Choose two plants that are similar in size and health to get more accurate observations.

Quick Lab

PACING: 10 minutes

Objective Observe two plants to find out if plants grow toward light.

Skills observe

Materials shoeboxes with holes, two seedlings for each box, water, light source

PLAN AHEAD Grow seeds for about one week to produce seedlings in time to conduct this experiment.

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
nutrients	predict
oxygen	record data
leaves	observe
stem	compare
roots	infer
flower	draw conclusions
seed	classify
fruit	
trait	

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 A *seed* is the part of the plant that can grow into a new plant.

Example A *seed* needs water to grow.

Ask What happens to a *seed* when it is planted?

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

Vocabulary Activities

Help students compare seeds and their parts.

BEGINNING Hand out green beans and nuts in the shell. Have students open them and observe the seeds. Guide them to compare and contrast the seeds. Ask, for example: *What color are the seeds? Which seeds are larger? Which coat comes off?*

INTERMEDIATE Hand out green beans and peanuts in the shell. Ask students to open them and observe the seeds. Guide them to identify the different parts of the seeds and have volunteers draw the parts and label them on the board.

ADVANCED Hand out green beans and peanuts in the shell. Have students describe how the seeds are protected differently. Encourage them to discuss whether they think the fruit or the shell provides better protection for the seed and then complete the following sentence frame with their opinion: *The _____ provides better protection because _____.*

CHAPTER 2

Plants

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:

- **What kinds of things do plants need to live? Do they need different things from animals?**
- **What parts do plants have?**
- **How do plants get their traits, like their colors and their heights and the shapes of their flowers?**

Answers shown represent sample students' responses.

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

CHAPTER 2

Plants

What do you know about plants?

Possible answer: Plants are green and can grow in the ground. Plants have leaves and some have flowers.

Preview Vocabulary

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

root a plant part that keeps the plant in the ground

stem the part of the plant that holds up the plant

trait the way plants or animals look or act

Differentiated Instruction

Instructional Plan

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

EXTRA SUPPORT Students who do not know what plants need to live and grow should start the chapter with **Lesson 1** before continuing in the chapter.

ENRICHMENT Students who understand how plants meet their basic needs may explore differences in plants and the ways in which plants get their traits in **Lesson 2**.

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		
What We Know	What We Want to Know	What We Learned
Some plants grow in the ground.	Do all plants grow in the ground?	Plants can grow from seeds that are not in the ground.
Plants have leaves.	What do leaves do?	Leaves make food for plants.
Some plants are green.	What gives a plant its traits?	Plants get their traits from parents.

Vocabulary

- Have a volunteer read the Preview Vocabulary words aloud to the class. Ask students to find one or two of the words in the chapter. 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.

Lesson 1 What Plants Need

Objectives

- Identify what plants need to live and grow.
- Explain how plants make their food.

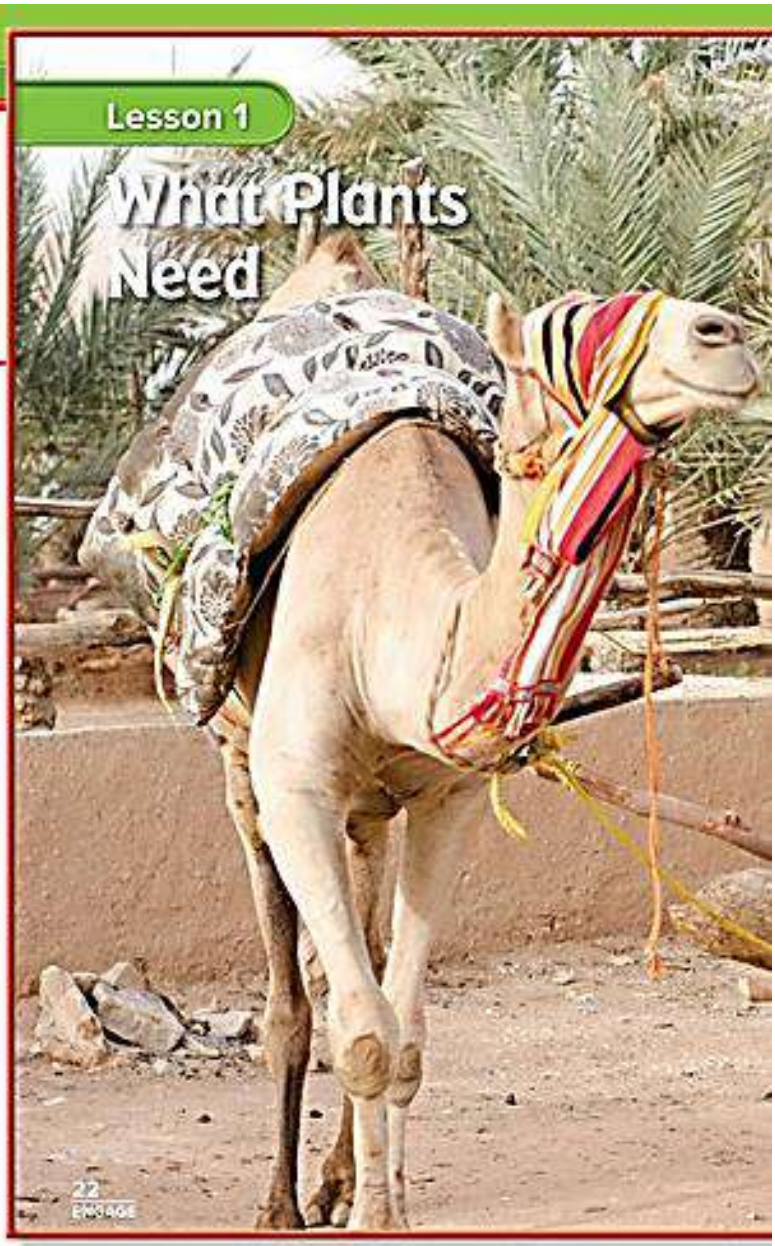
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about plants. Ask:

- **Why are plants living things?**
- **Why do plants need to continue to live?**
- **Plants need food. How do they get it?**

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



Warm Up

Start with a Visual

Show students a picture of a botanical garden with sculptured plants or designs made from various color plants. Discuss the living and nonliving things in the picture. Ask:

- **What do you see in the picture?** Possible answers: plants made into designs; benches; people
- **How do you think this was created?** Possible answers: cutting; careful planting; paying attention to the needs of the plants
- **What parts of these plants can you see?** leaves
- **Why do people study and care for plants?** Possible answers: because plants are used for beauty, education, medicine, food

Look and Wonder

Before You Read

Plants are living things just like animals. How can you tell?

Possible answer: Plants and animals both need food, air, and water to survive.

Write the lesson vocabulary words below.

nutrients

oxygen

Essential Question

What do plants need to live and grow?

Look and Wonder

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

- **What things in our classroom are living?** Possible answers: students, plants, class pets
- **How are plants and animals alike? What do they both need?** Possible answer: They both need light and air. They both need food and water.

Write students' responses on the class KWL chart and note any misconceptions they may 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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

whole class | 30 minutes

Plan Ahead Choose two of the same leafy plant, such as geraniums. Prepare a place for the plants to live and have classroom monitors care for the plants. This activity will require five minutes every day, or every other day, for one week.

Purpose Students conduct a controlled investigation to observe how leaves need light to keep the plant healthy. They are encouraged to conduct their own experiments to find out what else plants need to live.

Structured Inquiry

What to Do

Discuss what students need to live and grow. Ask: **What do plants need to live?** light, water, space, nutrients

How are plants the same as you? How are plants different? Possible answer: Plants use light to make food, and I eat food to live.

1. Have students observe how the plants are alike before labeling them and covering the leaves of Plant B. If necessary, model how to carefully place the foil on the leaves.
2. Predict Provide a sentence frame for students to write down their predictions, such as: *If I cover the leaves of Plant B, then the leaves will* _____.

Explore

What do leaves need?

You need

two potted plants

foil

What to Do

1. Put the plants in a sunny place. Choose one plant and cover its leaves with foil. Keep the soil moist in both pots.

2. **Predict.** What will happen to each plant in one week?

Possible answer: The plant without the foil will continue to grow, but the plant with the foil may start to dry up.

Inquiry Activity

3. **Record Data.** Write down what you observe for one week.

Students' answers may vary but they should include information about both plants.

4. Were your predictions correct? What do leaves need?

Possible answer: Yes, my prediction was correct. Leaves need sunlight to grow.

Explore More

5. **Predict.** What will happen if the foil is removed? Observe the plant for one week. Was your prediction correct?

Possible answer: I predict that plant will get healthy and grow. My prediction was correct.

Open Inquiry

Investigate the other needs of plants.

My question:

Sample question: What nutrients do plants need to grow?

3. **Record Data** Ask a volunteer to remove a small piece of foil for students to observe the leaves of Plant B. Replace the foil. Ask: **Why is Plant A needed for our observations?** Possible answer: to make it easier to compare and see the changes in Plant B

4. Discuss how leaves help the plant live by using light to make food.

Guided Inquiry

Explore More

5. **Predict** Encourage students to use what they've learned to make more predictions.

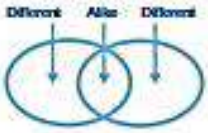
Open Inquiry

Discuss other things plants need, and ask students how they could test whether plants need those items. Encourage students to plan their own investigation to find out what else plants need to live and grow.

2 Teach

Read and Respond

Reading Skill **Compare and Contrast** To compare is to decide how things are alike. To contrast is to decide how things are different.



What do plants need?

▶ Discuss the Main Idea

Main Idea Plants are living things that need air, water, and space to live and grow.

After reading together, ask:

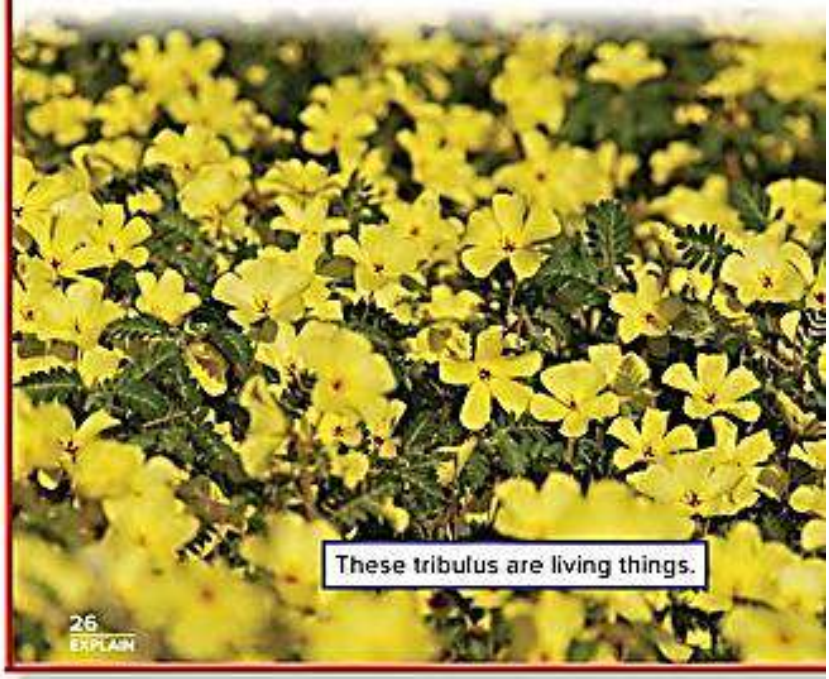
- **How can you tell that plants are living things?** Possible answer: Plants grow bigger and change over time.
- **What do plants need to live?** air, water, space, light

Read and Respond

What do plants need?

Underline the words and phrases that describe a living thing.

Remember that living things grow and change. Sometimes it is easy to tell when something is living. You can see animals move, breathe air, eat food, and drink water. It might be harder to tell, but plants are living things too.



These tribulus are living things.

Science Background

Plants Plants are living things. Like all living things, plants grow, reproduce, and die. They are made of cells. They breathe and use energy. Plants respond to stimuli and adapt to their environment.

Unlike animals, plants make their own food. Energy from sunlight, water, and carbon dioxide are used to make food through the process of photosynthesis.

LA Support

Act Out Use actions to show that living things breathe, eat, and move. Show that living things need water by watering a plant. Show the need for air by breathing deeply or pretending to hold your breath. Have students wave their hands around to feel the air move. Use a picture of a house, a bird's nest, and a pot of soil to demonstrate space to grow. Ask **Who lives here?** person, bird, plant

BEGINNING Ask students to repeat the actions and name them in their own language. Name each action and have them repeat the words.

INTERMEDIATE Have students guess what is being acted out from a list of words or from words they know.

ADVANCED Read the text. Have students act out the text.

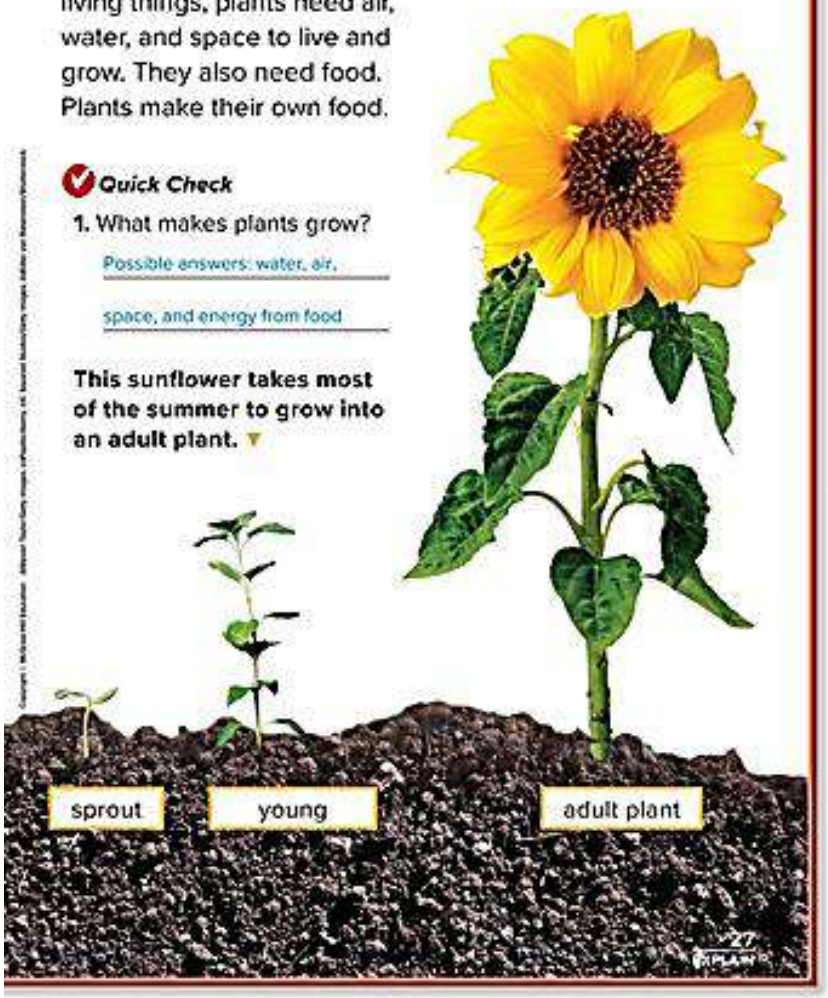
You have to watch plants over time to see them change and grow. Like all living things, plants need air, water, and space to live and grow. They also need food. Plants make their own food.

Quick Check

1. What makes plants grow?

Possible answers: water, air, space, and energy from food

This sunflower takes most of the summer to grow into an adult plant.



Use the Visuals

Have students examine the pictures on these pages. Ask:

- **How can you tell that the flowers are living things?** They grow and they change and they "drink" water when it rains.
- **How does the sunflower grow and change?** The sunflower pops through the soil. Then it grows. When it is an adult, it flowers.

Develop Vocabulary

Preview lesson vocabulary with this word study activity.

Write the word *oxygen* on the board. Ask students what they think the word means. Explain that *oxygen* is a "gas found in the air we breathe." Have students draw pictures of things that need oxygen. Possible answers: plants, animals, people Have them write captions for their pictures.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Have students draw a picture of a plant. Encourage them to draw and label the things plants need. They may include soil, the Sun, air, and rain in their pictures.

ENRICHMENT Challenge students to write a simple report about how they can tell when something is living. Have them include plants, animals, and people in their reports. They should mention that living things need air, water, food, and space. Encourage students to illustrate their reports.

How do plants make food?

Discuss the Main Idea

Main Idea Plants have leaves, stems, and roots that help them live and grow.

After reading, ask:

- **Why do plants need minerals?** Minerals help plants grow.

Read a Diagram

Use the image of the plant to discuss how plants make food. Read the captions with students. Ask:

- **What is the main idea of the diagram?** Plants have leaves, stems, and roots that get water and make food for the plant to live.

Quick Lab

Objective Observe how plants take in water.

You need two small, potted plants; water; sponge; hand lens

1. Keep the soil of Plant A moist. Wipe the leaves of Plant B each day with a moist sponge.
2. After a few days, have students carefully remove the plants from the pots, keeping the roots intact. Students should observe the roots with the hand lens and draw what they see.
3. Have students compare Plant A and Plant B. Ask: **What happened? Why?**

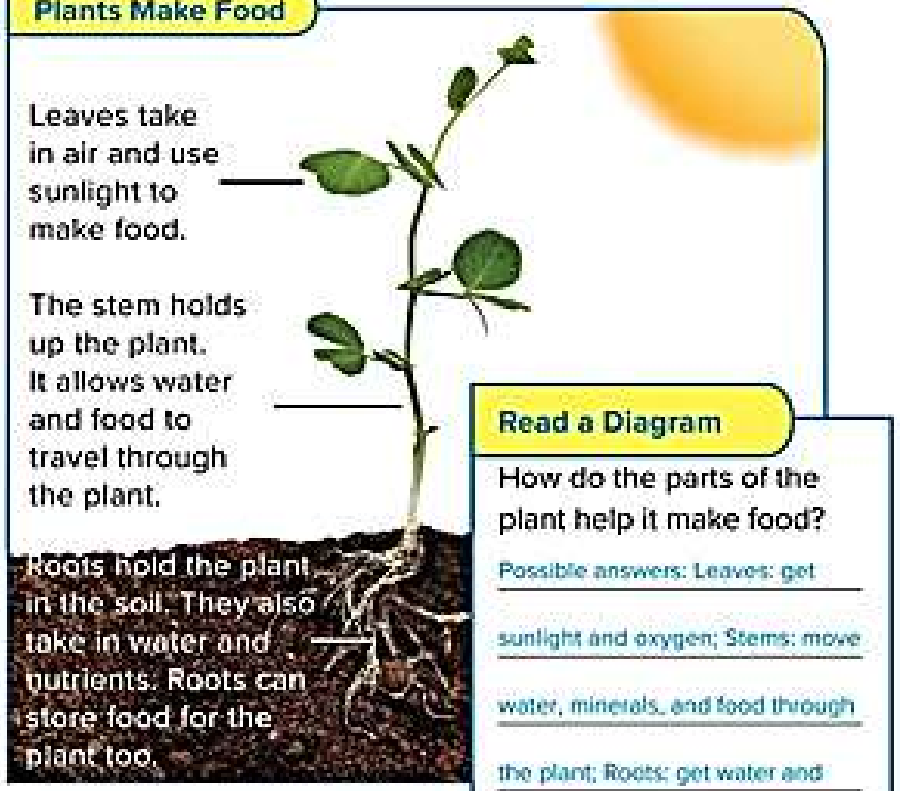
How do plants make food?

Plants need food just like animals. Plants have parts that help them make food. Plants need sunlight, air, and water to make their own food. Plants also need nutrients. **Nutrients** are things in the soil that help plants grow and stay healthy.

Quick Lab

Observe a plant. What parts take in water?

Plants Make Food



Read a Diagram

How do the parts of the plant help it make food?

Possible answers: Leaves: get sunlight and oxygen; Stems: move water, minerals, and food through the plant; Roots: get water and minerals and store food.

When plants make food, they give off a gas called oxygen into the air. **Oxygen** is what humans and other animals breathe in order to live.

These plants make oxygen that the rabbit needs to live. ▼

Quick Check

2. What do plants need to make food?

sunlight, water, minerals, air

▶ Develop Vocabulary

nutrients Write the word *nutrients* on the board. What word do students know that is like *nutrients*? They might know the word *nutrition*. Ask them what they know about nutrition. What foods do they eat to stay healthy? What nutrients do they need? What nutrients might plants need?

oxygen *Word Origin* Write the word *oxygen* on the board. Circle the suffix *-gen*. Explain that it means "producer." Ask: Can you think of other science words that end in *-gen*? nitrogen, hydrogen Ask: What do these words have in common? They're all gases.

3 Close

▸ Using the KWL Chart

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

▸ Using the Reading Skill
Compare and Contrast

Use the reading skill graphic organizer to reinforce lesson content. Ask: How are you like a plant? How are you different?

Visual Summary

Write about what you learned.

Plant Needs

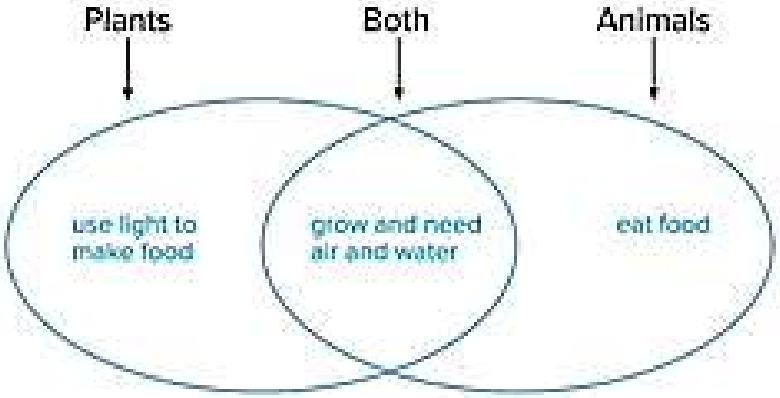
Possible answer: Plants need water, air, and light to make their own food. Nutrients also help plants grow. Plants live in an environment where they can get what they need.

Plants Make Food

Possible answers: The leaves take in air and sunlight. The stem holds up the plant and carries water, minerals, and food through the plant. The root takes in water and nutrients and stores food.

Think, Talk, and Write

1. **Compare and Contrast.** How are plants and animals alike? How are they different?



2. Write some parts of plants and their functions.

Possible answers: Roots: get water and minerals, hold plant in the ground, store food. Stems: hold up the plant, move water and food through the plant. Leaves: get sunlight and air, make food.

Essential Question What do plants need to live and grow?

Possible answers. They need air, water, and space to live. They change and grow over time.

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 sequence of pictures showing how the plant grows. Encourage them to draw arrows to indicate the direction in which roots, stems, and leaves grow.

Inquiry Skill: Observe

▶ Learn It

Read the text together. Ask students to give examples of things they can see, feel, hear, smell, and taste. Ask:

- **What words could be used to describe how something looks, feels, sounds, smells, or tastes?**
  Possible answers: See: red, big, triangular; Feel: tiny, round, smooth, rough; Hear: loud, quiet; Smell: spicy, moldy, stinky; Taste: sweet, salty, sour

Record students' responses on chart paper.

Tell students that they are going to use their senses to learn about flowers. Have them look at the image of jasmine blossoms and the chart beneath it. Ask:

- **What does the chart tell us about the flowers?**
  Possible answer: They have smooth leaves.

Integrate Writing

An Ode to a Flower

Have students use descriptive words to create a poem about a flower. Encourage them to use images to describe how the flower looks, feels, and smells.

Have students illustrate their poems, and hang them up for a class exhibit.

Focus Skills

Inquiry Skill: Observe

To **observe**, you use your senses to learn about something. You use senses to see, hear, taste, smell, and touch.

jasmine

▶ Learn It

You can use some of your senses to learn about flowers. You can make a chart to write down what you observe.

jasmine

See	
feel	The leaves feel smooth.
hear	
smell	The flowers smell sweet.

Skill Builder

▸ Try It

Find a flower to observe or look at the pictures below.

bougainvillea

yucca plant

1. What color is your flower? Which sense did you use?

Students' answers will vary, but they should describe the color of their flower and the sense they used. Possible answer: My flower is red. I used my eyes (sight) to help me find out.

2. How do you think the leaves will feel to your touch?

Possible answer: The leaves will feel smooth.

3. **Write About It.** Find another flower to compare. On a separate piece of paper, compare what you see, feel, and smell.

Teacher Notes

▶ Try It

Read the Try It section aloud with students. Explain to them that they should closely observe the details of their flower.

1. Encourage students to share names of colors that they know, and record their responses on the board. Use a large box of crayons or paint samples to illustrate the many different shades of red, blue, or pink that flowers might be. Have them observe a flower, or a plant with flowers, and discuss the colors of the flowers.
2. Ask students to share words that describe how things feel, and make another word list on the board. Have students use two words from the list to write a sentence that describes how the leaves feel. If students are using pictures to complete the activity, ask them to look closely at pictures of the leaves and predict how they may feel. Ask: **Do they look rough or smooth? Are the leaves pointy or round?**
3. Have students make their own *See, Feel,* and *Smell* chart comparing the two flowers.

▶ Apply It

Review with students the senses chart they made at the beginning of the activity. Ask: **Is there anything you want to add to the chart?**

Have students think of their favorite toy or object. Provide a few minutes for students to think about how the object looks, feels, smells, and sounds.

Ask students to write a few sentences describing their favorite thing. Encourage them to use words from the chart on the board.

Play a game by asking students to read their descriptions aloud. Have the class guess the object.

Lesson 2 How Plants Are Alike and Different

Objectives

- Recognize that plants look and act like their parent plants.
- Describe ways that plants change to meet their needs.

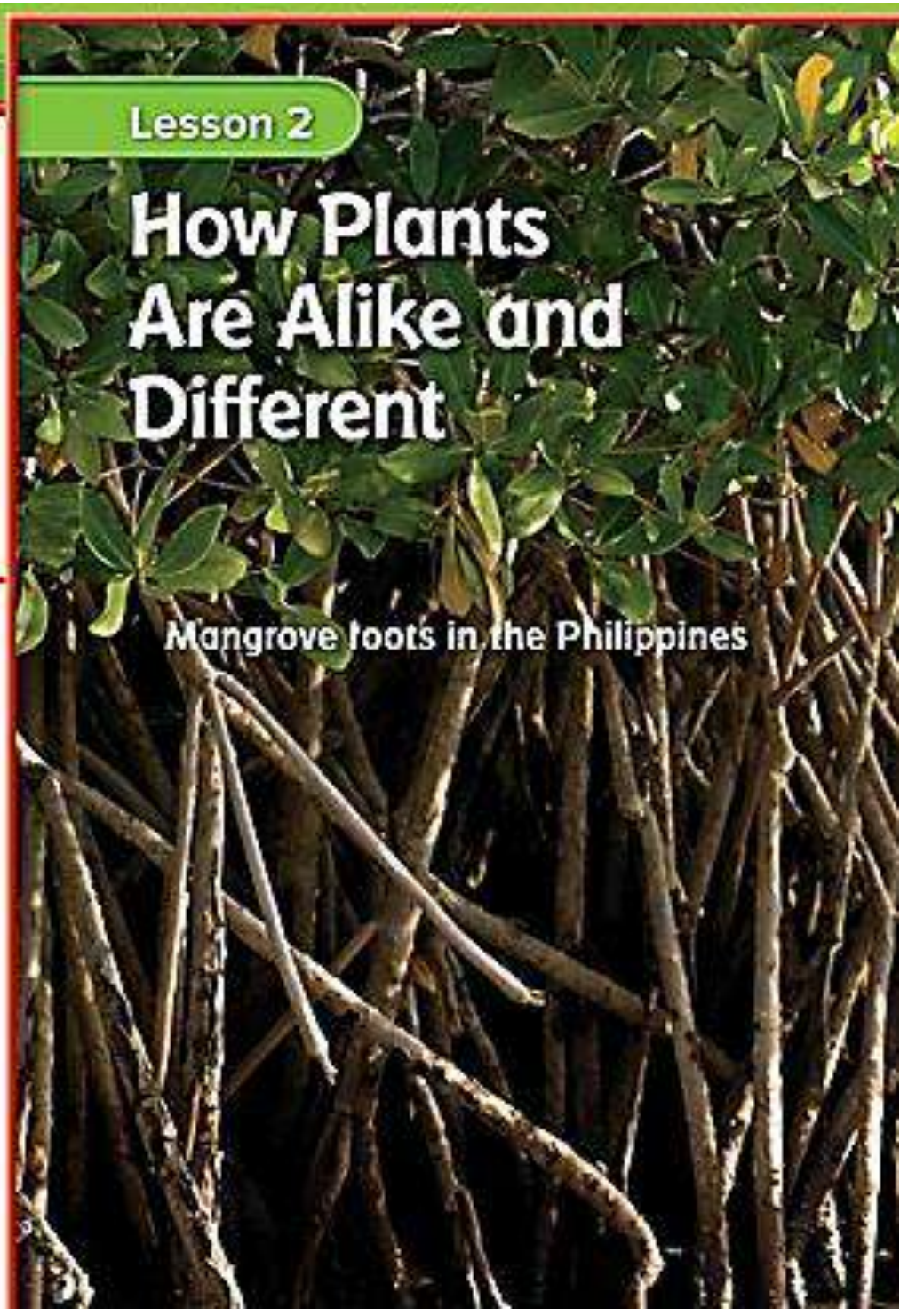
1 Introduce

▶ Assess Prior Knowledge

Find out what students know about plant traits and how plants meet their needs. Ask:

- **How are plants like their parent plants?** Possible answers: They have the same shape of leaves. They grow in the same type of environment.
- **What things cause plants to change as they grow?** Possible answers: gravity, light, wind

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



ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder statement and question about roots. Have students describe the roots of this plant. Ask:

- **Which way are the roots growing?** down
- **Why are the roots growing down?** to get water and minerals from the soil
- **What causes roots to grow down?** Roots respond to gravity.

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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

Individual

20 minutes

Plan Ahead Have materials available in stations throughout the room. Put pieces of tape on the board for students to use. This activity will require follow-up time of approximately five minutes a day for a week or two.

Purpose This activity shows students that roots change direction in response to gravity. Roots grow down and shoots grow toward light to meet the needs of the plant. This is one way plants change in order to survive in their environment.

Structured Inquiry

What to Do

Tell students that they are going to watch how roots grow from a bean seed.

1. Have students write their names on the plastic bags to ensure they know which seeds are their own.
2. Observe Depending on how beans are positioned, it may take a long time for some roots to start growing down.

Explore

How do roots grow?

You need

- 3 bean seeds
- paper towels
- tape
- plastic bag
- hand lens

What to Do

1. Put three bean seeds on a damp paper towel. Put them in the bag and tape it to a bulletin board.

2. **Observe.** Which part grows first? Which way did the roots grow?

Possible answer: The roots grow first. They grow down.

Inquiry Activity

3 After the roots grow, turn the bag upside down. Tape it to the board again. Make sure the paper towel stays wet.

4 **Draw Conclusions.** What happened to the roots?

Possible answer: The roots continued to grow down.

Explore More

5 **Investigate.** What happens to the roots if left in the dark?

Possible answer: The roots continued to grow.

Open Inquiry

Investigate which environments are best for roots to grow.
My question is:

Sample question: Where do seeds grow best?

3 Wait until some of the roots are growing down to turn the bag. Ask: **How will the roots change?**

4 **Draw Conclusions** Students should notice that the roots continued to grow down. Discuss with students how gravity helps the roots grow downward. Have them draw the way the roots changed as they grew.

Guided Inquiry

Explore More

5 **Investigate** Leave the plastic bags with roots in a dark, warm closet for two days. Make sure the paper towel stays wet over the two days. Then have students observe the roots. Ask: **What happened to the roots?**

Open Inquiry

Discuss with students what they learned about roots. Ask them to compare the positioning of the beans and the way the roots first grew. Encourage students to think of their own experiments based on questions they have.

Alternative Explore

What makes seeds sprout down?

Place four bean seeds in a plastic bag, each facing a different direction. Add a moist paper towel.

Show students the beans once they have germinated. Ask:

- **In which direction did the roots of each seed grow?** They all grew down.
- **Why do roots grow down?** They respond to gravity.

2 Teach

Read and Respond

Reading Skill **Classify** To put things that are alike into groups.

How are plants like their parents?

▶ Discuss the Main Idea

Main Idea Plants make new plants that have the traits of, or look like, the plants they came from.

Ask:

- **What is an example of a plant growing up to be like the plant from which it came?** Possible answer: The bean seed grows into a bean plant.
- **What will the acorn look like as it grows?** It will grow to look like the oak tree.

Read and Respond

How are plants like their parents?

You know that cats have kittens and hens have chicks. Animals have young that look and act like their parents. Plants do the same thing.

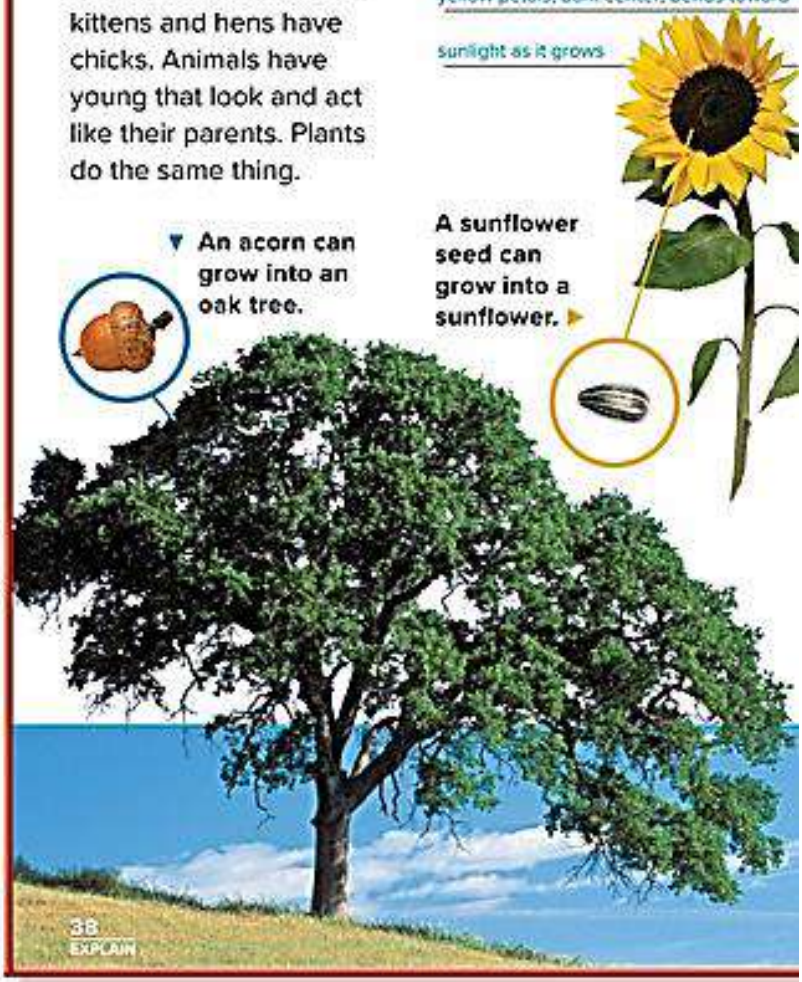
Quick Check

1. What are some traits of a sunflower?

yellow petals; dark center; bends toward sunlight as it grows

▼ An acorn can grow into an oak tree.

A sunflower seed can grow into a sunflower. ▶



Science Background

Nature vs. Nurture Plants inherit many traits, such as leaf shape and flower color, from their parent plants. A plant will have a life cycle similar to its parent plants' and will grow best in the same type of environment as its parent plants. Plants are also affected by the place where they grow. Different environmental stimuli, such as light, gravity, water, and touch, affect a plant's growth. A plant's responses to stimuli help it to survive.

LA Support

Match Game Use pictures of young and adult plants and animals to play a matching game. Have students sort the pictures to match the young plants and animals with the adults.

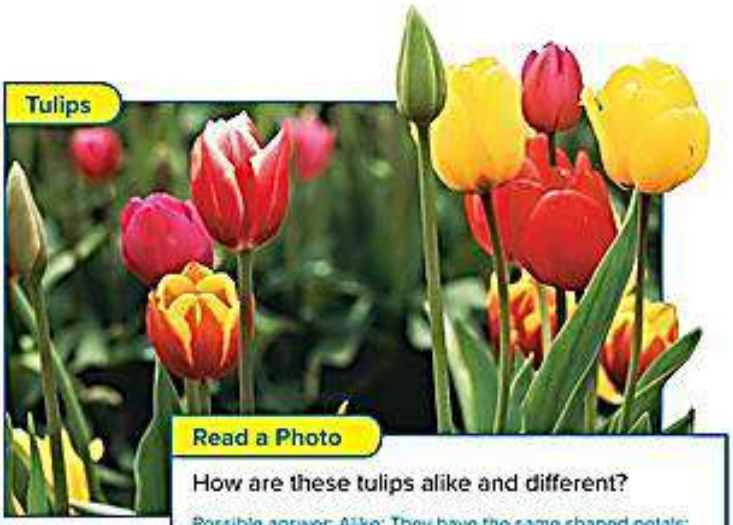
BEGINNING Name the things in the pictures and have students repeat the names. Pair students with a peer so they can hear and repeat the names multiple times.

INTERMEDIATE Help students describe the things in the picture by using a sentence frame, such as: *A ____ grows into a ____.* A bean seed grows into a bean plant.

ADVANCED Reinforce vocabulary by having students use the word *trait* to describe ways the young plants are like the adult plants.

The way plants or animals look or act is called a **trait**. Plants get many of their traits from their parents. Young plants will have many of the same traits as their parents. Some plants might look a little different from their parents. The plant will still have the same shape of flowers, petals, and leaves.

Tulips



Read a Photo

How are these tulips alike and different?

Possible answer: Alike: They have the same shaped petals; thin green stems; and need water, light, and a place to grow.

Different: They are different colors and sizes.

Read a Photo

Look at the picture and read the caption together. Ask:

- **What are some traits of these tulips?** long leaves; cup-shaped flowers; thin green stems
- **What will the seeds from the tulips grow to look like?** the tulips in the picture

▶ Develop Vocabulary

trait Have volunteers describe how they look or act like their parents, siblings, or grandparents. Model for students how to describe the similarities as *traits*. For example: *Maysa said she and her mother have straight black hair. Straight black hair is a* trait *Maysa and her mother share.* After several examples, encourage students to describe the traits they share with relatives, using the word correctly.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Show students a variety of seed packets containing fruit and vegetable seeds. Explain where the seeds come from and how the seed packagers know what type of plants these seeds will become. Help students read the packet information to find out how long it takes for the plants to complete their life cycle.

ENRICHMENT Have students research an animal they like. They should find photographs of the animal as an adult and young animal. Ask students to complete a Venn diagram comparing the adult and young animal. What traits do they share?

How do plants survive in different places?

▶ Discuss the Main Idea

Main Idea Plants have traits that help them live and stay safe in their environments.

Read the text together. Ask:

- **How do plants look different in different places?** Possible answer: Leaves are big in wet places and small in dry places.

▶ Use Visuals

Look at the pictures. Ask:

- **What helps these plants survive in their environments?** Possible answer: The plant parts help plants get what they need to live.

▶ Explore the Main Idea

ACTIVITY Show students a picture of a sculpted topiary plant. Explain that the plant was specially pruned to grow in this way. Ask:

- **What traits could this plant pass down to its offspring?** Possible answers: the color and size of its leaves
- **What traits cannot be passed down?** the shape in which the plant was cut

How do plants survive in different places?

Plant parts may look different in different places, but the parts still help make food. The roots from seeds always grow down. Some plants have many leaves. Other plants have few or no leaves.

Quick Lab

Observe two different plants that are the same type. Tell about the traits the plants share.

▲ This tree and other plants in very dry places have small spiny leaves. These plants store water in thick stems.

▲ This banana tree and other plants in very wet places have large leaves. They get light in the thick, dark forest.

Quick Lab

whole class · 10 minutes

Objective Observe two plants to find out if plants grow toward light.

You need shoebox with hole, two seedlings, water, light source

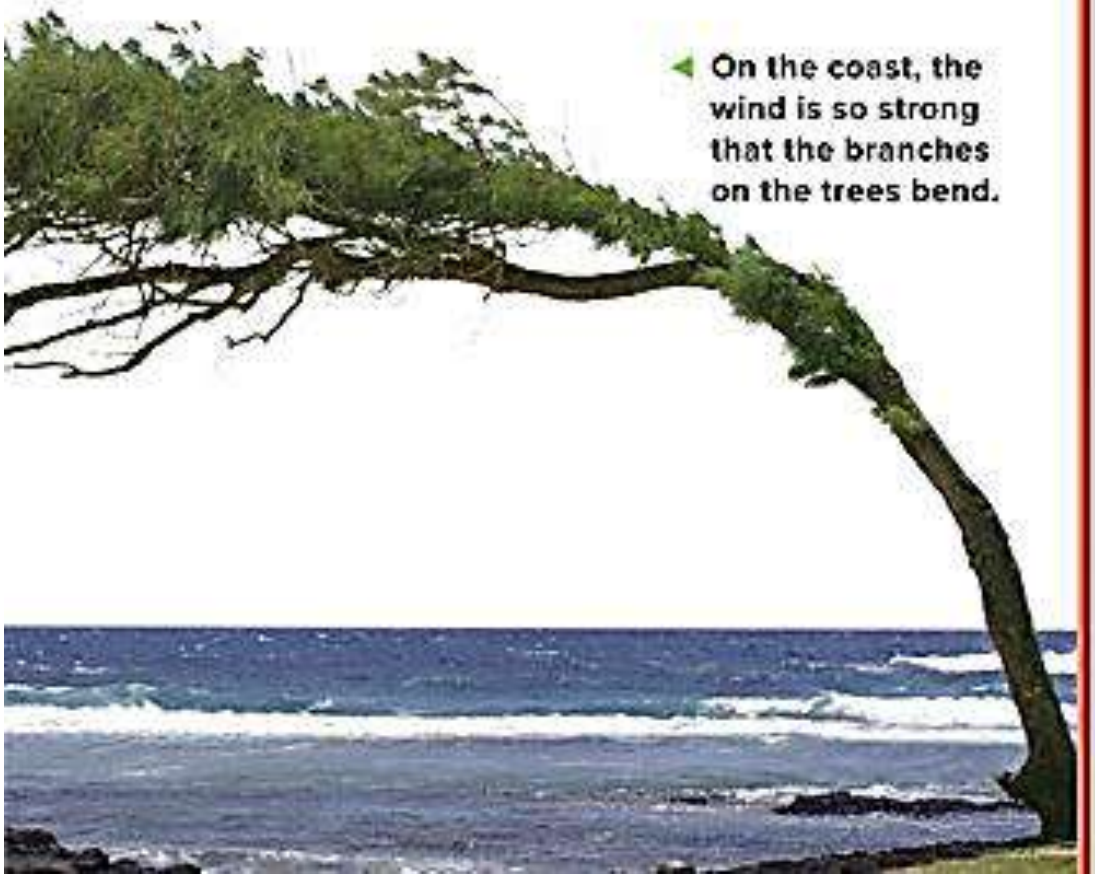
1. Place one seedling in the box, and seal the box tightly. Place both plants near a window. Open the box only to water the plant.
2. After one week, have students observe the seedlings. Ask: **What do you notice?** The boxed plant leans toward the hole.
3. Help students conclude that plants grow toward light.

Plants can change to stay safe too. Some plants have ways to stay safe from animals. Other plants need to stay safe from the weather where they live. When plants change during their lives, those traits are not passed down to their offspring.

Quick Check

2. Why do you think some plants have thorns?

Possible answer: to prevent animals from eating them



On the coast, the wind is so strong that the branches on the trees bend.

Develop Vocabulary

Use this word study activity to reinforce lesson vocabulary. Ask students to write an acrostic poem with the word *trait*. For example, T: To be like my parents, R: Running fast and liking math, A: A nose like Dad's, I: I have black hair and brown eyes like Mom, T: These traits make me look like a part of the family.

3 Close

Using the KWL Chart

Review with students what they learned about how plants and their parent plants are alike and different. Record their 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 how plants are alike and different.

Alike	Different
Plants grow to be like the parent plants they came from. They all need water, light, and nutrients.	Plants change to get the things they need and to stay safe in their environment.

Visual Summary

Write about what you learned.

Plant Traits

Possible answer: Plants get many of their traits from adult plants. Some plants may look different, but they will still have the same shape of flowers, petals, and leaves.

Plants Survive

Possible answer: Plants have traits that help them live and survive in their environments. Stems help plants in dry places store water. Leaves are big in wet places and small in dry places.

Think, Talk, and Write

1. **Classify.** Think of four ways that plants are like their parent plants.

Possible answers: leaf shape, flower shape, petal shape, grow best in the same environment

2. What can change the way plants grow?

Possible answers: soil types, location of light, wind

Essential Question How do plants get their traits?

Possible answer: Plants get their traits from their parents. Some plants might look a little different from their parents, but they will still have the same shape of flowers, petals, and leaves.

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

Distribute leaves to students. **Be Careful!** Make sure the leaves are not poisonous. Model how to move the crayon gently over a piece of paper covering the leaf to make a rubbing. Have students make a chart of the similarities and differences of the leaves.

Reading in Science

Objective

- Classify ways that plants can help people.

The Power of Periwinkle

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

Direct students to the photos. Explain that the flower in the photos is a rosy periwinkle. Ask

- **How is the forest in the photo different from the forests you know?** Possible answer: It is filled with rosy periwinkles.

Before Reading

Point out to students that rosy periwinkle grows in Madagascar, an island off the coast of Africa. Ask volunteers to find their state and Madagascar on a world map. Encourage students to identify the land and bodies of water that separate the two places. Ask:

- **How can flowers help people?** Possible answer: Flowers can make people smile and feel happy when they see them.
- **In what kinds of groups can scientists put flowers?** Possible answer: Scientists can group flowers by the way they look or how they are used.

During Reading

As students read, encourage them to look for details that tell how rosy periwinkle helps people. Ask:

- **How is rosy periwinkle helpful?** It is used to treat sore throats, toothaches, fevers, and upset stomachs.
- **Why is it important to keep forests safe?** Forests contain many useful plants that people need and scientists want to study.

Real World Reading in Science

The Power of Periwinkle

People who live in forests all over the world know about helpful plants. They use plants for food and building homes. They also use plants to make medicine.

One helpful plant is the rosy periwinkle. It first grew in Madagascar, and later people spread it around the world. People now use the plant to treat fevers, sore throats, toothaches, and upset stomachs.

Today some forests in Madagascar are being cut down. People clear the land to grow food. Scientists want to keep these forests safe. There may be more helpful plants to study and use.

44
EXTEND

LA Support

Use Pictures and Text Have students describe the different plants in the pictures. Ask students to use words from the story and captions to tell what they know about the pictures. Explain the use of words like *treat* and *clear*. Ask comprehension questions, such as: **How can rosy periwinkle help people?**

BEGINNING Point to the images of trees, flowers, and plants in the photo. State the word for each. Have students point to the pictures and repeat the words after you.

INTERMEDIATE Ask students to use words and short sentences to tell how rosy periwinkle is used and why scientists want to keep forests safe.

ADVANCED Encourage students to create sentences that tell how rosy periwinkle is used. Have them read their sentences to the class.

▲ Scientists and local people use the rosy periwinkle to treat diseases.

Rosy periwinkle ► plants

Classify. Make a list of plants you know. Classify them by how they help people. Possible answers shown.

Plants	Uses
peppermint	treats stomachaches
ginger	treats stomachaches and nausea
tomato	plants grow food that people eat

Integrate Reading

Suffixes

Write the word *helpful* on the board. Ask students to find the word in the story.

Circle the suffix *-ful*. Explain that *-ful* changes the word *help* into an adjective that means "full of help."

Write the words *care*, *wonder*, *fear*, and *cheer* on the board. Have students identify the meaning of each. Then have them add the suffix *-ful* to each word. Ask volunteers to give definitions for the adjectives.

After Reading

Discuss with students the many ways that people use plants and record their answers on chart paper. Have students review the article to identify how people in Madagascar use plants. Ask:

- **How do people who live in forests use plants?** for food; to build homes; to make medicine

Draw a Classify Graphic Organizer on chart paper. Remind students that when they classify, they group things by how they are alike. Review students' discussion responses and ask them how they could group ways that people use plants. Write two of the grouping schemes on the chart, such as *Food* in one column and *Medicine* in the other.

Food	Medicine
apples	treat fever
peanuts	treat toothache
lettuce	treat sore throat

If students are having difficulty, have them list plants that they know about. Ask:

- **How do you use these plants?**
- **What kinds of things can be made from these plants?**

Ask students to draw things that are made from plants. Next, have them group the pictures. For example, students can put pictures of things made from wood in a group.

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.

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.

Science Skills and Ideas

BOOK 3

Answer the questions below.

5. Tell how plants are like their parent plants.

Plants have the same traits as their parent plants, such as height, shape, and colors of flowers.

6. What do plants need to live and grow?

Plants need water, air, nutrients, and space to grow.

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

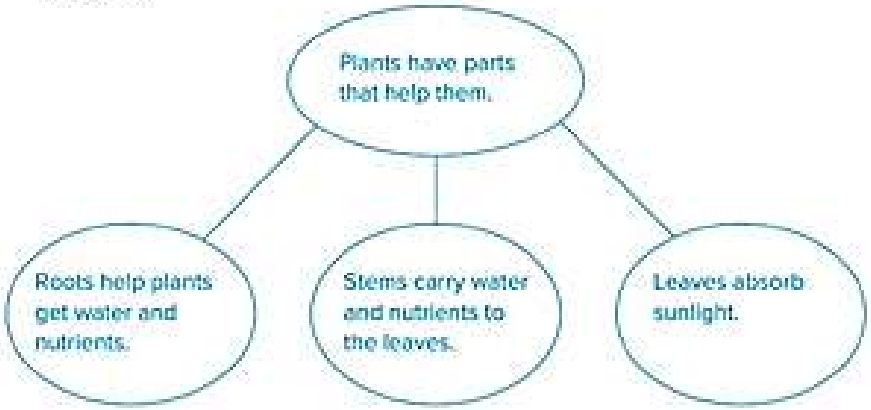
The plants are outside and can get sunlight. They can get water from rain and nutrients from soil.

CHAPTER 2 Review

Science Skills and Ideas

10. Students should address concepts taught in each lesson: telling what plants need; identifying parts of plants; comparing different plants.

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



9. Write about the plant parts you ate today.

Possible answers: Accept all foods derived from plants.

10. What do you know about plants?

Accept all reasonable responses.

Test Prep

1. How are plants different from other living things?

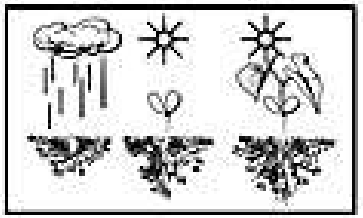
   (A) They use sunlight to make their own food.

   B They need air to grow.

   C They need water to survive.

   D They take up less space.

2. Look at the picture below.



   What does this picture show?

   A how a plant makes food

   B Plant life cycle

   (C) how a plant survives weather changes

   D how a plant gives off oxygen

3. What part of a plant takes in water and minerals from the soil?

   A stem

   B flower

   C leaf

   (D) root

Test Preparation

1. Only plants use sunlight to make their own food. All living things need water, air, and space.
2. A life cycle shows the different stages in a plant's life.
3. Leaves and flowers do not move water around in a plant. Stems do move water and minerals, but do not take them in from the soil.

Depth of Knowledge

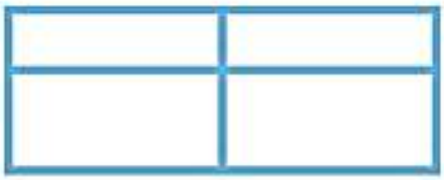
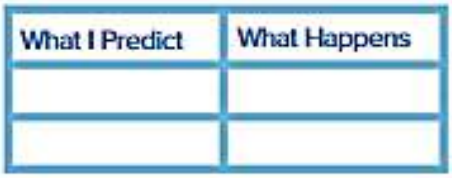
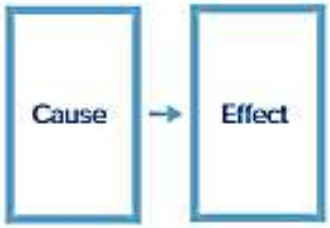
Level 1 Recall Level 1 requires memory of a fact, a definition, or a procedure. At this level, there is only one correct answer.

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.

CHAPTER 3 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
1 Animal Groups PACING: 2 days *FAST TRACK:* 1 day	■ Describe, classify, and compare animals. ■ Explain how animal parts help animals meet their needs.  **Reading Skill** Classify	mammal amphibian reptile insect
2 Animals Grow and Change PACING: 2 days *FAST TRACK:* 1 day	■ Explain that every animal has a life cycle. ■ Describe and compare the life cycles of animals.  **Reading Skill** Predict	life cycle larva pupa
3 Staying Alive PACING: 2 days *FAST TRACK:* 1 day	■ Identify how camouflage helps animals stay safe. ■ Explain how animals protect themselves.  **Reading Skill** Cause and Effect	adaptation camouflage

Activity Planner

EXPLORE Activities

Explore

PACING: 20 minutes

Objective Compare and contrast the differences between a variety of animals.

Skills classify, compare

Materials Animal pictures, paper, pencils

PLAN AHEAD Provide enough pictures of animals for every student. Pair students together who have different abilities in doing this activity.

Explore

PACING: 20 minutes

Objective Compare and contrast how adults and babies are alike and different.

Skills compare

Materials paper, pencils

PLAN AHEAD Pair students of different abilities.

Explore

PACING: 25 minutes

Objective Explore the importance of camouflage.

Skills infer

Materials scissors, two pieces of patterned paper per grouping, stopwatches, plain paper

PLAN AHEAD Each pair needs two pieces of patterned paper.

QUICK LAB Activities

Quick Lab

PACING: 15 minutes

Objective Explain how animal parts help animals meet their needs.

Skills make a model, communicate, compare

Materials card stock, construction paper, shiny paper, felt, aluminum foil, pipe cleaners, glue, scissors, tape

PLAN AHEAD It may be a good idea to make an example of an animal model to show students.

Quick Lab

PACING: 15 minutes

Objective Explain the life cycles of different animals.

Skills communicate

Materials index cards, yarn, crayons

PLAN AHEAD Have materials available that describes the life cycle of various animals.

Quick Lab

PACING: 15 minutes

Objective Explore why eyes are where they are on animals.

Skills compare, infer

Materials cardboard tubes, paper, pencils

PLAN AHEAD Ask students to bring in paper towel rolls from home.

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
mammal amphibian reptile insect life cycle larva pupa adaptation camouflage	classify compare infer

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 An *adaptation* is a body part or a way of acting that helps an animal stay alive.

Example The giraffe's long neck is an *adaptation*.

Ask What are some *adaptations* that help a shark live?

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

Vocabulary Activities

Help students understand the concept of adaptation.

BEGINNING Draw a two-column chart and write *giraffe*, *snow leopard*, and *turtle* in the first column. Have students look for pictures of these animals in Lesson 3. Discuss each animal's adaptation and write it in the second column. Ask students to read the completed chart with you.

INTERMEDIATE Working in pairs, have students look at the animals pictured in Lesson 3. and then classify them in a three-column chart according to the type of adaptation shown, body part, color, or behavior. Then help students form sentences that describe the adaptations.

ADVANCED Working in small groups, help students choose an animal from those pictured in Lesson 3. and write a short first-person riddle to ask another group. Model writing the riddle on the board. Example: *I swim in a group. It helps me stay alive. Which animal am I?* (a fish)

CHAPTER 3

Animals

THE BIG IDEA How do animals grow and change?

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, and then ask:

- How can we classify animals?
- How do different kinds of animals grow and change?
- What do animals need to keep safe?

Answers shown represent sample student responses.

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

CHAPTER 3

Animals

How do animals grow and change?

Answers will vary. Accept all reasonable answers.

Vocabulary

mammal an animal with hair or fur that feeds milk to its young

life cycle how a living thing grows, lives, has young, and dies

larva the stage in the life cycle of some animals after they hatch from eggs

adaptation a body part or the way an animal acts that helps it stay alive

Differentiated Instruction

Instructional Plan

Chapter Concept All animals meet their needs and have life cycles.

EXTRA SUPPORT Students who need to contrast basic groups of animals should cover all of Lesson 1 before continuing through the chapter.

ON LEVEL Students who can distinguish basic animal groups may do the Lesson 1 Explore Activity as review and then go directly to Lesson 2 to compare life cycles of groups of animals.

ENRICHMENT Students who are ready to go beyond the Chapter 3 concept may explore animal survival, 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.

Animals		
What We Know	What We Want to Know	What We Learned
Frogs are some type of animal.	In which animal group are frogs?	Frogs belong to the amphibian group.
Caterpillars become butterflies.	How do caterpillars become butterflies?	Butterflies begin as eggs. The egg hatches into a caterpillar or larva. The caterpillar turns into a butterfly.
Birds fly away from cats.	Why do birds fly away from cats?	Birds fly away to stay safe.

Vocabulary

- Have a volunteer read the **Preview Vocabulary** words aloud to the class. Ask students to find one or two of the words in the chapter. 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.

Lesson 1 Animal Groups

Objectives

- Describe, classify, and compare animals.
- Explain how animal parts help animals meet their needs.

1 Introduce

▶ Assess Prior Knowledge

Have a discussion with students about animals. Ask:

- **What are some different kinds of animals?**
- **How are animals the same and different?**

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

Warm Up

Start with a Book

Read a book about different animals.

Before reading each page, ask:

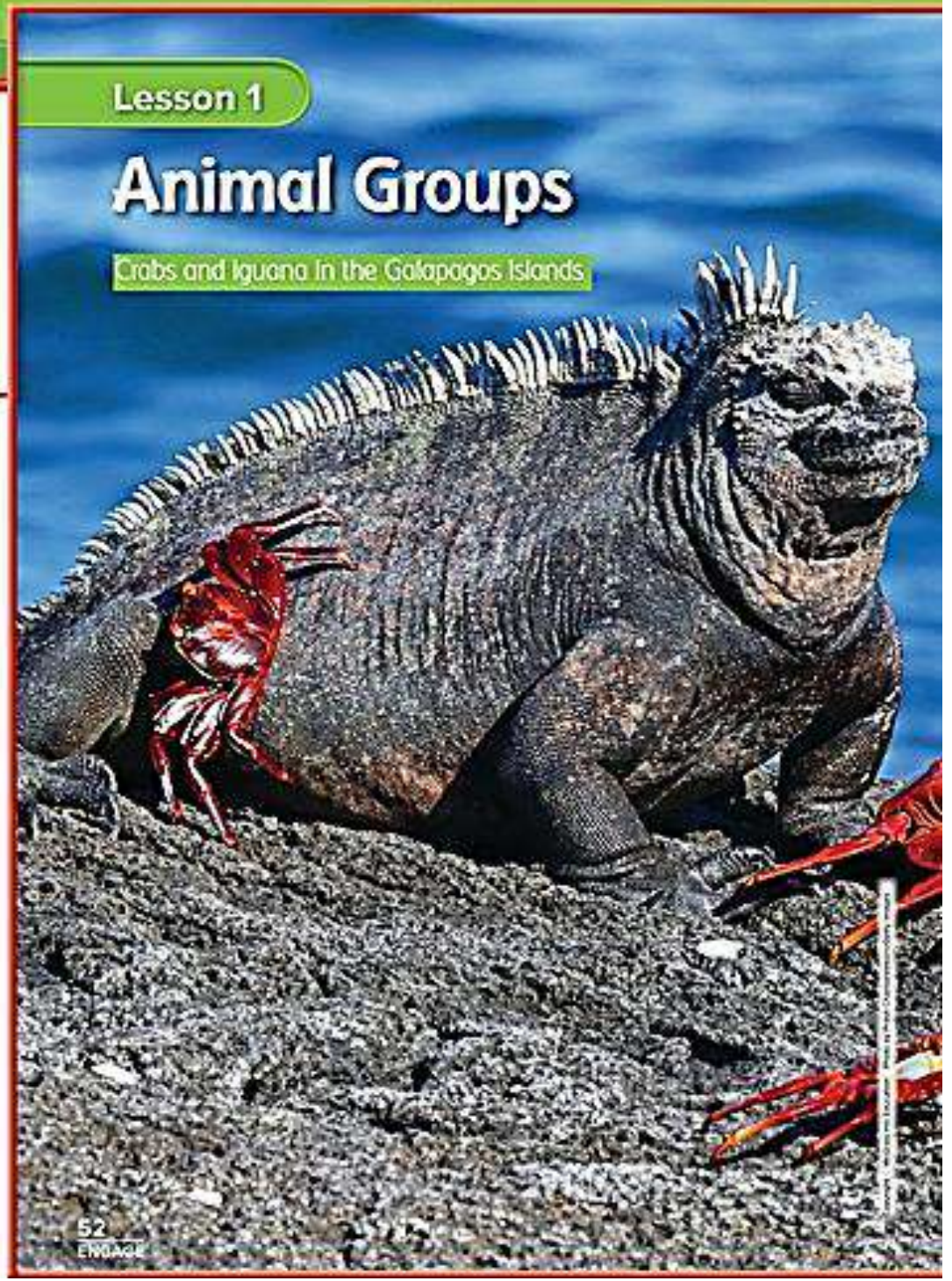
- **What do you know about this animal?**

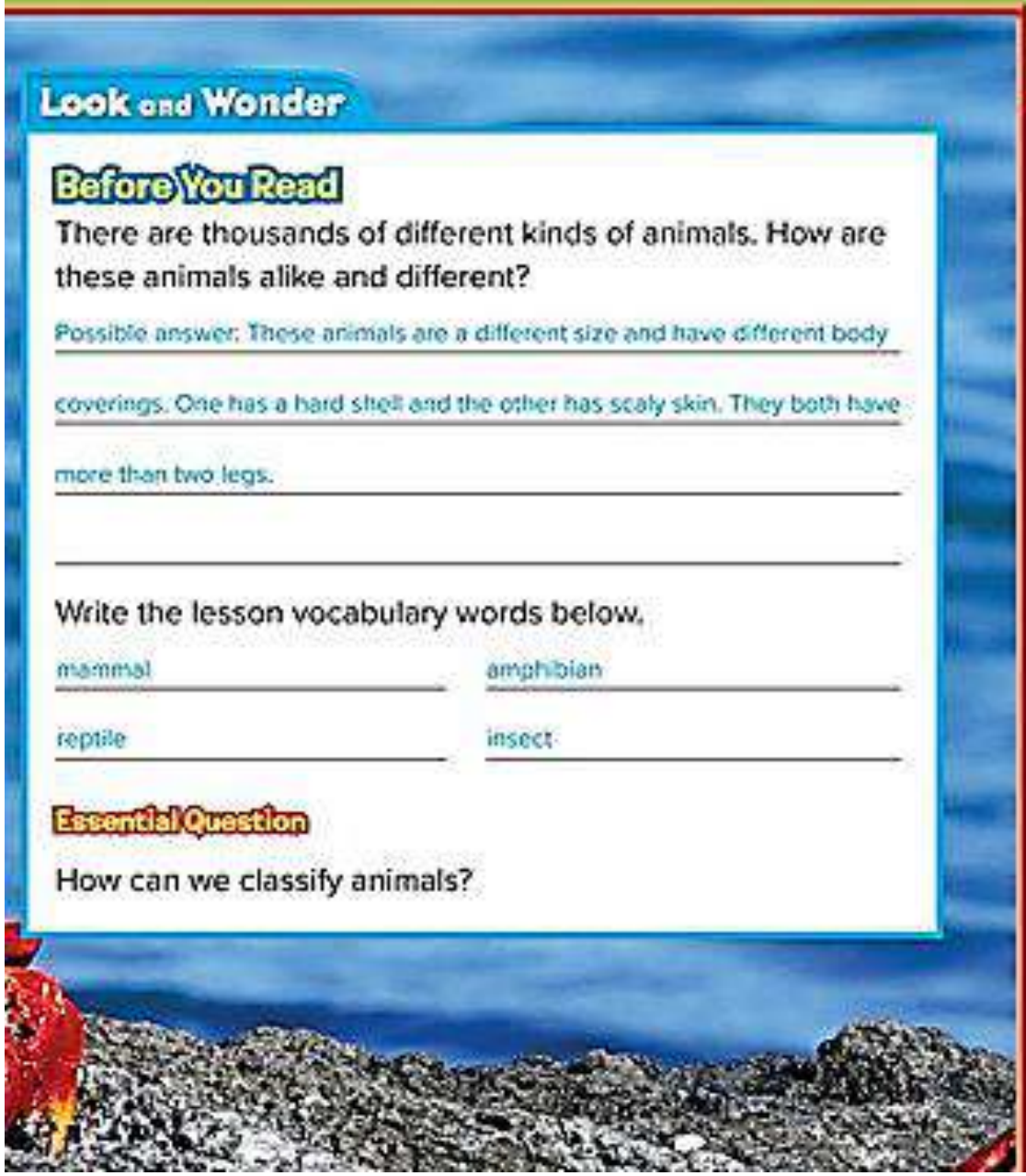
List the names of the animals on the board.

After reading, ask:

- **How are the animals the same?**
- **How are the animals different?**

Have students pick two animals to draw and write about how they are the same and different.





Look and Wonder

Read the Look and Wonder statement and question about animals.

Discuss students' responses to the question. Have students look at the picture. Ask:

- **What parts of these animals help them move?** Possible answer: their many legs
- **What kind of body coverings do the animals have?** Possible answers: a hard shell; scaly skin

Write students' responses on the KWL chart and note any misconceptions they may 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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

pairs | 20 minutes

Plan Ahead Provide enough pictures of animals for every student. Pair students together who have different abilities.

Purpose Students practice comparing by thinking about how animals are the same and different.

Structured Inquiry

What to Do

Begin by discussing how the animals pictured on the page are alike and different. Ask: **If we were to put these animals into two groups, animals with legs and animals without legs, how many would be in each group?** four with legs; two without legs. Ask: **How else could we sort them into two groups?** Possible answers: animals that swim/animals that do not swim; animals that fly/animals that do not fly

1. **Classify** Encourage students to look closely at each animal's body parts. To help students decide how they will group their pictures of animals, suggest that they think about how the animals move and where they live. Have students list their animal groups or make piles using pictures.
2. Ask students to look at their partner's animal groups and to silently predict how the partner grouped them. After students listen carefully to how their partner sorted the animals, ask partners to share their predictions.

Explore

How can we put animals into groups?






What to Do

1. **Classify.** Look at the pictures of the animals. Put the animals into groups. How did you decide to group the animals?

Answers may vary depending on students' groups. Possible answer: I grouped the animals by those with legs and those without legs.

2. Talk about the animal groups with a partner. What groups did your partner use?

Answers may vary. Possible answer: My partner grouped the animals into those that fly and those that do not fly.

Alternative Explore

How are animals alike and different?

Distribute an animal picture to each student. Have partners describe and compare their animals. Remind students to talk about what parts of their animals help them to survive and where the animals live. Model for students how to fill out a Venn diagram. Have the partners complete a Venn diagram using their animals.

3 **Compare.** How are your groups and your partner's groups alike? How are they different?

Accept all reasonable responses.

Explore More

4 **Classify.** Think about animals that live on land. How can you classify them?

Group number	Group name	Group properties

Open Inquiry

Investigate one of the animals in your groups.

My question is:

Sample question: How do these animals survive?

3 **Compare** Have students find out which of their animals fit into their partner's groupings.

Guided Inquiry

Explore More

4 **Classify** After students are done sorting their animals into groups, ask: **What did you learn about animals? What information did you find about the animals in each group?**

Open Inquiry

Encourage students to further explore one of their animal groups. Help them think of questions, such as: **What are some other ways the animals in my group are similar?**

2 Teach

Read and Respond

Reading Skill Classify To put things that are alike into groups.

How do we group animals?

▶ Discuss the Main Idea

Main Idea Animals are classified into different groups by their physical characteristics.

Read the blue question and allow students to respond.

After reading together, ask:

- **How do scientists classify animals?** animals with and without backbones
- **What do all animals need to stay alive?** food, water, air, shelter, and space to live
- **How do animals get what they need?** different body parts help them meet their needs

Read and Respond

How do we group animals?

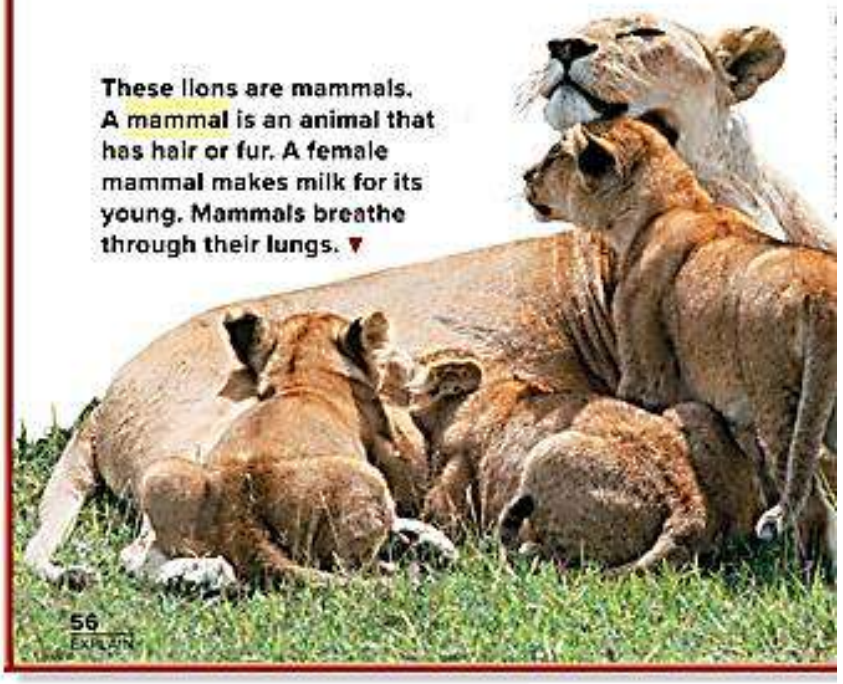
All animals need food, water, air, shelter, and space to live. They have different parts that help them get what they need to live.

Scientists classify animals into two main groups. One group is vertebrates. The other group is non-vertebrates. Here are some animals with backbones.

Quick Check

1. Why is a lion a mammal?

Possible answer: We classify a lion as a mammal because it has fur and lungs and the female lion makes milk for its babies.



These lions are mammals. A mammal is an animal that has hair or fur. A female mammal makes milk for its young. Mammals breathe through their lungs. ▼

Science Background

Vertebrates Vertebrates, animals with backbones, can be divided into endothermic and exothermic animals. Endothermic animals, such as mammals and birds, have internal processes that keep their bodies warm. Exothermic animals, such as fish, reptiles, and amphibians, depend on their environment to regulate the temperature of their bodies.

LA Support

Practice Using Language Collect a set of photos of mammals and make name cards to go with each picture.

BEGINNING Display the name cards face up and help students identify the names of each animal. Have each student take a photograph card from a pile, and help them find the name card that matches the picture.

INTERMEDIATE Show students the pictures and have them describe two features of each animal.

ADVANCED Have students describe each animal and explain how they can tell that it is a mammal.

This is a bluebird. Birds are the only animals with feathers. All birds have two wings and a beak that they use to get food. They lay eggs to hatch their young. ▶

▲ Fish, such as this sheri, live in water. Their gills help them breathe. Their fins help them swim.

▶ This salamander is an amphibian. Most amphibians begin their lives in water. Their moist skin helps them live on land and in water.

This baby alligator is a reptile. It has rough, scaly skin to help protect it. ▼

FACT Birds are not the only animals that hatch from eggs. Other animals such as alligators, butterflies, and snakes do too!

▶ Address Misconceptions

Students may think that only birds hatch from eggs.

FACT **Birds are not the only animals that hatch from eggs. Other animals such as alligators, butterflies, and snakes do, too!** Show students pictures of these and other animals hatching from eggs, so students can see that a variety of animals hatch from eggs.

▶ Use the Visuals

Look at the pictures and read the captions. Ask

- **What are the different kinds of animals that have backbones?** mammals, birds, fish, amphibians, reptiles
- **How is a reptile different from an amphibian?** reptiles: rough, scaly skin; amphibians: moist skin

▶ Develop Vocabulary

mammal Have students make a list of as many mammals as they can. Ask students to write a sentence about one of the mammals on their lists. They should explain why the animal is a mammal.

amphibian Explain that *amphibians* are animals that can live on both land and water. Make a list of *amphibians* with students. Ask them to write a sentence using one of the listed words and the word *amphibian*.

reptile ***Word Origin*** Tell students that the word *reptile* comes from the Latin word *reptilis*, which means "crawling." Explain that *reptile* is derived from a word about crawling because that's how *reptiles* move.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Display pictures of animals belonging to *mammal*, *bird*, *fish*, *amphibian*, and *reptile* animal groups. Explain to students why those animals were placed in their group. Provide students with additional animal pictures and ask students to sort the pictures into animal groups. Have them explain why they placed each animal in a particular group.

ENRICHMENT Ask students to select a research topic of an animal function. For example: *How do animals breathe?* Or: *How do animals move?* Give students books to research different animals. Encourage them to gather information about animals from at least three animal groups. They can present their research on an illustrated poster. Suggest that students share their posters with the class.

What are some animals without backbones?

Discuss the Main Idea

Main Idea Animals without backbones have parts to help them meet their needs.

Read the blue question. Have students discuss which animals they think do not have backbones.

After reading, ask:

- **What are some animals with a hard body coverings?** Possible answers: beetle, dragonfly, blue crayfish
- **How can you tell whether a bug is an insect?** Possible answer: count its legs; an insect has six legs

Read a Diagram

Explain to students that there are more animals in the insect group than all the other animals combined.

This jellyfish has no hard body coverings. It stings other animals to stay safe and get food.

What are some non-vertebrates?

There are many kinds of animals that have no backbones. There are more without backbones than with backbones! Some animals without backbones have hard body coverings that keep them safe.

Read a Diagram

How do the body parts of a beetle help it meet its needs?

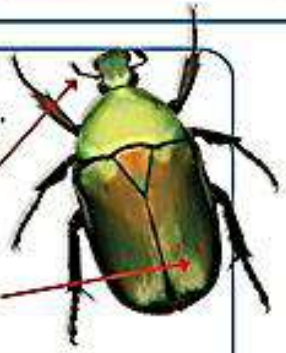
Possible answer: wings to fly; hard shell to keep it safe; antennae to feel, taste, and smell; legs to climb

Beetle

An **insect** is an animal with six legs, antennae, and a hard, outer shell.

The antenna helps insects feel, taste, and smell.

The outer shell helps keep insects safe. The legs help insects climb on smooth or rough places.



Quick Lab

Individual · 15 minutes

Objective Explain how animal parts help animals meet their needs.

You need card stock, construction paper, shiny paper, felt, aluminum foil, pipe cleaners, glue, scissors, tape

1. Invite students to make a model of an animal. Have them use the different art elements to represent important body parts that help their animal meet its needs.
2. Ask students to discuss their partner's animal and communicate how its body parts meet its needs.
3. Have students compare how their animal models are the same and different.

Quick Lab

Make a model of an animal. Show a partner how the animal meets its needs.

The dragonfly has a hard body covering. It uses its wings to fly away from its enemies.

Quick Check

2. How do animals without backbones stay safe?

Possible answers: Hard body coverings help protect some of them. Some have wings to fly away from danger. Some have stingers to hurt animals that try to harm them.

crayfish

earthworm

Develop Vocabulary

insect *Word Origin* Tell students that the prefix *-in* means "into" and in Latin *sect* means "cut." Ask students to look closely at the pictures of insects. Discuss how their bodies are divided into sections, as if they have been "cut into" three pieces and put together again.

3 Close

▶ Using the KWL Chart

Review with students what they have learned about animals and their different parts. Record their responses in the What We Learned column of the class KWL chart.

▶ Using the Reading Skill Classify

Use the reading skill graphic organizer to classify animals.

Backbones	Without Backbones
Mammals, fish, birds, amphibians	Insects

Formative Assessment

Make An Animal Accordion Book

Have students fold 46 × 61 cm paper into six even panels. Ask them to label the first panel with an animal book title, and then label the other panels with different animal groups. Tell students to draw a picture of an animal for each group and to write why that animal belongs in its group.

Visual Summary

Write about what you learned.

Animals With Backbones

Possible answer: Mammals, birds, amphibians, fish, and reptiles are all animals with backbones.

Animals Without Backbones

Possible answer: Animals without a backbone have hard body coverings that keep them safe. Insects, jellyfish, and crayfish are all animals without backbones.

Think, Talk, and Write

1. Classify How can you classify a lion and a salamander?

Mammal	Amphibian
A lion is a mammal.	A salamander is an amphibian.

2. What do animals need to stay alive?

Possible answers: food, water, air, shelter, and space

Essential Question How can we classify animals?

Possible answers: We can classify animals by their shapes, sizes, and the different body parts they have or do not have.

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.

Social Studies Link

Have students make a collage of animals without backbones and find out where they live. Supply students with nature magazines. Discuss with students how they can find out where the animals live.

Lesson 2 Animals Grow and Change

Objectives

- Explain that every animal has a life cycle.
- Describe and compare the life cycles of animals.

1 Introduce

▶ Assess Prior Knowledge

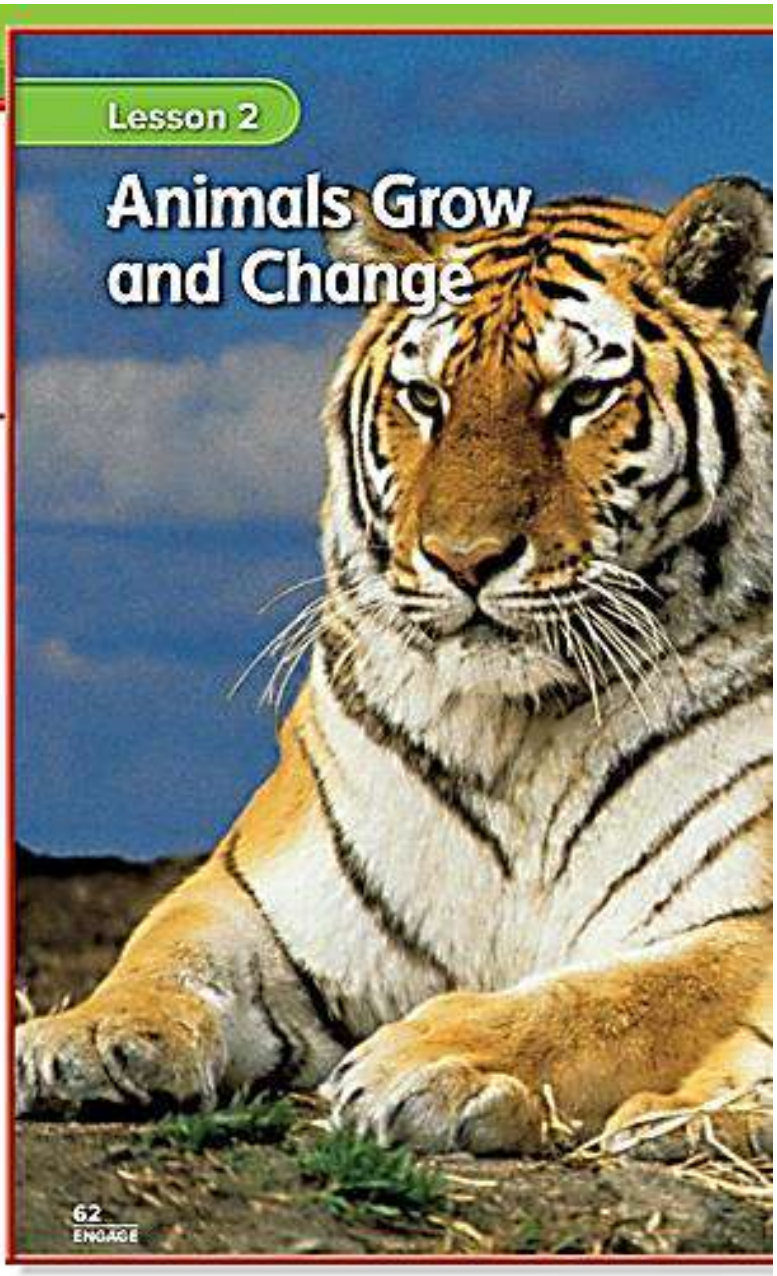
Have students share what they know about the life cycles of animals.

Ask:

- **What is a life cycle?** Accept all reasonable answers.

Have students describe a life cycle of an animal.

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



Warm Up

Start with a Poem

Find a poem about the life cycle of an animal. Write the words on chart paper and have students read the poem together. Ask:

- **What happens to a chick after it comes out of its shell?**
- **What other animals come out of eggs?**

Have students write their own animal life cycle poems and illustrate them.

Look and Wonder

Before You Read

How are baby animals different from their parents?

Possible answer: Babies are not able to take care of themselves. They depend on their parents for all their needs.

Write the lesson vocabulary words below.

life cycle

larva

pupa

Essential Question

How can animal life cycles be different?

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder question and discuss students' responses.

Ask:

- **Do all animals grow and change in the same way? How do you know?** Possible answer: No, some animals are born and others hatch from eggs.
- **How is a baby tiger different from its mother?** Possible answer: A baby tiger cannot care for itself. Its mother can care for herself.

Have students describe baby animals they have seen. Ask them to discuss how the animals are different from their parents.

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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

pairs | 20 minutes

Plan Ahead Pair students of different abilities together.

Purpose Students use what they know about human adults and babies to infer how animal adults and babies might look and behave.

Structured Inquiry

What to Do

Before pairing students for this activity, have a whole group discussion. Ask students who have very young siblings to describe how their baby brothers and sisters look and act.

1. Pair students and have them discuss what babies can do. Suggest that students make a list of the things they discuss.
2. Encourage partners to discuss things that adults can do that babies cannot do. Ask **What kinds of tools do adults use that babies do not use?** Possible answers: cars, phones, computers
   Remind students to discuss which activities both adults and very young students do, for example: sleep, eat, breathe.

Explore

How are babies and adults alike and different?

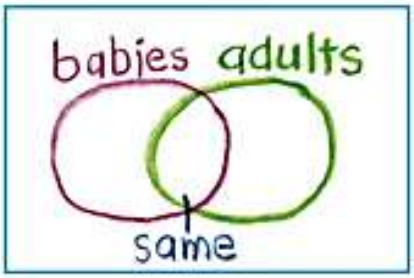
What to Do

1. What are some things that babies do?

   Possible answer: Babies crawl on their hands and knees. They make noises because they cannot talk. Babies cry a lot.

2. What are some things adults do?

   Possible answer: Adults go to work. They cook food and fix things. Adults drive cars, too.



Alternative Explore

How can you compare baby and adult animals?

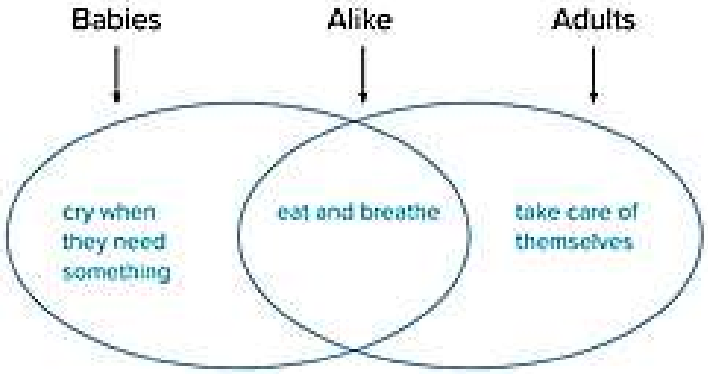
Distribute magazine pictures of baby and adult animals.

Ask students to describe the baby animals and what they are doing in the pictures. Have them do the same thing for the adult animal pictures.

Ask students to compare the baby and adult animals.

Inquiry Activity

3 **Compare.** Complete the Venn diagram to compare babies to adults. Possible answers shown.



Explore More

4 How are baby humans and baby tigers alike and different?

Possible answer: Baby humans and baby tigers both look like their parents. They both need food and shelter. Baby tigers have tails and stripes, but baby humans do not.

Open Inquiry

Investigate and compare adult and baby animals.

My question is:

Sample question: How are other babies alike and different from adults?

3 **Compare** Students will use a Venn diagram to record their discussion results. Ask: **What things do adults do that babies do not?** Possible answers: read, talk, drive

Guided Inquiry

Explore More

4 Suggest that students use a Venn diagram to show how a baby human and a baby tiger are alike and different. Ask: **To which animal group do both tigers and babies belong?** mammals

Open Inquiry

Encourage students to further investigate and compare other mammal babies and adults. If students have difficulty coming up with their own questions, ask: **Are there things that you think might be the same in all mammal babies? How could you find out?**

2 Teach

Read and Respond

Reading Skill Predict To make an educated guess about what might happen next.

What I Predict	What I Learned

What is a life cycle?

▶ Discuss the Main Idea

Main Idea All animals have life cycles.

After reading, ask:

- **How are mammals different from other animals when they have babies?** Mammals have live babies, other animals might lay eggs.
- **What is a life cycle?** how an animal grows, lives, has babies, and dies

Read and Respond

What is a life cycle?

Insects, birds, fish, reptiles, and amphibians lay eggs. Mammals give birth to live babies. Chickens are birds and lay eggs. All animals have a life cycle. A **life cycle** tells how an animal starts life, grows to be an adult, has young, and dies.

Quick Lab

Communicate. Act out the life cycle of an animal.

Giant Panda Life Cycle

Baby pandas grow inside their mothers' bodies. When they are born, they drink milk from their mothers so they can grow.

Chicken Life Cycle

Baby chickens, or chicks, break the shell to get out of an egg. They can see, walk, and feed themselves after they hatch.

Classroom Equity

Some students may have a hard time seeing the connection between science and their futures. For example, many students love the idea of working with animals, yet often don't realize the role that science can play in such work. Pair students in teams and list five ways in which people who take care of or work with animals use science.

LA Support

Practice Using Language Use the pictures to help students practice using language in a supportive setting while learning about animal life cycles.

BEGINNING Describe each picture and have students point to the correct picture. Ask them to name each animal.

INTERMEDIATE Read the captions with students. Have students look at the pictures again and describe in their own words what happens in each stage.

ADVANCED Have students explain how a baby chick is different from a baby panda. Talk together about the life cycle of a cat or rabbit.

Quick Check

1. What are the stages of a life cycle?

Possible answer: born, grow to be an adult, have babies, die

A baby panda grows up to be an atdult. The adult panda may have a baby of its own.

The chicks grow up to be adult chickens. The hens, or female chickens, lay eggs.

Read a Diagram

How is the life cycle of a panda different from the life cycle of a chicken?

Possible answer: Baby panda: born live, drinks mother's milk, cannot see; Chick: hatches from egg, feeds self, can see

Address Misconceptions

Students may think that all mammals have the same gestation period. However, different mammals carry their young for different periods of time.

FACT **It takes nine months for baby humans to grow before they are born. It takes four months for a baby panda to grow.** Have students research the time it takes other baby mammals to grow inside of their mothers.

Read a Diagram

Explain to students that animals have different life cycles. Tell them that each photo represents a different stage in the life cycle of each animal. Point out that the photos on the left show the animals as babies. Explain that as you move across each diagram, the animals pictured are older.

Develop Vocabulary

life cycle ***Word Origin*** *Cycle* means "*circle*." Ask students to explain why the word *cycle* is used in *life cycle*. Possible answer: A circle goes around and around and a life cycle happens over and over. Have students give examples of *life cycles*.

Quick Lab

small groups · 15 minutes

Objective Explain the life cycles of different animals.

You need index cards, yarn, crayons

1. Divide the class into small, mixed-ability groups.
2. Have students decide which animal's life cycle they want to act out. Students may need resources to find out more about the life cycle of their chosen animal.
3. Encourage students to prepare name necklaces to indicate which animal or life cycle stage they are demonstrating.

What are some other animal life cycles?

▶ Discuss the Main Idea

Main Idea Some animals do not begin their lives looking like their parents.

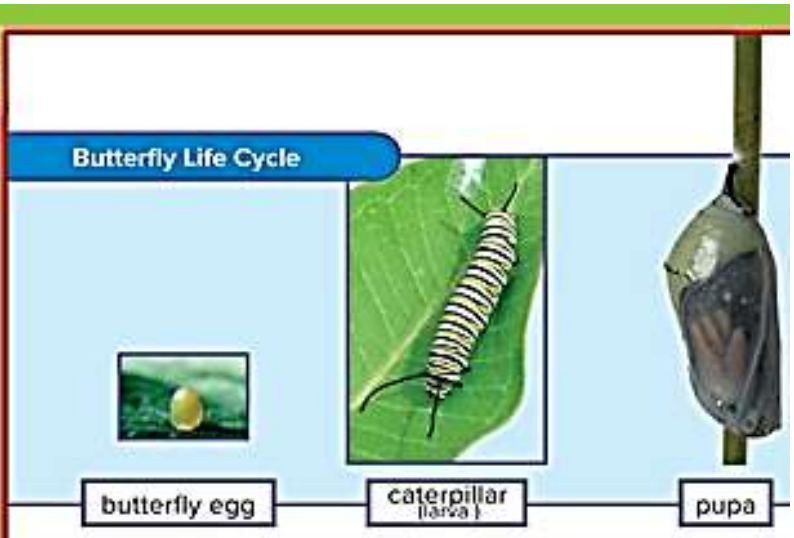
After reading, ask:

- **How is the life cycle of a butterfly different from the life cycle of a chicken?** Possible answer: A butterfly goes through a pupa and larva stage; a chicken does not.

▶ Use the Visuals

Look at the pictures and read the captions. Have students describe the pictures. Ask:

- **How is the young butterfly different from the adult butterfly?** The wings of the young butterfly are closed and the butterfly is still attached to its covering. The adult butterfly's wings are open and it is unattached.



What are some other animal life cycles?

Insects, such as butterflies, do not start out looking like their parents. They change during their lives.

Butterflies begin as eggs. The next stage after an egg hatches is called the **larva**. A caterpillar is the larva of a butterfly. Caterpillars eat plants to grow.

When a caterpillar is ready to change, it stops moving and eating. It finds a place where it can pupate. Its skin becomes a hard shell. Inside the shell, the caterpillar is slowly changing. This is the **pupa** stage, the caterpillar grows wings and its body and legs change. Soon a butter comes out of the shell.

Differentiated Instruction

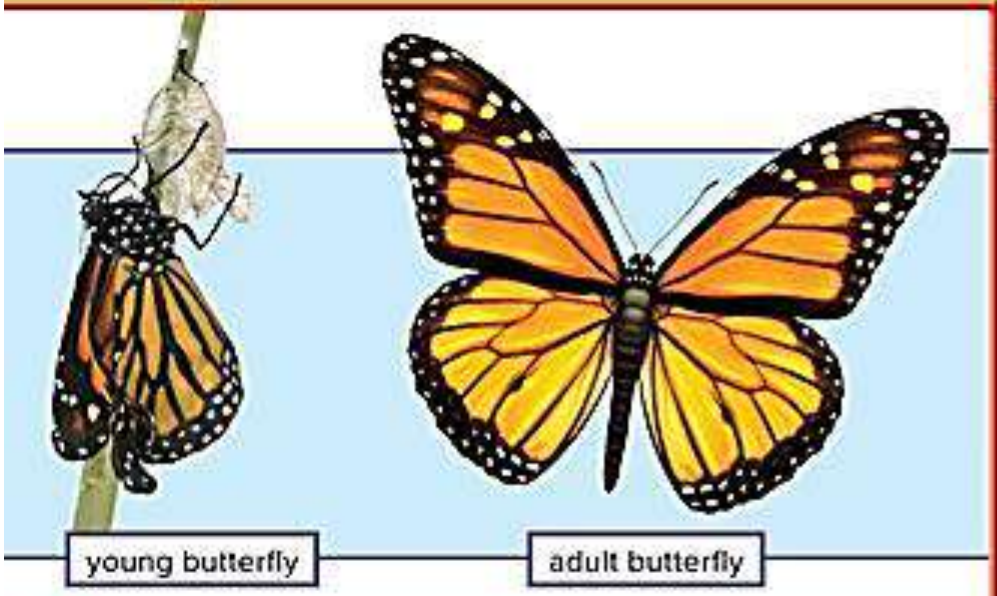
Leveled Questions

EXTRA SUPPORT Ask questions such as these to check for comprehension:

- **Which animals do not look like their parents when they are young?** butterflies, frogs, crabs
- **What is the caterpillar stage of the butterfly's life cycle called?** larva

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

- **How is the life cycle of a butterfly different from the life cycle of a squirrel?** Butterflies have larval and pupal stages; Squirrels are born live.
- **Why are caterpillars found on plants?** Caterpillars eat plants.



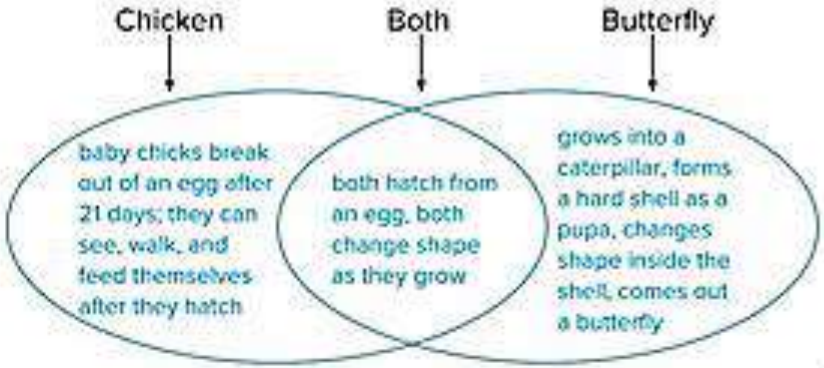
Quick Check

2. How does a caterpillar become a butterfly?

Possible answer: The caterpillar eats plants, forms a hard shell, changes shape inside the shell, and comes out as a butterfly.

Quick Check

3. Compare the life cycle of a chicken and a butterfly. Use the Venn diagram below.



Develop Vocabulary

larva In Medieval Latin, *larva* meant "mask." Tell students that Carolus Linnaeus, the scientist who developed the animal classification system, used this term in 1691 to described newly-hatched insects. Explain to students that at the larval stage, the animal does not look like its parents, so it is difficult to tell what it will become. It is as if the animal is masked until it grows to be an adult.

pupa Have students compare eggs and pupa, using the word *pupa* in their responses. Students should note that in both instances the animal is changing inside of a shell.

3 Close

Using the KWL Chart

Review with students what they learned about the life cycles of animals. Record their responses in the What We Learned column of the class KWL chart.

Using the Reading Skill
Predict

Use the reading skill graphic organizer to reinforce lesson content. Ask **What would happen if you found a stick with a pupa on it and brought it indoors?**

What I Predict	What Happens
The pupa will stay on the stick. After a while, a butterfly will come out.	

Formative Assessment

Compare the Life Cycles of Different Animals

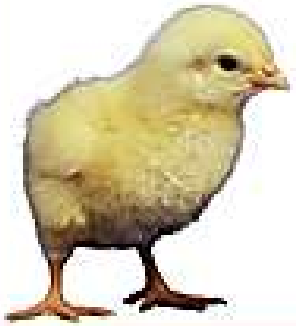
Distribute two cards with the name of an animal written on each one. Have students compare the life cycles of the two animals. Encourage them to use a Venn diagram to record how the life cycles are alike and different.

Visual Summary

Write about what you learned.

Mammals

Possible answer: Mammals give birth to live babies. Mammals grow and change to look like their parents.



Chickens

Possible answer: Baby chicks hatch from an egg after 21 days.

Butterflies

Possible answer: Butterflies hatch from eggs and grow to be caterpillars. A caterpillar is the larva of a butterfly. Caterpillars change into butterflies while they are in the pupa stage.

Think, Talk, and Write

1 **Predict.** What will the butterfly do when it is an adult?

What I Predict	What Happens
Possible answer: The butterfly will live, lay eggs, and die.	Possible answer: The butterfly lays eggs then dies.

2 How is the life cycle of a panda the same as the life cycle of a human?

Possible answers: For both, babies grow inside their mothers, the mothers feed their babies milk, and the babies need to be cared for by their parents.

Essential Question How can animal life cycles be different?

Possible answer: Animals can grow and change in different steps. Some animals are born alive and look like their parents right away. Other animals do not start out looking like their parents. They hatch from eggs and change shape.

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.

Social Studies Link

Provide books and resources for students. Suggest that they research animals from different groups. Remind students to label animals and to provide average animal life span numbers in their chart.

Reading in Science

Objective

- Describe how bats grow and change.

Meet Nancy Simmons

Genre: Biography a book about a real person's life

Have students read the title and look at the photo. Read the caption together. Ask:

- **Who will you read about?** Nancy Simmons
- **What does Nancy Simmons study?** bats

Before Reading

Ask students to share what they know about bats. Point out that the photos help to show the size of bats and their behavior. Ask:

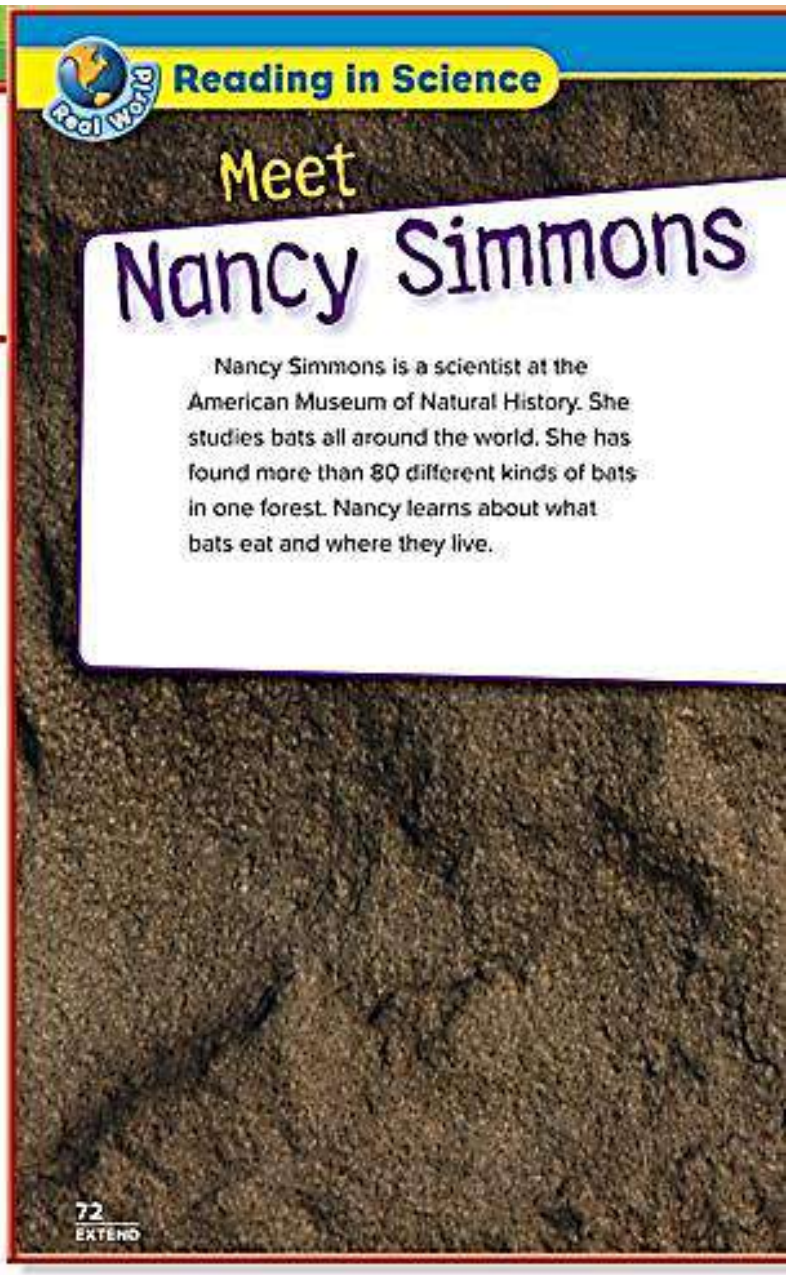
- **Why would a scientist study bats?** Possible answer: to learn where and how they live

Display a prediction graphic organizer. Ask students to predict what they will learn about bats. Write their predictions in the first column.

During Reading

Read the article together. Then ask:

- **Where does Nancy Simmons go to study bats?** all around the world; forests
- **What does she learn about bats?** what bats eat and where they live
- **What does this story tell you about bats?** Possible answers: There are more than eighty different kinds of bats. Bats give birth to one baby at a time. The bat pup gets milk from its mother. After a few months, the pup is ready to fly.



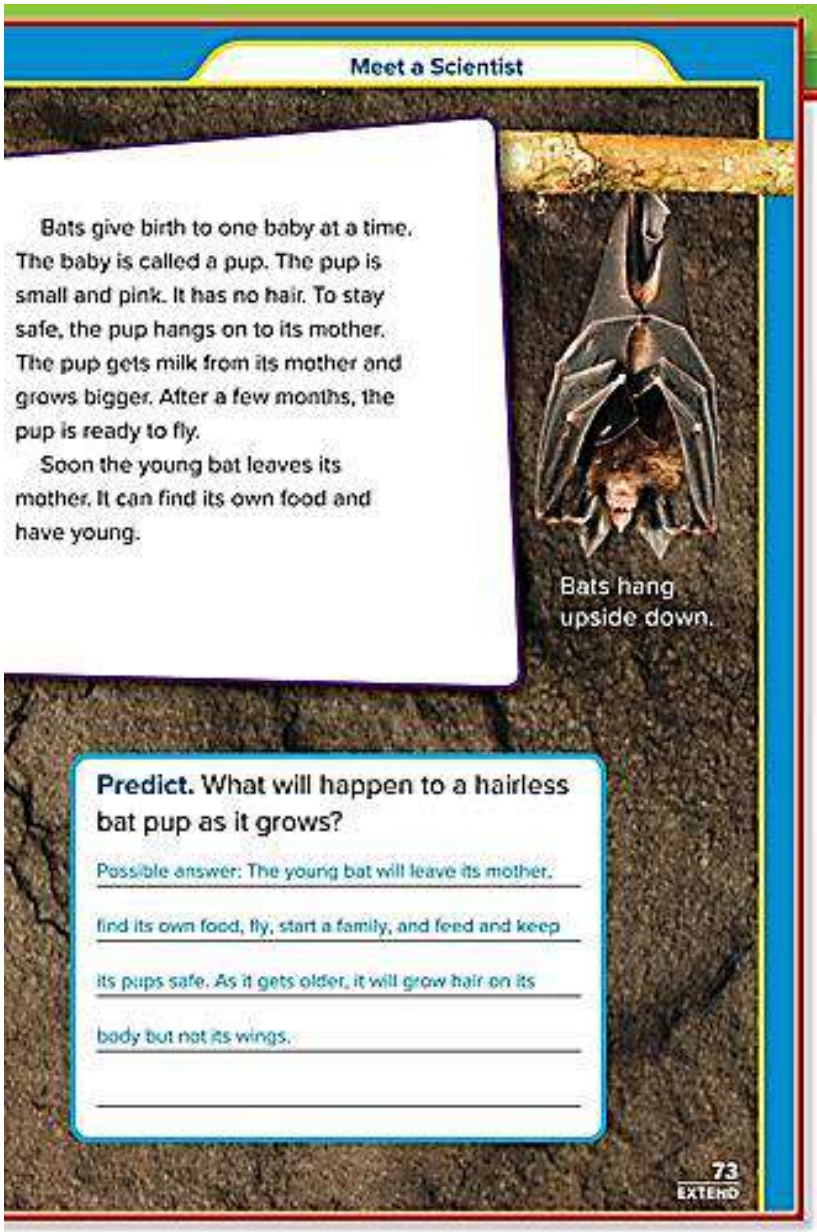
LA Support

Clarify/Ask Questions Ask questions about the article, such as: **What are pups? What do pups eat? Can pups fly?** Have students describe the bats. Write their observations on the board. Then have students find three words to describe what pups look like. Encourage them to form statements, such as: *Pups are small. Pups drink milk.*

BEGINNING Give students short descriptions of adult and baby bats, such as: *These are pink. These are small. These can fly.* Have students name what was described by using the words *bats* or *pups*.

INTERMEDIATE Have students use short sentences to give two ways that pups are different from adult bats.

ADVANCED Ask students to explain in their own words how pups are different from adult bats.



Integrate Reading

Classify Animals

Draw a chart with two columns on the board. Label the first column *Animal* and the second column *Baby's Name*. Write *bat* in the first column.

Ask students to look through the article to find what a baby bat is called. Write *pup* in the second column.

Have students think of other animals and the names of their offspring. Fill in the chart accordingly.

▶ Address Misconceptions

Students may believe that bats are blind. Bats are nocturnal (active at night), but not blind. In fact, many bats can see very well. Bats hunt at night. They rely on sound waves instead of their vision to make their way around in darkness. This process is called *echolocation*. With echolocation, bats can accurately sense where objects are, although they use their vision as well.

After Reading

Review and discuss students' predictions. For each prediction, have students talk about what happens in the article. Write their responses in the second column.

What I Predict	What Happens
I will learn what Nancy Simmons studies	She studies where bats live and what they eat.
I will learn about a baby bat.	Baby bats are called pups. They stay with their mothers.
I will learn what baby bats eat.	Baby bats drink their mother's milk.

If students are having difficulty answering the question, ask students to reread. Ask them to retell the facts they learned about bats, and write them on sentence strips. Review the sentences and remove any strips that are not about how pups grow into bats. Mix up the fact strips, then have students put them in order. Ask them to draw a comic strip showing what happens to a pup as it grows.

Lesson 3 Staying Alive

Objectives

- Identify how camouflage helps animals stay safe.
- Explain how animals protect themselves.

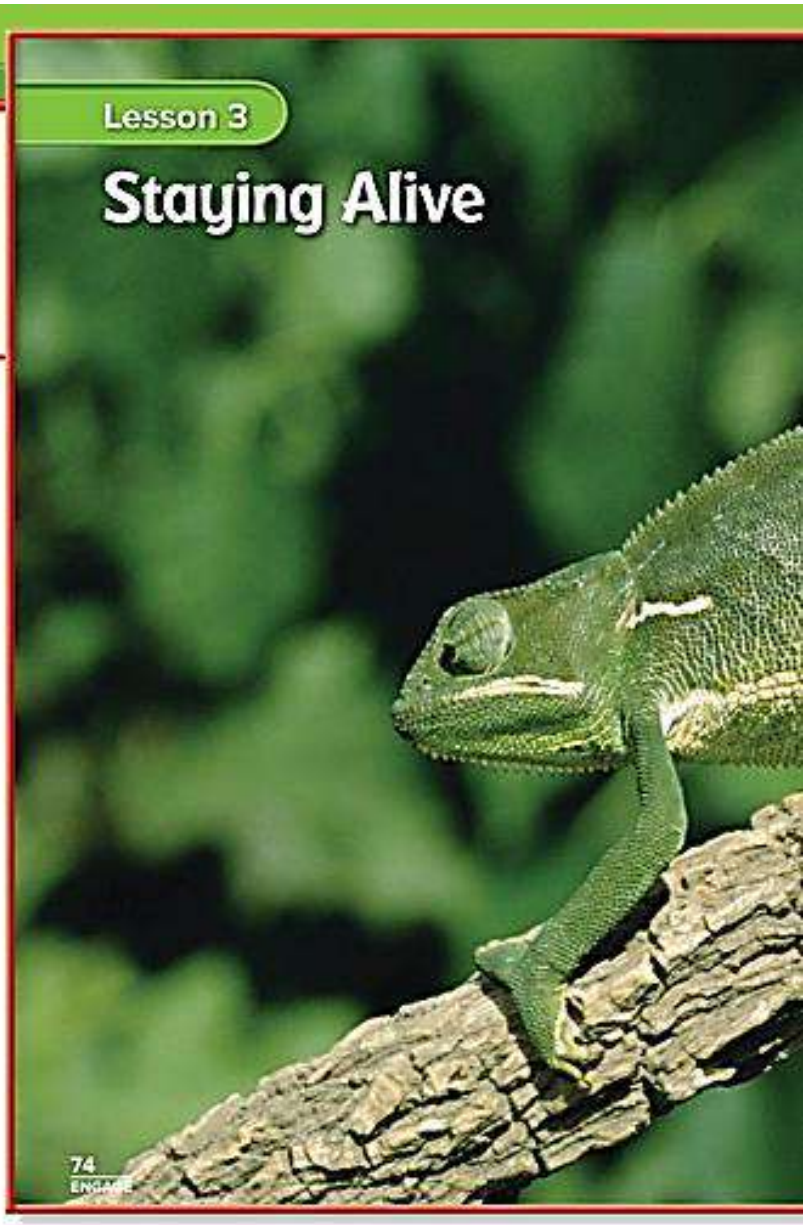
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about how animals keep themselves safe. Ask:

- **From what do animals need to protect themselves?** Possible answers: other animals, including humans; the weather
- **How do different kinds of animals keep themselves safe?** Possible answer: Different parts of their bodies help keep animals safe.

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



Warm Up

Start with a Model

Show students various toy models of animals. Have students identify the animal parts and discuss how they are used to help the animal get what it needs to live.

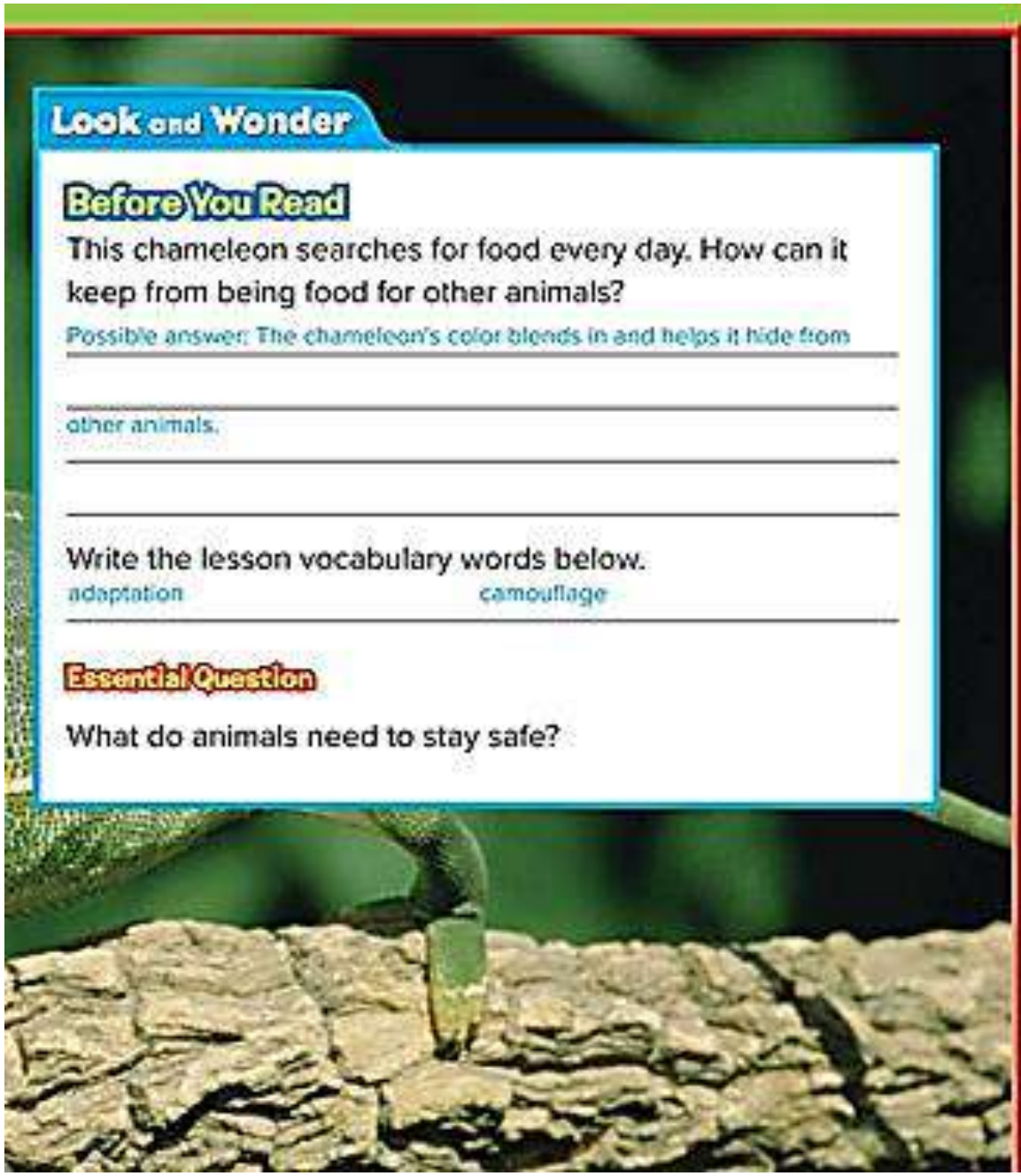
For each animal, ask:

- **How does this animal keep itself safe?**

Discuss with students what they know about the animals and where they live. Ask:

- **Which parts of these animals help keep them safe?**

Have students draw one animal and where it lives.



Look and Wonder

Before You Read

This chameleon searches for food every day. How can it keep from being food for other animals?

Possible answer: The chameleon's color blends in and helps it hide from other animals.

Write the lesson vocabulary words below.

adaptation camouflage

Essential Question

What do animals need to stay safe?

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder statement and question. Discuss students' responses. Ask:

- **Which parts of this animal help it protect itself?**
  Possible answers: its eyes, feet, and spiky skin
- **How does the animal's covering help it survive?**
  Possible answers: It helps it hide; it keeps it warm.

Write students' responses on the class KWL chart and note any misconceptions that they may 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: Animals need to protect themselves from danger or threat. They also need a place to live to stay safe.

Explore

pairs | 25 minutes

Plan Ahead Each pair needs two sheets of patterned paper. If patterned paper is not available, newspaper can be used.

Purpose Students identify how animal traits help animals stay safe.

Structured Inquiry

What to Do

Read the steps of the activity aloud with students. Model how to use a stopwatch before they begin.

1. Show students the ideal size the shapes should be in order to fit all eight pieces on the paper.
2. Consider seating partners at different tables while they prepare patterned pieces. When the patterned papers are ready, partners can move to the table with the ready pattern.
3. Consider having all students begin at the same time, and asking them to raise their hands when their partner completes the activity. Record the time for each group as hands are raised. Compare the timekeeper's records with students' records, and provide assistance to those who need help.

Explore

How does the color of an animal keep it safe?

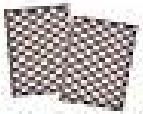
What to Do

1. Cut one piece of patterned paper into eight shapes.

2. Put the eight shapes on the other sheet of patterned paper.
3. Time your partner while he or she picks up the shapes.

You need


scissors


2 pieces of patterned paper


stopwatch

plain paper

4 Now put the shapes on plain paper and time your partner again.

5 Which was easier to find? Which was faster? Why?

Possible answer: The shape that has a different color than the background was easier to find.

Explore More

6 **Infer.** How can an animal's skin help it stay safe?

Possible answer: It hides the animal because it blends into the environment.

Open Inquiry

Learn more about a desert animal and how it can survive.

My question:

Possible question: What traits do desert or forest animals use to stay safe?

4 Remind students to place all the shapes on the paper. Recommend that they count the pieces to make sure they have the correct amount.

5 Have students compare the length of time it took to complete the activities. Students should determine that the shapes on plain paper were easier and faster to find because they were easier to see. Discuss why it was important to have the same number of paper pieces for each activity.

Guided Inquiry

Explore More

6 **Infer** Discuss the results of the activity with students. Ask: **How can an animal's skin help it stay safe?** Possible answer: It hides the animal because it blends into the environment.

Open Inquiry

Encourage students to research animals from a particular habitat, such as the forest or desert. Ask them to find out which traits the animals use to stay safe.

2 Teach

Read and Respond

Reading Skill Cause and Effect A cause is why an event happens. An effect is the event that happens.

Why do animals act and look the way they do?

▶ Discuss the Main Idea

Main Idea Animals have adaptations and use camouflage to help them stay safe.

After reading together, ask:

- **What is a way for an animal that lives in the forest to stay safe?** Possible answer: by having its skin color match the color of the forest
- **How does one of your favorite animals use its parts to help it live?** Accept all reasonable answers.

Read and Respond

Why do animals act and look the way they do?

Animals have adaptations that help them stay alive. An **adaptation** is a body part or a way an animal acts that helps it stay alive.

◀ Giraffes have long necks that help them reach leaves in the tops of trees.

A tarsier has big eyes to see at night and long fingers to dig for food. ▶

An anteater can reach insects underground with its long snout. ▶

Science Background

Predator vs. Prey Both predators and prey have adaptations that help them survive. Predators must be good at seeing and smelling to find their prey. Their eyes are usually on the front of their heads. Animals that are prey usually have good hearing and a wide range of sight. Their eyes are often on the sides of their heads. Their ears may be able to turn in different directions. These adaptations help prey become aware of a predator before it attacks.

LA Support

Use Pictures/Demonstrate Supplement the pictures on these pages with other pictures that show camouflaged animals and different adaptations. Include pictures of animals and birds with webbed feet. Explain the pictures using simple sentences.

BEGINNING Have students point to the adaptation as it is being described.

INTERMEDIATE Point to a part of an animal and have students use simple sentences to explain how that part helps the animal stay alive.

ADVANCED Have students choose two pictures and explain what helps the different animals stay alive.

Camouflage is a way that animals blend into their surroundings. The color or shape of an animal helps it hide. Camouflage keeps animals from being seen by their enemies.

Quick Check

1. What helps animals stay alive?

Possible answers: adaptations and camouflage

Ptarmigan Feathers

In summer a ptarmigan has brown feathers.	In fall the bird's feathers begin to turn white.	In winter its feathers blend in with the snow.

Read a Photo

Why does a ptarmigan turn white in winter?

Possible answer: Its white coat blends in with the snow, so other animals can't see it.

Address Misconceptions

Students may believe that certain adaptations, such as strength or speed, are always helpful to animals. Explain that the stronger or faster an animal is, the more food it needs. If an animal has difficulty finding food, the animal cannot depend on its strength and speed to live.

Read a Photo

Explain that some animals are different colors at different times of the year. Ask:

- **How might the ptarmigan look in the spring?** Possible answer: white with some brown feathers

Develop Vocabulary

adaptation *Word Origin* Write *adaptation* on the board and ask students to identify and define the base word. If they need help, circle *adapt* and explain that it means "to make fit." Ask: **Which adaptations help animals fit in a water environment?** Possible answers: webbed feet, gills Have students use the word *adaptation* in their responses.

camouflage Have students explain how reading the sentence with the word helped them understand its meaning. Ask students to describe how animals, such as polar bears, praying mantids, leopards, and ptarmigans, use camouflage to stay safe.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Give students nature magazines and ask them to clip out pictures of animals. Once they have enough clippings, ask them to identify parts that help the animals stay alive. They should put the pictures in groups, such as *camouflage* or *claws*. Have students glue the pictures to poster board and write about how the parts of the animal help keep it alive. Encourage students to present their posters to the class.

ENRICHMENT Have students choose an animal and research its adaptations. Encourage students to group the adaptations by animal needs (shelter, food, water, air). Ask students to make a diorama of the animal in its environment. Give them sticky notes on which they may write descriptions of the animal's adaptations and place them in the appropriate areas of the diorama.

How do animals stay safe?

Discuss the Main Idea

Main Idea There are many ways that animals act to stay safe.

Read the blue question on the page and discuss students' responses.

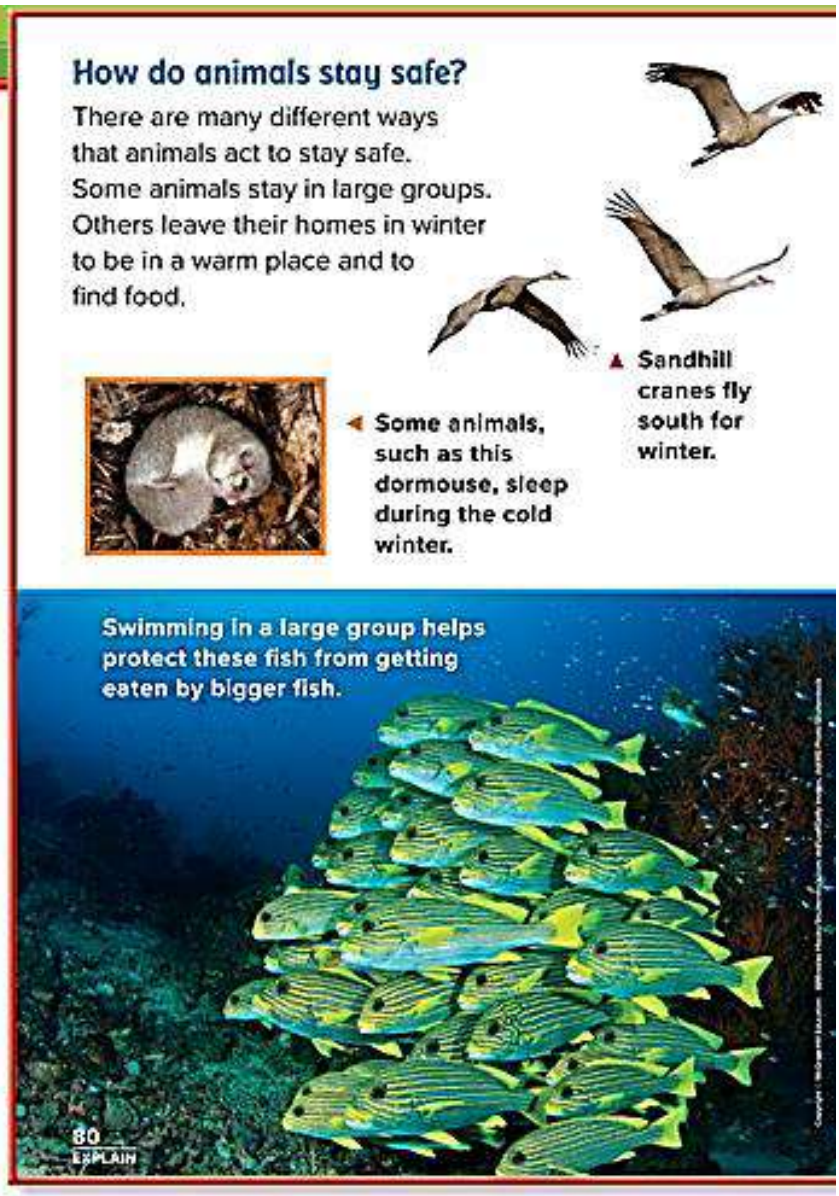
After reading the text, ask:

- **What different things do animals do to stay safe?** Possible answers: stay in large groups; move to warmer places in winter
- **How does an animal that lives near you protect itself?** Possible answers: Dogs bark or run away; cats scratch and hiss; squirrels run up trees.

Use the Visuals

Look at the pictures and read the captions. Ask:

- **How does a turtle's shell help keep it safe?** The shell is hard, and protects the turtle's soft body when it is attacked by other animals.
- **Why do birds go south for the winter?** Possible answer: It is easier for birds to find the type of food they eat in warm places.



Quick Lab

pairs 15 minutes

Objective Explore why eyes are where they are on animals.

You need cardboard tubes

1. Have one partner put a tube up to each eye and stand with his or her back to a partner. As students look through the tubes, the partner moves his or her arms forward slowly.
2. Students with the tubes should tell when they first see their partner's fingers. Ask partners to switch roles.
3. Repeat the activity without the tubes, and then ask students to compare what they saw with and without the tubes.
4. Have students infer why fish have eyes on the sides of their heads. Possible answer: It helps a fish see things beside it.

Animals have body parts that keep them safe. Some animals have shells or smells that protect them from other animals.

Quick Lab

Investigate to find out why eyes are in different places on different animals.

Quick Check

2. What are some ways animals protect themselves?

Possible answers: hide in shells; move in groups

▲ Turtles stay safe by hiding in their shells.

▲ Skunks spray a bad-smelling liquid to keep other animals away.

Develop Vocabulary

Review lesson vocabulary with this word study activity. Ask students to make a chart of *mammal adaptations*. Make sure that students include at least one example of *camouflage* in their charts. Have students present their charts to the class. Encourage them to use the lesson vocabulary by asking classmates to give a thumbs-up when they hear the words *mammal*, *adaptation*, and *camouflage* during presentations.

3 Close

▸ Using the KWL Chart

Review with students what they have learned about animal adaptations and behaviors. Record their responses in the What We Learned column of the class KWL chart.

▸ Using the Reading Skill
Cause and Effect

Use the reading skill graphic organizer to identify causes and effects in the lesson. Ask **How does a skunk's spray protect it from an attacking dog?**

A dog attacks a skunk.	→	The skunk sprays a smelly liquid on the dog, and it goes away.

Visual Summary

Write about what you learned.

Adaptation

Possible answer: Animals have adaptations to help them stay safe. Giraffes have long necks that help them reach leaves in the trees. An anteater can reach insects underground with its long snout.

Camouflage

Possible answer: Camouflage is another way that animals can stay safe in their environment. Some animals can change color or shape to help them hide from danger.

Think, Talk, and Write

1. **Cause and Effect.** How does the white fur of a polar bear help it stay alive?

Polar bears have white fur.	→	It is difficult for other animals to see the bear in the snow.

2. Why is it helpful for fish to stay in a group?

Possible answer: The size of a group may scare other fish away.

Essential Question What do animals need to stay safe?

Possible answer: Animals might need special body parts or they might need to act a certain way to stay safe. They have adaptations that help them hide or protect themselves.

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.

Health Link

Suggest that students think about how they dress during different seasons and the things they do to stay healthy. Discuss how students act in particular situations, such as crossing the street or riding a bicycle.

ENGAGE EXPLORE EXPLAIN EVALUATE **EXTEND**

Math in Science

Objective

- **Write a fraction to tell about the parts of a group.**

Parts of a Group

Talk About It

Read the paragraph at the top of the page together. Have students look at the cats. Ask:

- **What traits do the cats have in common?** Possible answers: furry skin; four legs; short ears
- **What traits are different?** Possible answer: fur color

Math in Science

Parts of a Group

A cat had 6 kittens. Even though the kittens share many traits, they look different from each other. In this family, 3 of the 6 kittens have black and white fur. You can write this as the fraction $\frac{3}{6}$.

Write Fractions

How many of the 6 kittens have dark brown fur? Write a fraction to show your answer.

$\frac{2}{6}$

Remember

You can use a fraction to tell about parts of a group.

Now draw a group of 3 kittens. Make one-third of the group black.

Try It

Explain to students that the number on top of a fraction is called the *numerator*. Have students use what they learned to create a picture showing $\frac{1}{3}$ of 3 cats are black. . Students may draw a group of puppies or a fraction picture.

Learn About It

Read the top paragraph with students. Explain that a fraction is a way of showing a part of a group. Invite students to solve the problem. Ask:

- **How many cats have black stripes?** 3
- **How many cats are there in all?** 6
- **How would you show this as a fraction?** $\frac{3}{6}$

Illustrate the fraction on chart paper with 3 black striped cats drawn above a line, and all of the cats (3 black striped, 3 orange striped) drawn below it.

CHAPTER 3 Review

Vocabulary

Use each word once for items 1–5.

adaptation
amphibian
camouflage
life cycle
mammal

1. An animal that lives the first part of its life in water and another part on land is an amphibian.
2. An animal that feeds milk to its young is a mammal.
3. How an animal grows and changes is called its life cycle.
4. The spots on this leopard are a kind of camouflage.

5. An adaptation helps an animal stay alive where it lives.

CHAPTER 3 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 animals now with what they knew then. Add any additional information to the What We Learned column of the KWL chart.

Science Skills and Ideas

Answer the questions below.

6. **Classify.** How would you classify these two animals? List their traits.

birds	fish
feathers, wings, lives on land	scales, fins, lives in water

7. **Predict.** What will happen after a chick hatches from an egg?

The chick will use its eyes to see.

The chick will feed itself. The chick's feathers will grow and it will walk.

CHAPTER 3 Review

Science Skills and Ideas

10. Students should address concepts taught in lessons: how animals in different animal groups are alike and different, how different animals grow and change, how animals can change their appearance or behavior to survive.

8. Put these pictures of a butterfly's life cycle in order.


larva

2


adult butterfly

4


butterfly egg

1


pupa

3

9. What are some ways animals can stay safe?

Possible answers: adaptation, camouflage, traveling in groups

10. How do animals grow and change?

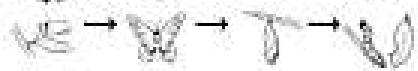
Accept all reasonable responses.

Test Prep

1. Which group contains the same type of animal?

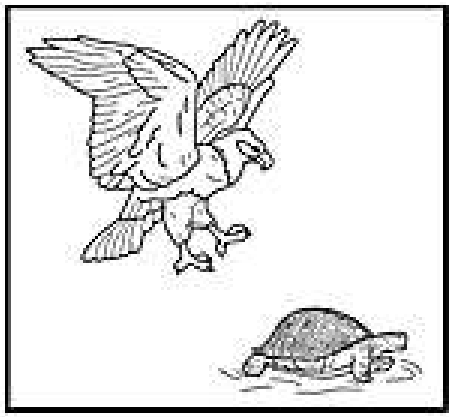
   A bear, dog, catfish
   B alligator, salmon, trout
   (C) ladybug, ant, dragonfly
   D duck, seagull, lizard

2. Which shows the correct order for the life cycle of a butterfly?

   A 
   B 
   C 
   (D) 

3. Look at the picture.

   Which body part best helps the turtle protect itself from enemies?

   (A) shell
   B teeth
   C legs
   D claws

Test Preparation

1. All three animals are insects. The other answers list animals of different groups: A lists mammals and fish, B lists a reptile and fish, D lists birds and a reptile.
2. A shows the egg after the pupa and before the adult butterfly. B and C show the adult butterfly before other stages.
3. A turtle does not have sharp claws or teeth. Its legs are too short to help it fight enemies.

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.

ENGAGE EXPLORE EXPLAIN EVALUATE **EXTEND**

Careers in Science

Objective

- **Discover how scientists learn about birds.**

Bird Bander

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

- **What does a bird bander do?** They put tags on birds.

Talk About It

- **What do you know about birds?** Possible answers: They build nests. They lay eggs.
- **What is the bird bander holding in his hand?** a bird

Learn About It

Read the text about bird banders together. Ask:

- **What do bird banders do?** Possible answers: put a band around the birds' legs; make observations about birds
- **Why do scientists band birds?** Possible answer: to learn about birds, such as how long they live, and whether they move to a warmer place in winter.
- **How do scientists use the information they get from banding birds?** Possible answer: Scientists can learn how birds are affected by weather changes and the building of new homes and buildings. This can help people learn how to protect birds.

Write About It

Tell students that banders, wildlife guides, and veterinarians often work with birds and other animals. Have students write about what a scientist might do if she or he found a banded bird.

Bird Bander

bird bander

Do you love to learn about birds? You could become a bird bander. A bird bander helps scientists keep track of birds.

The bander catches a bird and puts a tiny band around its ankle. The band has a number on it. The bander records the number, the bird's age, and its size.

Then the bander returns the bird to the wild. Later, other banders and scientists might trap the same bird. They can look up the bird's number and see how it grew and changed.

Why do scientists band birds?

Possible answer: to learn about birds, such as how long they live and whether they move to a warmer place in winter

Integrate Writing

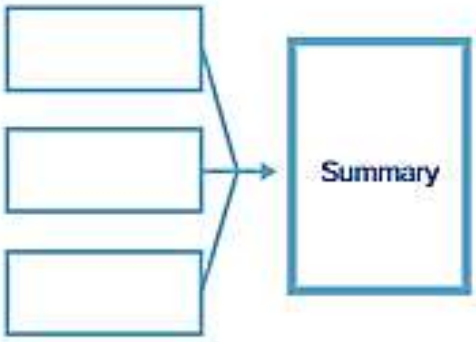
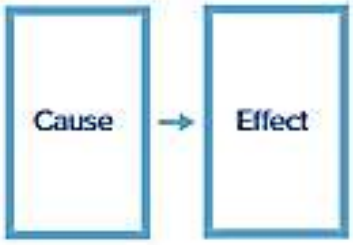
Where Did the Bird Go?

Have students suppose that they have banded a bird near where they live.

Encourage them to use book and online resources to research the types of birds that live in the area and the migration pattern of the bird they are writing about.

Have students write a story that describes the bird, where it went, how long it was gone, and when it came back.

CHAPTER 4 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
1 Places to Live PACING: 2 days *FAST TRACK:* 1 day	■ Describe different habitats. ■ Explain how plants and animals use their habitats.  **Reading Skill** Summarize	habitat
2 Food Chains and Food Webs PACING: 2 days *FAST TRACK:* 1 day	■ Describe a food chain. ■ Describe a food web.  **Reading Skill** Main Idea and Details	food chain predator prey food web
3 Habitats Change PACING: 3 days *FAST TRACK:* 1 day	■ Explain why habitats change. ■ Describe what happens when habitats change.  **Reading Skill** Cause and Effect	drought endangered fossil extinct

Activity Planner

EXPLORE Activities

Explore

PACING: 20 minutes

Objective Observe footprints of different animals to compare how the shape of the feet help them adapt to their habitat.

Skills observe, infer, communicate

Materials paper, crayons

PLAN AHEAD Prepare different pictures of bird and mammal footprints to share with the class.

Explore

PACING: 25 minutes

Objective Learn that animals and plants depend on each other for survival.

Skills put in order, communicate

Materials construction paper strips, crayons, glue

PLAN AHEAD Cut enough paper strips of each color for every student.

Explore

PACING: 30 minutes

Objective Observe how towns and cities affect animals' habitats.

Skills observe, infer, predict

Materials large pieces of paper, crayons, toy cars or buses, blocks

PLAN AHEAD Provide a large enough space on the floor for each group to do the activity.

QUICK LAB Activities

Quick Lab

PACING: 15 minutes

Objective Describe a habitat and explain how living things live there.

Skills communicate, compare

Materials nature magazines, markers, paper

PLAN AHEAD Collect enough nature magazines for each student.

Quick Lab

PACING: 15 minutes

Objective Put in order and explain a food chain.

Skills communicate

Materials paper plates, crayons, glue, yarn, construction paper, craft sticks, scissors

PLAN AHEAD Make a few puppets beforehand to use as examples to show students what they could look like.

Quick Lab

PACING: 15 minutes

Objective Communicate how a habitat can change.

Skills put in order, communicate

Materials crayons, colored pencils, paper

PLAN AHEAD Find a comic strip to use as an example to show students.

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
habitat food chain predator prey food web drought endangered fossil extinct	observe infer communicate put in order predict

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 A *predator* is an animal that hunts other animals for food.

Example A hawk is a *predator*. It hunts mice and rabbits to eat.

Ask What animals are *predators?*

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

Vocabulary Activities

Help students identify predators.

BEGINNING Show the diagram of the desert food web in Lesson 2. Name each animal and have students repeat. Then point to the snake and ask: *Why is this snake a predator? What animals does it hunt to eat?* Model the answers and repeat with other animals.

INTERMEDIATE Show the diagram of the desert food web in Lesson 2. Encourage students to identify some desert features and animals. Then have them complete sentence frames such as: *The snake is a predator because it hunts* _____ *and* _____ *so it can eat them.*

ADVANCED Show the diagram of the desert food web in Lesson 2. Encourage students to explain why this habitat is a desert. Then challenge them to draw and label a food chain in which the hawk is the final predator. Remind them that every food chain starts with the Sun.

CHAPTER 4

Looking at Habitats

THE BIG IDEA What is in a habitat?

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, and then ask:

- How do plants and animals live in different places?
- Where do animals get their food?
- How can places change?

Answers shown represent sample student responses.

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

CHAPTER 4

Looking at Habitats

What is in a habitat?

Answers will vary. Accept all reasonable responses.

Vocabulary

habitat a place where plants and animals live

predator an animal that hunts other animals for food

drought a long period of time with little or no rain

fossil what is left of a living thing from the past

Differentiated Instruction

Instructional Plan

Chapter Concept Living things depend on each other.

EXTRA SUPPORT Students who need to understand how living things meet their own needs in their habitats should complete **Lesson 1** before continuing through the rest of the chapter.

ON LEVEL Students who can describe why habitats are important to living things can do **Lesson 1** as a review and go directly to **Lesson 2** to explore dependency in food chains and webs.

ENRICHMENT For students who are ready to explore why habitats change, **Lesson 3** builds on the concept of changes in habitats from Grade 1 by introducing fossils.

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.

Habitats

What We Know	What We Want to Know	What We Learned
Animals live in many types of places.	How do animals live in cold places?	Animals that live in cold places have adapted to their environment.
Some animals eat other animals.	What do hawks eat?	Hawks eat other animals, such as snakes and mice.
Fires can burn things down.	What happens to animals if there's a fire?	A fire changes an animal's habitat, and the animal is forced to find a new habitat.

Vocabulary

- Have a volunteer read the **Preview Vocabulary** words aloud to the class. Ask students to find one or two of the words in the chapter. 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.

Lesson 1 Places to Live

Objectives

- Describe different habitats.
- Explain how plants and animals use their habitats.

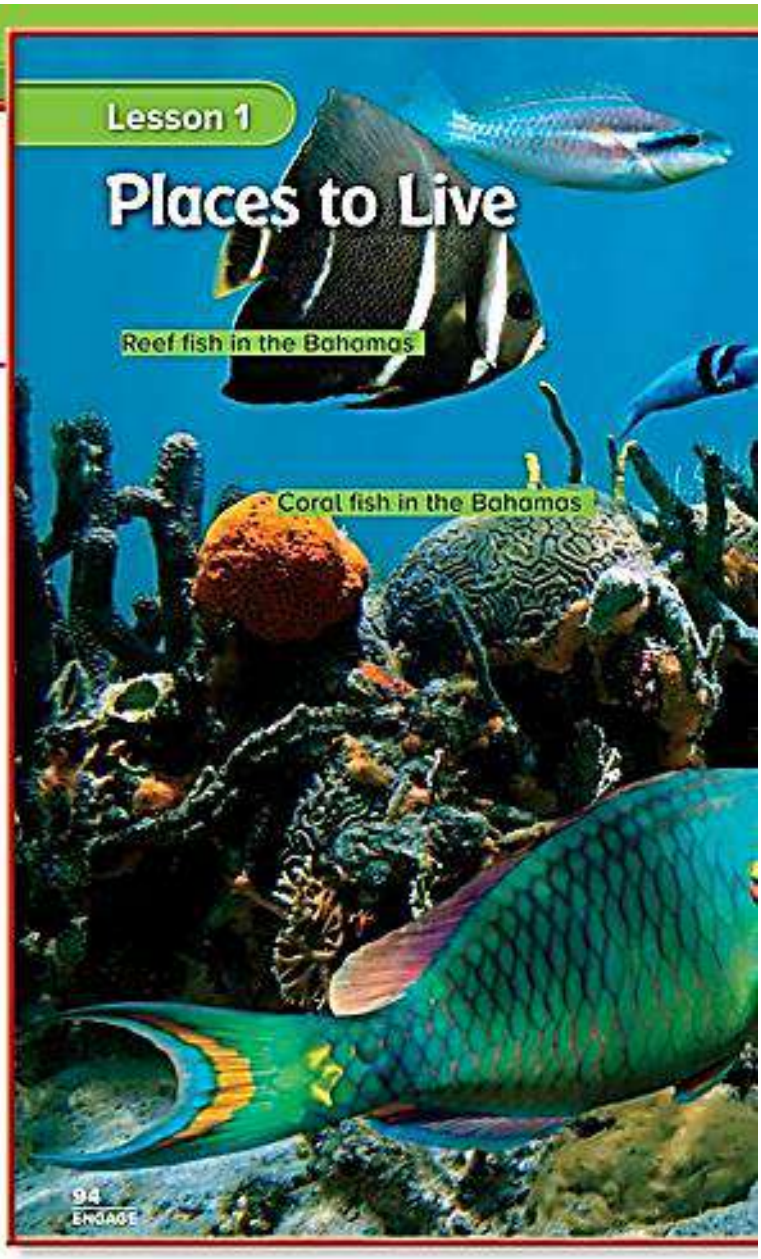
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about different places to live. Ask:

- How are places different?
- Why are there different plants and animals in different places?
- How are plants and animals able to live in different places?

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



Warm Up

Start with a Poem

Read a poem about the ocean and animals that live in the ocean.

Ask students to describe what animals and plants they might find in the ocean.

Invite students to research the places mentioned in the poem and share with others what they found.

Look and Wonder

Before You Read

What can you tell about the place these plants and animals live?

Possible answer: This place is deep in the ocean waters.

Write the lesson vocabulary word below.

habitat

Essential Question

How do plants and animals survive in their habitats?

Look and Wonder

Read the Look and Wonder statement and question about where plants and animals live.

Invite students to share their responses to the question. Ask:

- **What are some other animals that might live in this place?** Possible answers: whale, octopus, dolphin
- **Why couldn't a cat live here?** Possible answer: A cat cannot breathe under water.
- **What are some other places animals can live?** Possible answers: on land; in trees; under the ground

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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

pairs

30 minutes

Plan Ahead Prepare different pictures of bird and mammal footprints to share with the class.

Purpose Encourage students to observe and make inferences about their observations.

Structured Inquiry

What to Do

Ask students if they know how people track animals. Explain that recognizing the footprints of animals is one way to tell which animals have been or are in a certain place.

1. **Observe** Discuss with students what kinds of feet different animals have. If no one suggests that the footprint in the picture is that of a bird, show students other examples of both bird and mammal footprints to help them decide what kind of animal made this print. Ask: **Which way do you think this animal was going?** It was walking away because its toes are pointing away from the photographer.

2. **Infer** Encourage students to describe the footprint. Ask: **How would these kind of feet help this animal?**

Explore

Where do animals live?

You need

paper

crayons

What to Do

1. **Observe.** Look at the footprints below. What animal do you think made them?

bird

2. **Infer.** How does the shape of its feet help this animal? Share your idea with a partner.

Possible answer: Its feet keep it from sinking too fast in the sand. Its long toes can wrap around things.

Alternative Explore

How do animals get their needs where they live?

Distribute a picture of an animal to each student. Have students observe their animal.

Ask students to think about where their animal lives, what it eats, how it gets food, and the kind of home it lives in.

Have students share their ideas with a partner and compare their animals.

3 Draw a picture of the animal and the place where it lives.

Explore More

4 **Communicate.** What other animals could live near this animal? What do they need to live? How do they get food and water? Make a chart.

Animals that Live Near the Animal	Animals' Needs	How Animals Get Food and Water
Other birds, fish, turtles, sea lions	Animals need food and water. They also need a safe place to live.	Animals eat plants and other animals. They also drink water near their habitat.

Open Inquiry

Learn more about birds in land or water habitats.

My question:

Sample question: What kinds of animals live in water habitats?

3 Encourage students to include details about the place in their pictures. Suggest they show whether it is warm, cold, dry, wet, rocky, or flat. Ask: **What does the ground tell you about where this animal may live?** Possible answer: The wavy lines in the sand may mean it lives near the ocean.

Guided Inquiry

Explore More

4 **Communicate** Ask students to list the different animals that may live near the bird, what those animals need to live, and how they get food and water.

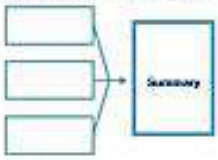
Open Inquiry

Have students research the feet and footprints of other birds. They should look at birds from both land and water habitats. Ask them to compare the different feet, footprints and bird habitats, and share their findings with the class.

2 Teach

Read and Respond

Reading Skill Summarize To retell the most important ideas from the reading selection.



What is a habitat?

▶ Discuss the Main Idea

Main Idea Different plant and animals live in different habitats to get what they need.

Before reading, ask students to describe a habitat.

After reading together, ask:

- **What kind of habitat do we live in?** Accept all reasonable answers.
- **How does our habitat help plants meet their needs?** Possible answers: Plants need sunlight, soil, and animals.

Read and Respond

What is a habitat?

A **habitat** is a place where plants and animals live. In a habitat, animals can find the food, homes, and water they need to live. Plants need soil, rain, sunlight, and animals in their habitats to live.

Quick Check

1. What are some kinds of habitats?

Possible answer: grassy and warm; cold and snowy; wet and grassy; hot and dry

Science Background

Flowers A habitat is a place where a particular plant or animal lives. The specific area and resources a living thing uses within a habitat are called a niche. Habitats are within ecosystems. An ecosystem is where living and nonliving things interact. An ecosystem can be small or large.

LA Support

Use Pictures Look at the pictures and read the captions. Show students other photos of similar habitats. Briefly describe the pictures.

BEGINNING Describe a picture on a page. Have students point to the correct one. Ask students to look at the other photos and point to one that shows a similar habitat. Have students repeat descriptive words for each habitat, such as *hot and dry*, or *cold and snowy*.

INTERMEDIATE Point to one of the pictures of habitats. Have students describe the habitat in complete sentences.

ADVANCED Have students describe each of the habitats and what they would need to live there.

There are many kinds of habitats. Some have lots of rain. Some are dry. Some places are windy and others are cold.

Different plants and animals need different habitats to live. These pictures show some kinds of habitats.

Use the Visuals

Look at the pictures. Read the captions. Have students describe each habitat. Ask:

- **What animals might you find in each of the habitats?** Grassy and warm: prairie dog, rabbit, bison. Cold and snowy: owl, fox, bear. Wet and grassy: beaver, egret, crayfish. Hot and dry: camel, iguana, rattlesnake, bobcat.
- **What would animals need to live in each of the habitats?** Possible answers: food; water; shelter; protection from the weather
- **What would it be like to live in each of these habitats?** Accept all reasonable answers.
- **How are the habitats alike and different?** Alike: provide what animals need to live. Different: weather, plants, animals

Develop Vocabulary

habitat ***Word Origin*** Explain to students that *habitat* comes from the Latin word *habitare* meaning "it dwells." Ask: **How does this meaning relate to what you have learned about habitats?** Possible answer: A habitat is a place where plants and animals dwell.

Explore the Main Idea

ACTIVITY Invite small groups of students to select a habitat. Provide resources about different habitats. Ask students to create a mural of the plants and animals living in their chosen habitat. They should label the living things in their mural.

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Show students pictures of different habitats. Discuss and describe each habitat. Have students choose one of the habitats to describe in their own words.

ENRICHMENT Help students understand why animals belong in their habitat. Have them draw a picture of an animal in a habitat to which it does not belong. Then have students write the reasons why the animal could not survive in the habitat. They can title their drawings: *What's Wrong with this Picture?* Discuss and share the drawings with the class.

How do living things use their habitats?

Discuss the Main Idea

Main Idea Plants and animals use their habitats to get food, water, and shelter.

Read the blue question and invite students to respond.

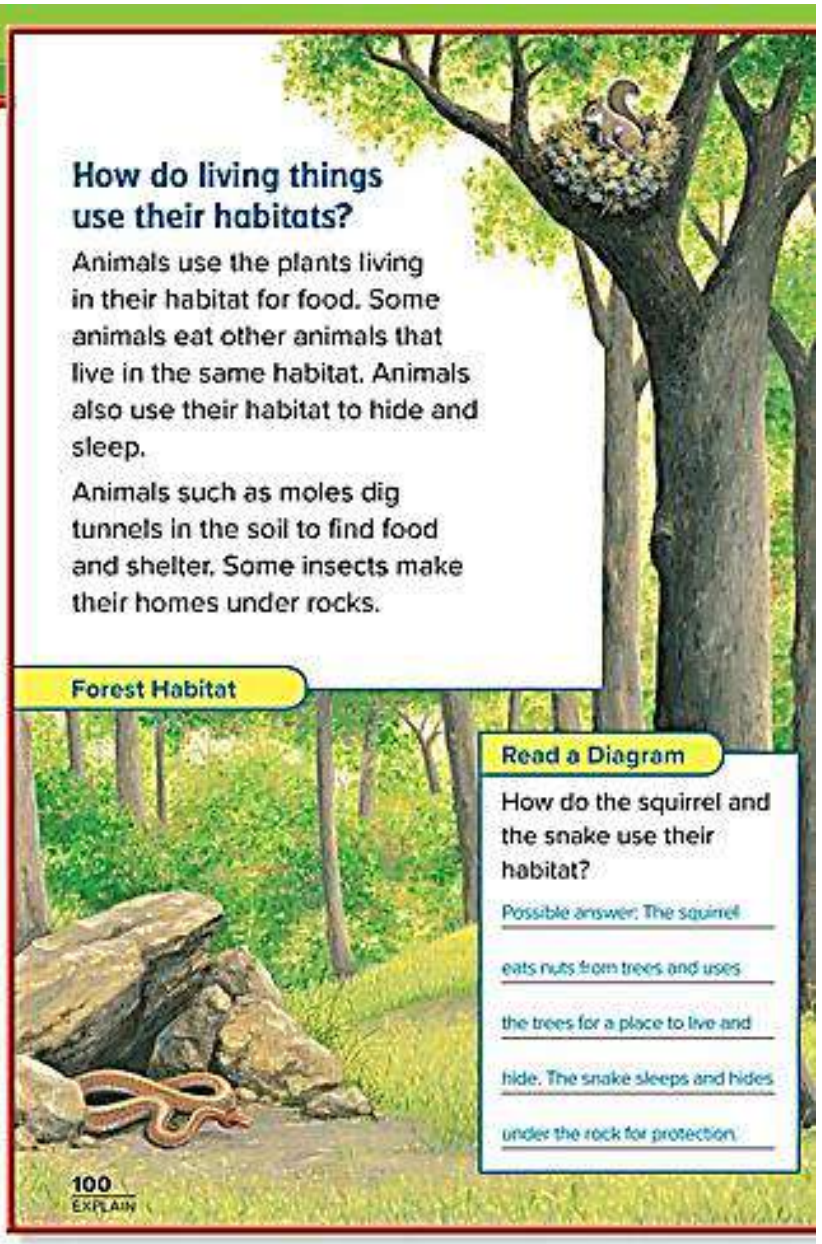
After reading, ask:

- **Which animals live in our habitat?** Accept all reasonable answers.
- **What do these animals eat and what kinds of shelter do they have?** Accept all reasonable answers.
- **How are plants able to live in dry and wet places?** Plants in dry places store water in their leaves. Plants in wet places have leaves that shed water.

Read a Diagram

Have students describe the habitat. Ask:

- **What kind of shelter does the squirrel have?** nest



Quick Lab

Objective Describe a habitat and explain how living things live there.

You need nature magazines, markers, paper

1. Ask students to find a habitat in a magazine that they would like to write about.
2. Have them draw the living things that might live in the habitat.
3. Invite students to communicate and write about their drawings.
4. Have them compare their habitats with a partner.

Different plants need different kinds of soil to live. Some plants grow in sandy soil and some plants grow in rocky soil.

Plants that live in dry places can hold water. Plants that live in very wet places can get rid of extra water. They have leaves that point down so water can roll off them.

Quick Lab

Find a picture of a habitat. Draw and write to **communicate** what could live there.

This plant lives in a dry place. Its leaves store water. ▼

Quick Check

2. How do animals and plants use their habitats?

Possible answers: Animals use the plants and animals in their habitats for food.

Animals find places to live, hide, and sleep.

Plants get food and water from the soil.

Animals and plants use their habitats in many ways.

Develop Vocabulary

Reinforce lesson vocabulary with this word study activity. Explain to students that a synonym is a word that has the same or similar meaning as another word. Ask **What are synonyms for the word *habitat*?**

Possible answers: home, place, surroundings

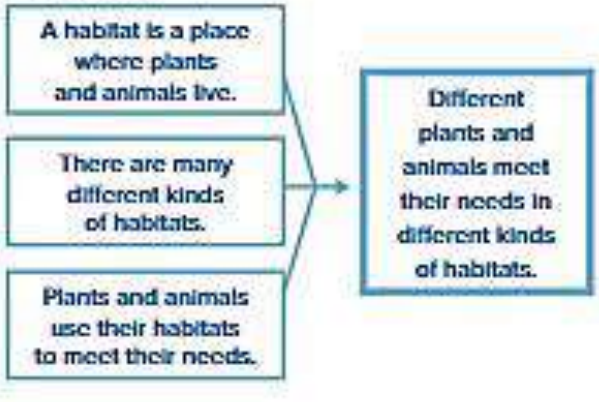
3 Close

▸ Using the KWL Chart

Review with students what they learned about habitats and how living things use them. Record their 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.



Formative Assessment

Diorama of a Habitat

Invite pairs of students to choose a habitat. Ask them to make a diorama of a habitat that shows the kinds of plants and animals that live there. Remind students to include the type of scenery they would find in their habitat. Have them write about their dioramas. Hang the mobiles in the class.

LESSON 1
Lesson Review

Visual Summary

Write about what you learned.

Habitats

Possible answer: A habitat is a place where plants and animals live. Animals find food, shelter, water, soil, and sunlight in their habitats.

Types of Habitats

Possible answer: There are many different kinds of habitats. Some are dry and hot. Others are wet, windy, or cold. Different plants and animals need different habitats to survive.

Think, Talk, and Write

1. **Summarize.** How are habitats different?

Possible answers: some are dry; some are wet; some are windy; some are cold. Different habitats have different plants and animals.

2. How do animals depend on plants in their habitat?

Possible answer: Animals use plants for food or to hide in or live in.

Essential Question How do plants and animals survive in their habitats?

Possible answer: Living things use the food, shelter, and water in their habitats to stay alive. Plants use the soil and the water to make their own food. Animals eat plants for food or live in them.

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

Provide resources about different habitats for students. Ask them to choose one. Suggest that students show in their picture how they will get food, water, and shelter.

Lesson 2 Food Chains and Food Webs

Objectives

- Describe a food chain.
- Describe a food web.

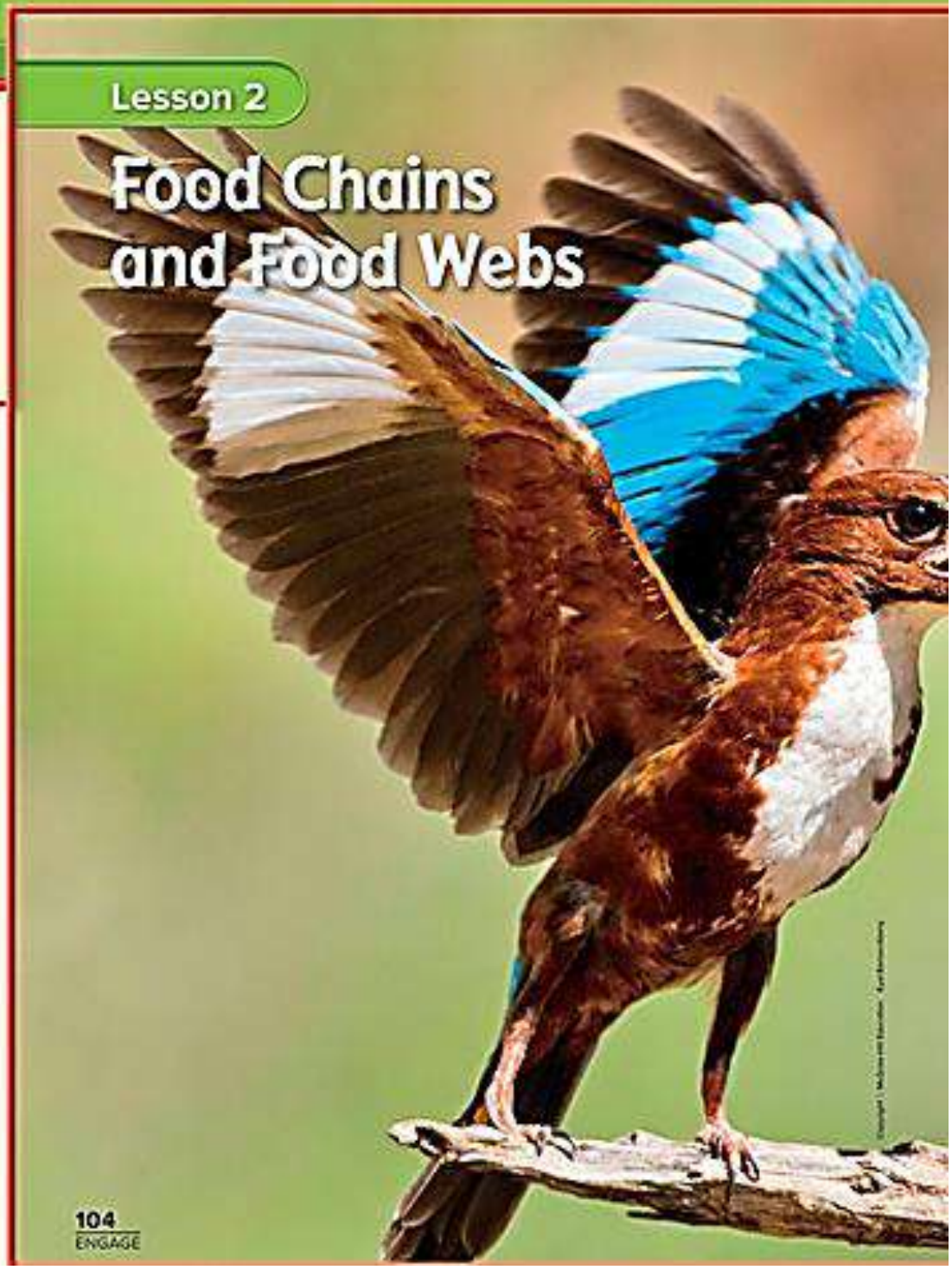
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about food chains and food webs. Ask:

- Why do animals need plants?
- Why do animals need other animals?

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



Look and Wonder

Before You Read

Animals need food to live.

What do different animals eat?

Accept all reasonable responses based on the animals that students list.

Some examples include: Elephants eat plants and grass; birds eat seeds and worms; tigers eat other animals.

Write the lesson vocabulary words below.

food chain

predator

prey

food web

Essential Question

How do animals depend on other animals?

Look and Wonder

Read the Look and Wonder statement and question about animals. Invite students to share their responses to the question.

Ask students to write a short list of animals on the board. Ask:

- **What do these animals eat?**
- **What do you notice about what animals eat?**

Write students' responses on the class KWL chart and note any misconceptions they may 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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

pairs | 25 minutes

Plan Ahead Cut enough paper strips of each color for every student. Each yellow, green, red, brown, and orange paper strip should be 5 x 10 cm.

Purpose Support students' understanding of the order of a food chain.

Structured Inquiry

What to Do

1. Discuss with students what plants need to grow. Have students list animals that eat plants, and then list animals that eat those animals.
2. Ask students to put the food chain paper strips in order on their desks. Ask: **Which strip shows the beginning of the food chain?** the Sun

Alternative Explore

What belongs in all food chains?

Have students write down two different food chains. Ask them to discuss with a partner how their food chains are alike and different. Ask: **What do all food chains have in common?** the Sun; a plant

Explore

What do animals eat?

You need


paper strips


crayons


glue

What to Do

1. The Sun makes plants grow. Which animals eat plants? Which animals eat those animals?

2. Draw the Sun on the yellow strip. Draw some grass and trees on the green strip. Then draw a bird on the red strip and a grasshopper on the brown strip.

Inquiry Activity

3 **Put Things in Order.** Make a chain with the strips. Glue them together in their order as food.

4 **Communicate.** Describe the order of your chain to a partner.

Possible answer: the Sun, plants, grasshopper, bird

Explore More

5 Repeat the activity with three other animals. Communicate how you put the animals in order.

Answers will vary. Accept all reasonable responses.

Open Inquiry

Learn more about a new habitat and the animals that live in it.

My question is:

Sample question: What do animals who live in the cold eat?

3 **Put Things in Order** Model for students how to glue the strips together. Remind them to check that their pictures face outside before they glue the strips.

4 **Communicate** Have students share and compare their food chains.

Guided Inquiry

Explore More

5 Have students create another food chain, using red paper for a bird, orange paper for a cat, and brown paper for a worm. Ask: How did you decide the order of your food chain?

Open Inquiry

Encourage students to choose a habitat and identify animals that live in it. Ask: Do you wonder about what some animals in that habitat eat?

Have students make a list of animals that have diets that students would like to investigate. Suggest that students research what animals eat, and then draw pictures of the food chains in the chosen habitat. Encourage students to present their food chains to the class.

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 is a food chain?

▶ **Discuss the Main Idea**

Main Idea There are many food chains.

After reading together, ask:

- **How does the Sun help animals live?** Possible answer: Plants need the Sun to grow, and animals need plants to eat.
- **What are the names of some predators?** Possible answers: hawk, shark, snake
- **Why are rabbits and giraffes called prey?** because they are hunted and eaten by other animals

Read and Respond

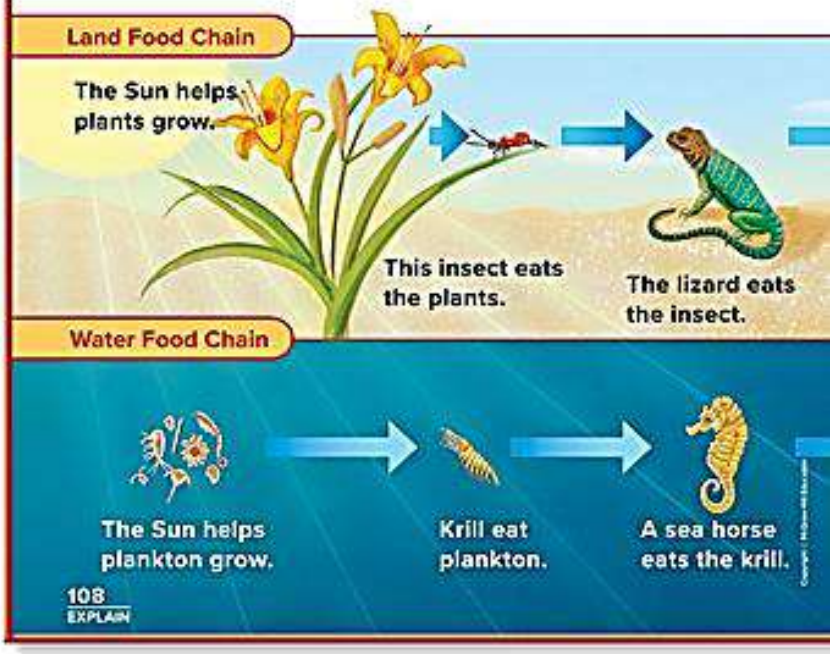
What is a food chain?

A **food chain** is a model of the order in which living things get the food they need. Most food chains start with the Sun.

There are many food chains. Some are on land and some are in the water. Some can be both on land and in water!

Quick Lab

Communicate. Act out a food chain with puppets.



Science Background

Plants and Animals Plants and animals need energy to survive. In most food chains, the original source of energy is the Sun. Plants use the energy of the Sun for the process of photosynthesis, which allows them to manufacture sugars and starches. Plants are called *primary producers*.

LA Support

Use Pictures Have students use pictures to help them describe the sequence of events that occur in various food chains.

BEGINNING Mix up pictures that show a food chain. Have students put the pictures in the correct order. They should also repeat a sentence describing the food chain.

INTERMEDIATE Have students complete sentence frames describing pictures of a food chain, such as: *The caterpillar eats the* ____. The caterpillar eats the plant.

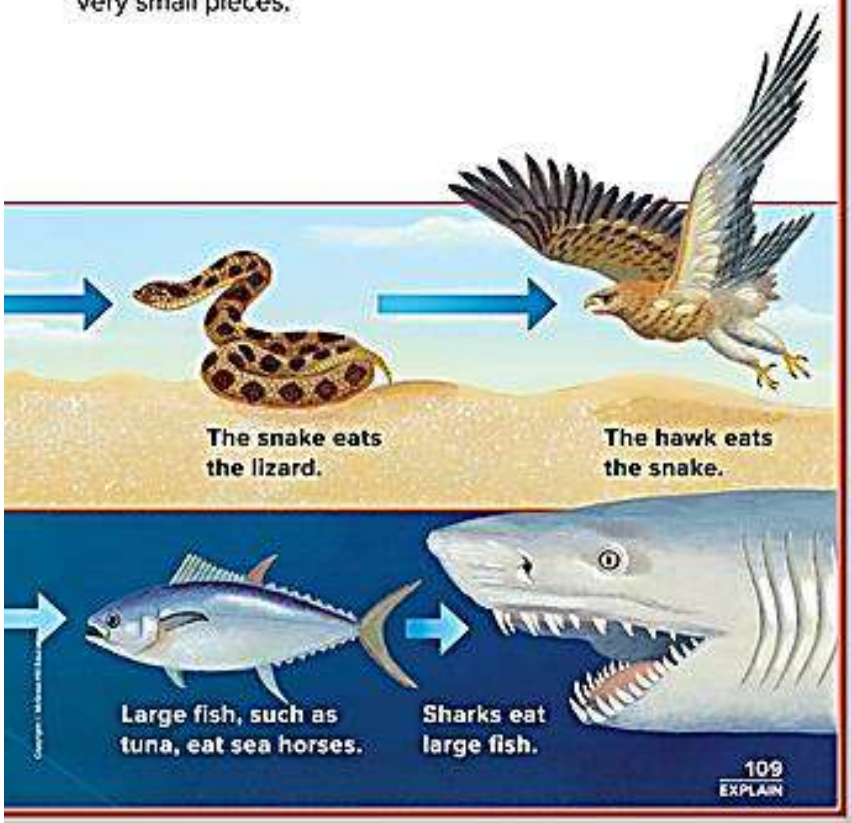
ADVANCED Have students select pictures to illustrate food chains. They should describe their food chains. Remind them to always begin with the Sun.

Animals can eat plants or other animals. An animal that hunts other animals for food is a **predator**. Animals that are hunted by predators are called **prey**.

Some animals eat plants and animals that are dead. Animals such as worms break the dead things up into very small pieces.

Quick Check

1. Food chains can be found on land, in water, and a combination of both.



Quick Lab

Objective Put in order and explain a food chain.

You need paper plates, crayons, glue, yarn, construction paper, craft sticks, scissors

1. Have each group discuss what plants and animals they will make for their food chains. Have the groups work together to make paper-plate puppets of the plants and animals in their food chains.
2. Ask each group to communicate their ideas with the class by acting out their food chains, using the paper-plate puppets. The class can identify the plant and animals in the food chains.

Use the Visuals

Look at the pictures. Read the captions. Ask:

- **Which animals are prey in the land food chain?** insect, lizard, snake
- **Which animals are predators in the water food chain?** sea horse, tuna, shark
- **Which animals in the two food chains are both prey and predators?** lizard, snake, sea horse, tuna
- **What is the same about the land and water food chains?** Possible answers: both start with the Sun; both have prey and predators

Develop Vocabulary

food chain Show students a chain. Ask: **What do you notice about this chain?** Possible answer: It is made of connected pieces that form a line. Direct students to the pictures. Ask: **How is a *food chain* like a chain?** Possible answer: All of the plants and animals in a food chain are connected in a line.

predator ***Word Origin*** Explain to students that *predator* comes from the Latin word *praedator*, which means "to take by force." Help students understand that *predators* hunt or "take other animals by force."

prey Tell students that the word *prey* can be used as a noun meaning "animals that are eaten by predators." Explain that *prey* can also be used as a verb meaning "to hunt," as in: *Sharks prey on fish.* Encourage students to write sentences using the word *prey* as a noun and verb. Ask students to trade papers and identify the usage by writing *N* or *V* next to the sentences.

What is a food web?

▶ Discuss the Main Idea

Main Idea A food web is two or more food chains that are connected.

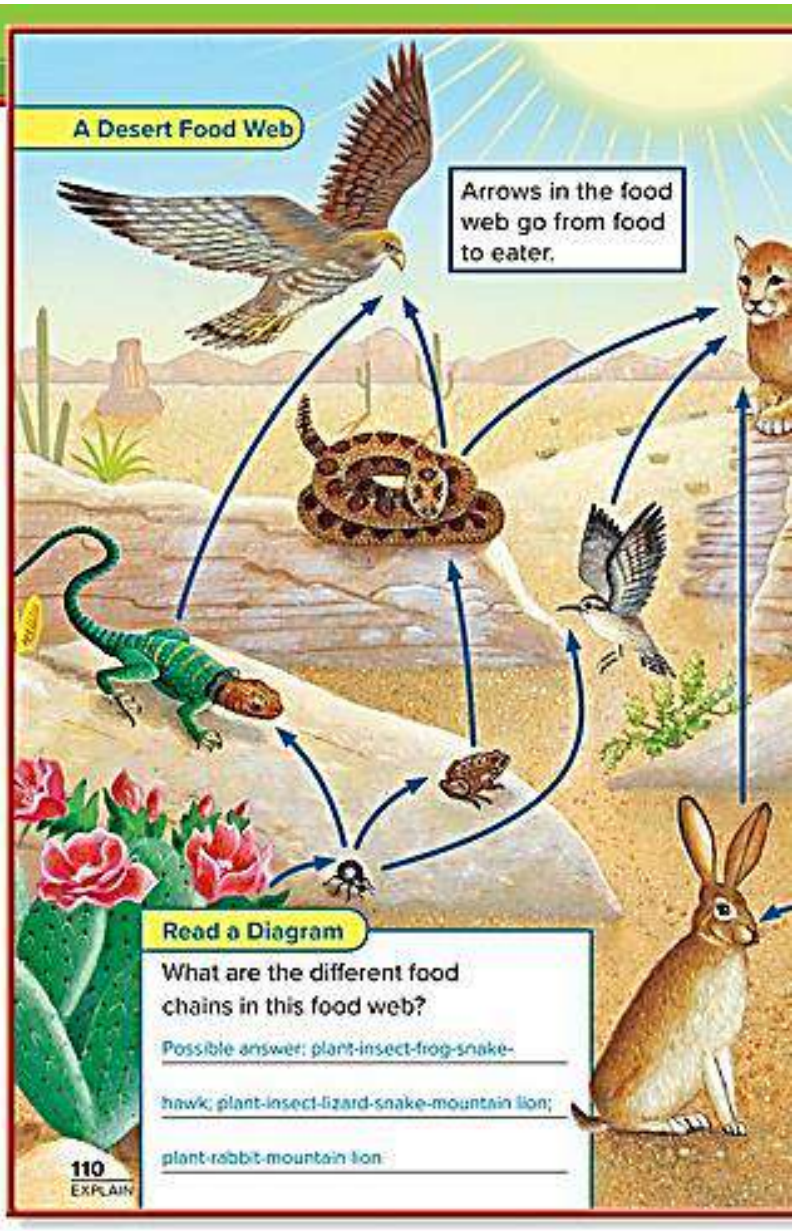
Read the blue question and invite students to respond.

After reading, ask:

- **Which animal is food for several animals?**
  Mice are eaten by hawks, owls, and snakes.
- **Which animal eats several different animals?**
  Hawks eat mice, rabbits, frogs, and snakes.
- **How are food webs different from food chains?**
  Possible answer: Animals in food chains are eaten by one type of animal, but animals in food webs can be eaten by many types of animals.

Read a Diagram

Explain to students that they can use the arrows to find out what each animal eats.



Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Display pictures of plants, predators, and prey that belong to the same food web. Have students discuss which animals are predators and which animals are prey. They may organize the animals in a two-column chart labeled . As students discuss which animals eat what, draw the web on the board. Use arrows to show the connections. Have students explain the food web after it is drawn.

ENRICHMENT Ask students to choose a favorite wild animal. Have them research the food web of their chosen animal. Encourage them to draw the web, beginning with a food chain within the web. Students can use the diagram on the pages as a model.

What is a food web?

A **food web** is two or more food chains that are connected. Sometimes one kind of animal is food for many animals. Mice are eaten by hawks, owls, and snakes.

Animals also eat more than one kind of animal. Hawks eat mice, rabbits, frogs, and snakes. If you put those food chains together, you have a food web.

The insect is prey for the bird.

Quick Check

2. What does a food web look like?

Possible answer: like a spider web

Develop Vocabulary

food web Write the term *food web* on the board. Ask: **What word in *food web* could help us understand the meaning of this word?** Circle the word *web*. Have students explain how a *food web* is like a *web*. Possible answers: A web has lots of lines that are connected. A food web is two or more connected food chains.

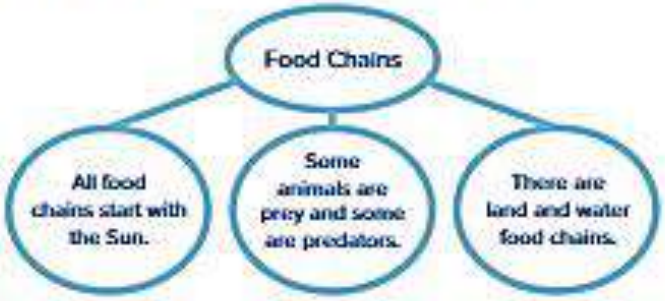
3 Close

Using the KWL Chart

Review with children what they have learned about food chains and food webs. Record their responses in 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 in the lesson.



Formative Assessment

Make a Food Web Mobile

Have children write down the plants and animals they want to use for a food web mobile. Ask them to draw the plants and animals, and then cut out the pictures. Children can attach the pictures to a stick or hanger using string. Invite children to explain their food web mobiles. Hang the mobiles in the class.

Visual Summary

Write about what you learned.

Food Chain

Possible answer: All living things need food to survive. A food chain shows the order in which living things get food in their habitat. Most food chains start with the Sun, but there are many food chains on land and in water.

Food Web

Possible answer: A food web is two or more food chains that are connected. Animals in food webs can be eaten by many types of animals.

Think, Talk, and Write

1. **Vocabulary.** What is a predator?

A predator is an animal that hunts other animals for food.

2. **Main Idea and Details.** Describe an example of a food chain.

Possible answer: Sun-plant-grasshopper-bird

3. What is a food web?

A food web is a model of two or more connected food chains.

Essential Question How do animals depend on other animals?

Possible answer: Some animals eat other animals for food.

Essential Question

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

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

Health Link

List with children different healthy foods they can eat for lunch. Write the foods on the board. Discuss with children whether the food is made from plants or animals. Encourage children to first draw a food chain that includes these foods, and then to expand the chain into a food web.

Writing in Science

Objective

- Explain how the foods people eat are part of a food web.

A Food Web for Lunch

Talk About It

Read the top paragraph with students. Ask:

- **What did Amal have for lunch?** a chicken sandwich

Have students look at Amal's Food Web drawing and identify the food chains that form the food web. Record the food chains on the board.

Learn About It

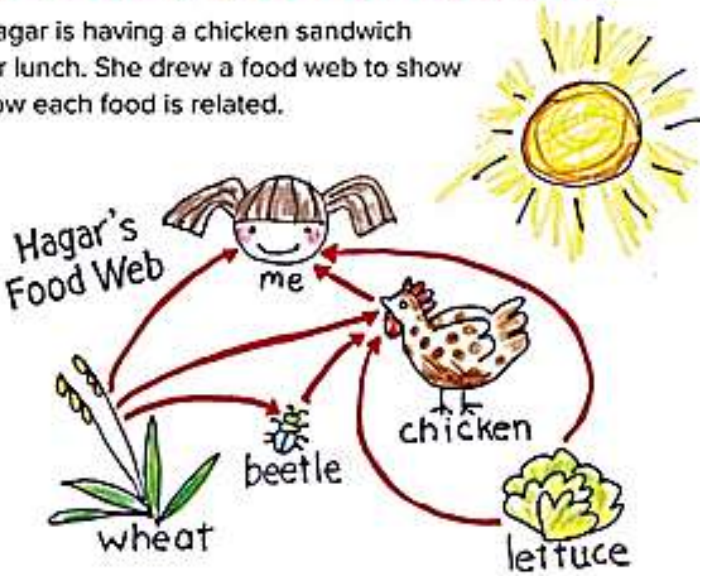
As a class, discuss the school lunch menu for the day. Help students make a food web that includes the foods from the lunch menu.

Work together as a class to write a sample paragraph explaining the food web in order.

Read the Remember box together with students. Use the sample paragraph the class wrote to show students how the steps in the food web are explained in order.

A Food Web for Lunch

Hagar is having a chicken sandwich for lunch. She drew a food web to show how each food is related.



Integrate Writing

Make a Food Web

Write the names of plants and animals on index cards that live around the school.

Have students pick a card and draw a picture of the plant or animal. Ask them to write a sentence about what the animal eats or what the plant needs to live.

Use string and students' drawings to make a food web for a bulletin board display.

Write About It

Explain how Hajar, the chicken, lettuce, and wheat form a food web.

Planning and Organizing

Put the steps in the correct order.

3 Hajar eats a chicken sandwich for lunch.

2 The chicken eats wheat and lettuce.

1 The Sun gives plants energy.

Remember
When you are writing to explain, you tell the steps in order.

Explain

Now explain Hajar's food web in your own words.

Possible answer: Hajar's lunch forms a food web that begins with the Sun. The Sun gives energy to plants. The chicken then eats wheat or lettuce. Hajar then eats a chicken sandwich.

Write About It

Read the bottom paragraph together. Have students review Amal's Food Web, and then have them write a paragraph about how Amal's foods form a food web. Make sure the food chains students identified in the web are visible. Students can discuss the steps in the food chains with a partner if they need help. Invite volunteers to read their paragraphs to the class.

Lesson 3 Habitats Change

Objectives

- Explain why habitats change.
- Describe what happens when habitats change.

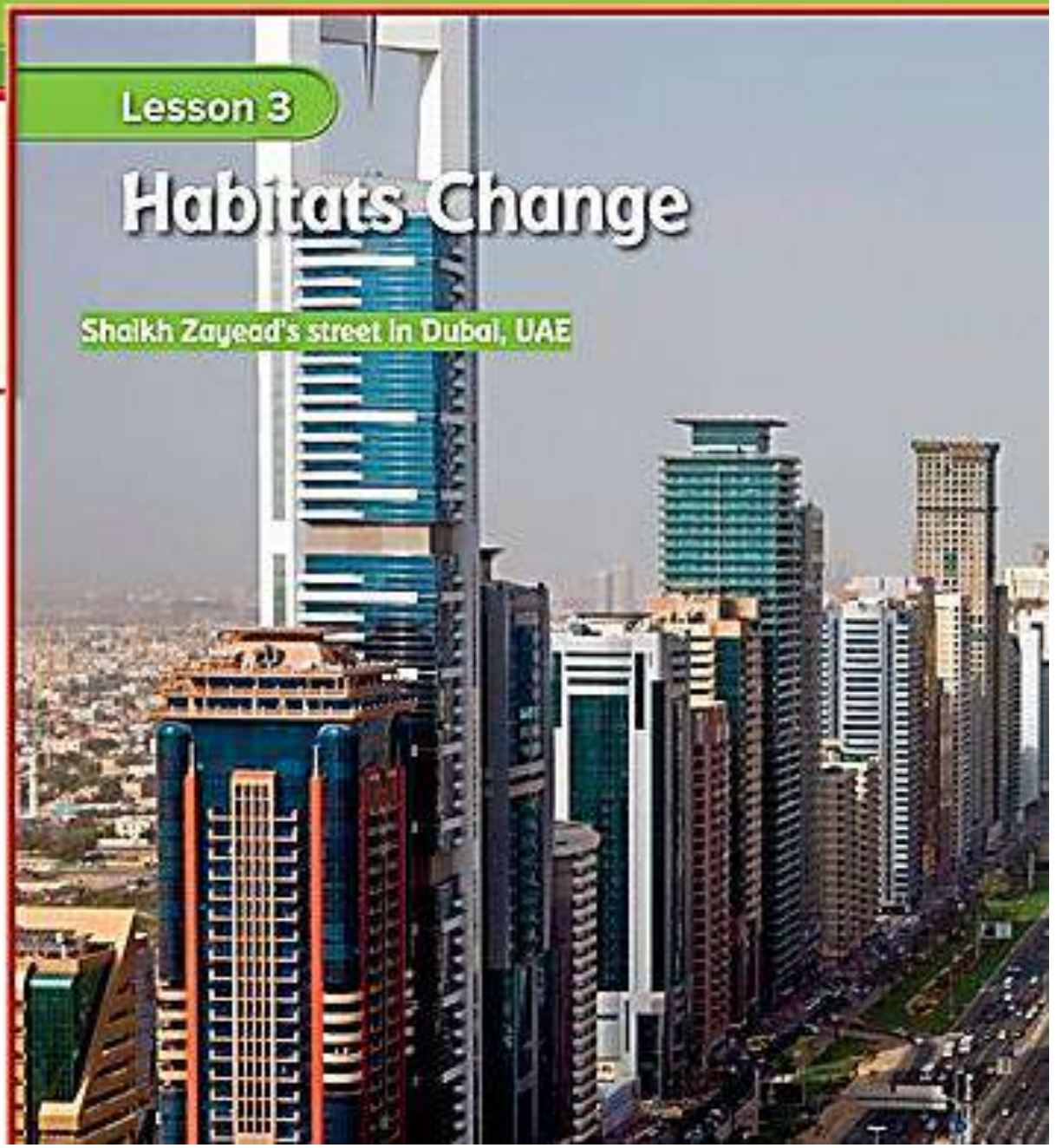
1 Introduce

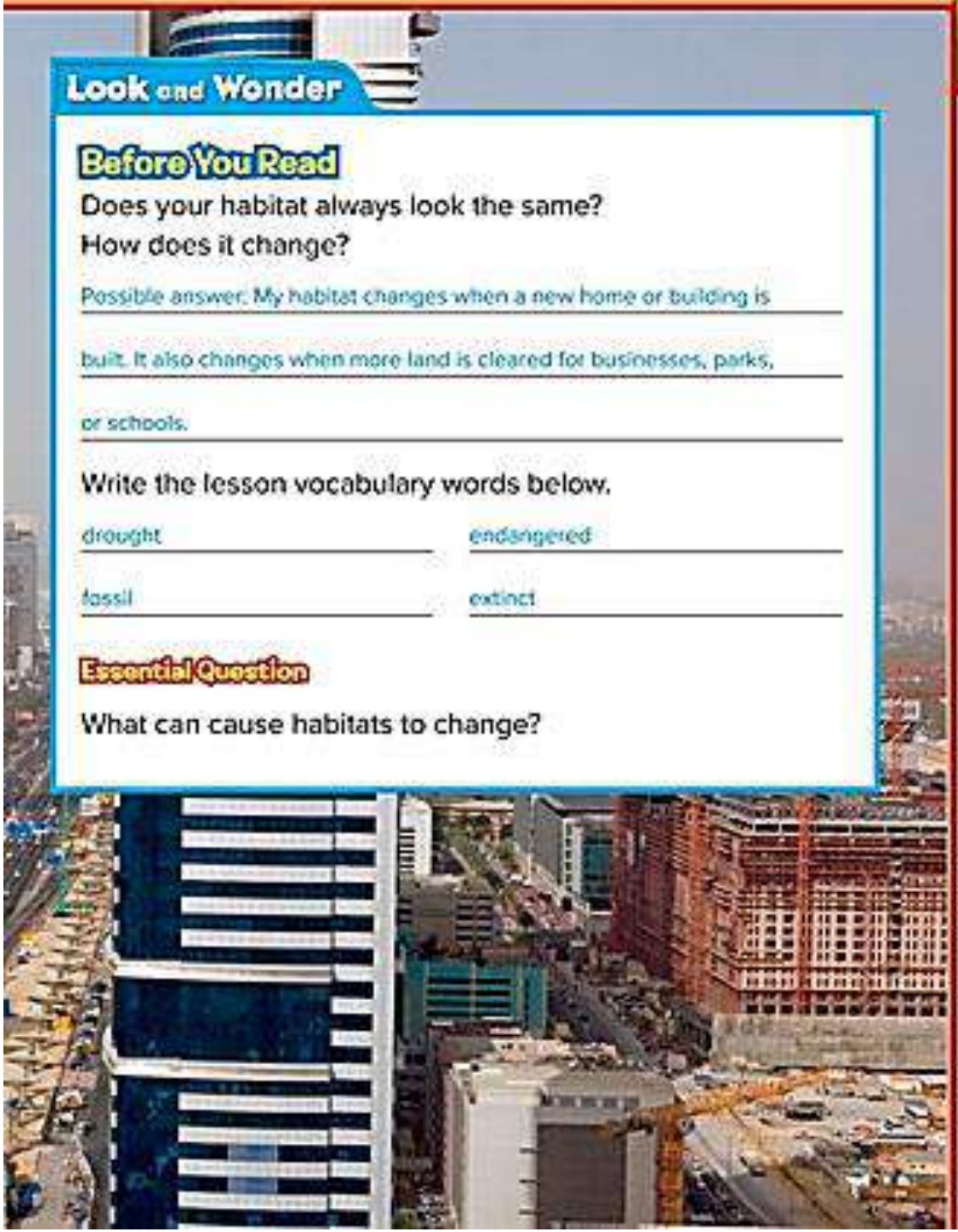
▶ Assess Prior Knowledge

Have students share what they know about how and why habitats change. Ask:

- **How do places change?**
- **What happens to animals and plants when places change?**
- **How do we know what places might have looked like a long time ago?**

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





Look and Wonder

Before You Read

Does your habitat always look the same?
How does it change?

Possible answer: My habitat changes when a new home or building is built. It also changes when more land is cleared for businesses, parks, or schools.

Write the lesson vocabulary words below.

drought

endangered

fossil

extinct

Essential Question

What can cause habitats to change?

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder questions about habitats. Invite students to share their responses to the questions.

Have students examine the picture. Ask:

- **How has this habitat changed?** Buildings and roads were built.
- **What do you think it looked like before?** Possible answer: It might have had lots of trees.
- **How do you think this change affected the animals that lived there?** Possible answers: They lost their homes and food. They had to move to a new place. They might have died.

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.

Explore

small groups | 20 minutes

Plan Ahead Provide a large enough space on the floor or on tables for each group to do the activity. Collect blocks and toy vehicles and animals, and plan a method of distributing these items to groups.

Purpose Support students' understanding that changes in a habitat affect the plants and animals that live there.

Structured Inquiry

What to Do

Ask students whether they have ever seen a group of houses or stores being built. Ask them what they think the land was like before the construction began.

1. Discuss with students what colors they might use to show different kinds of water and land formations. Have students talk in their small groups to decide what they will draw.

1. Discuss with students what kinds of animals live in the different habitats.

2. Have students discuss what kinds of buildings they would find in a town, such as a fire station, school, hospital, and market.

Explore

What happens when habitats change?

You need

large pieces of paper

crayons

small toys and blocks

What to Do

1. On a large sheet of paper, draw a large meadow, woods, and river. Place the animals where they would live.

2. Use blocks as houses and buildings. Build a town with houses and stores.

Alternative Explore

What can change habitats?

Ask students to draw a picture of land and trees where there are no people or buildings. Ask:

- **Which animals live in your pictured habitat?**

Have students use a dark marker or crayon to draw a town or city over the background.

Ask students how the construction of buildings changed the land.

Inquiry Activity

3 **Observe.** What happens to the meadow, woods, and animals that live there?

Possible answer: The habitat begins to grow. The animals depend on the meadow and woods for food and shelter.

4 **Infer.** How does building a town affect the animals, meadow, woods, farms, river, and people?

Possible answer: Building a town changes the habitat that animals depend on.

Explore More

5 **Predict.** What will happen if a highway is built?

A highway will affect the animals and their habitat.

Open Inquiry

Learn more about land near your school.

My question is:

Sample question: How has the land near my school changed?

3 **Observe** Ask students to describe what happens to the different habitats as they build a town.

4 **Infer** Ask: **What is happening to the animals' homes? How does the river get used? What happened to the land and trees?**

Guided Inquiry

Explore More

5 **Predict** Ask: **What would construction workers need to do to build a highway?** Cut down trees to make room for the highway.

Open Inquiry

Invite students to research what the land around the school had once been. As a class, have students list ideas about how they could find out. For example, they could conduct interviews with people who have lived in the area a long time.

Before students conduct their research, ask them to predict and draw what they think the land might have looked like before the school was built.

2 Teach

Read and Respond

Reading Skill Cause and Effect A cause is why an event happens. An effect is the event that happens.

How do habitats change?

▸ Discuss the Main Idea

Main Idea Habitats can be changed by nature and people.

Read the blue question and invite students to respond. After reading, ask:

- **How does a fire or flood change a habitat?** Possible answers: Plants and animals can die, or lose their homes.
- **What places have you seen change?** Accept all reasonable answers.
- **How did these places change?** Accept all reasonable answers.

Discuss with students any local changes to the land that have occurred.

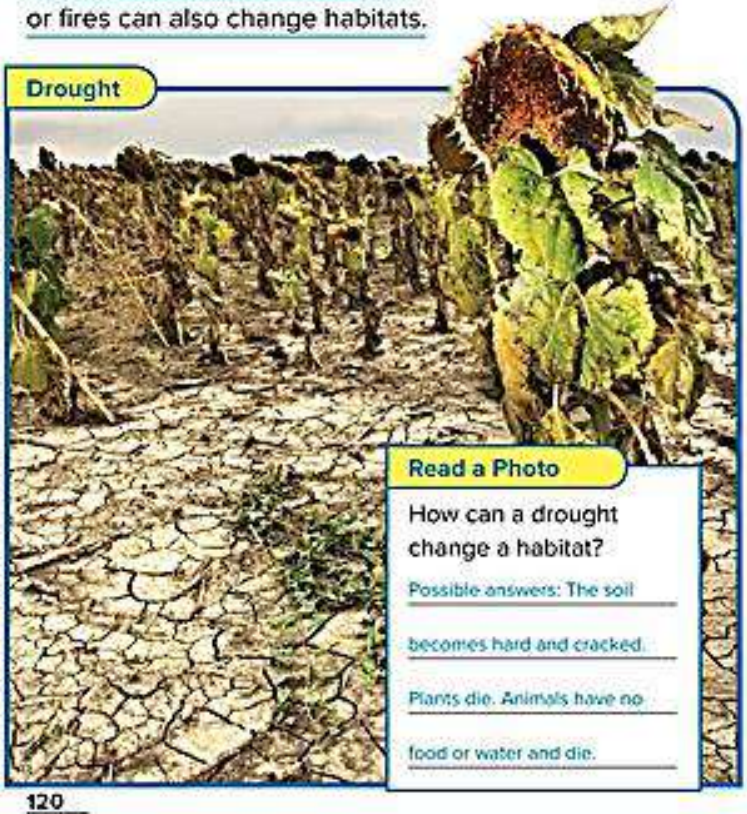
Read and Respond

How do habitats change?

Underline the part of the text that tells how nature can change habitats.

Nature can change habitats in many ways. A **drought** is a long period of time when there is little or no rain. Plants and animals cannot live without water. Floods or fires can also change habitats.

Drought



Read a Photo

How can a drought change a habitat?

Possible answers: The soil becomes hard and cracked. Plants die. Animals have no food or water and die.

Science Background

Changing Habitats Habitats usually change over very long periods of time. Currently, many habitats are changing more quickly. Some scientists are concerned about habitats that change due to land use, climate change, and shifts in water quality.

LA Support

Use Pictures/Compare Collect pictures that show types of habitats and ways in which they may change. Show students the pictures and name the habitat. For example, show a picture of a meadow, and say: *meadow*. Next, show them a picture of a meadow during a drought and say: *drought*. Repeat the activity using other kinds of habitats and reasons for change, such as a picture of a desert and a picture of houses in the desert.

BEGINNING While pointing to a picture of a flood, fire, building, or drought, say the appropriate word. Have students point to the pictures and repeat the words.

INTERMEDIATE Have students describe each picture.

ADVANCED Have students name the pictured habitat and explain how it is changing.

Animals can change habitats. Beavers make dams. Dams can form ponds.

People can change habitats too. People build houses and other buildings where grass, plants, and trees were growing.

Quick Check

1. How can a habitat change?

Possible answers: A habitat can be changed by natural forces, such as drought, flood, or fire (lightning); by animals, such as a beaver building a dam; by people, who could cause a fire or might do construction.

This beaver dam blocked the water from the stream and a pond formed.

▶ Address Misconceptions

Students may not know that where they live now was once a wilderness long ago. Briefly discuss with students the history of the area in which they live and how the land has changed.

Read a Photo

Direct students' attention to the photo and ask them to describe what they see. Ask:

- **How can you tell by looking at this picture that the plants are not healthy?** Possible answer: They are wilted and the leaves are yellow.

▶ Develop Vocabulary

drought ***Word Origin*** Explain to students that *drought* comes from the Middle English word *drugoth* meaning "dry." Ask students to explain how the words *drought* and *dry* are related.

Differentiated Instruction

Leveled Questions

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

- **How can weather change a habitat?** Possible answer: Heavy rains could change a habitat by making a flood.
- **How can people change a habitat?** Possible answer: People could change a habitat by cutting down plants.

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

- **How might a river habitat be changed by a beaver dam?** Possible answer: Pond animals may move into the area.
- **How might animals adapt to living around people?** Possible answer: They may find food in their garbage.

What happens when habitats change?

Discuss the Main Idea

Main Idea When habitats change, animals may not be able to find food and may become endangered.

Read the question and invite students to respond.

After reading together, ask:

- **Why can it be difficult for animals to find what they need when a habitat changes?** Because they lose their food and homes.
- **Why should we be concerned about endangered animals?** Possible answer: They are part of a food chain.

Develop Vocabulary

endangered *Word Origin* Write the word on the board. Have students identify and underline the base word *danger*. Ask: **How are endangered animals in danger?** Possible answer: They are in danger of dying because they have lost their homes or sources of food.

Use the Visuals

Look at the pictures and read the captions. Ask:

- **Why are tigers endangered?** Possible answer: People hunt them for their fur and cut down the forests where they live.
- **How might fishing nets and powerboats endanger manatees?** Possible answers: The manatees may get caught in the nets. The boats may hit the manatees and hurt them.
- **Why would building on marshes endanger whooping cranes?** Possible answer: The cranes may not have enough room or a safe place to build their nests.

Quick Lab

Individual 15 minutes

Objective Communicate how a habitat can change.

You need crayons, colored pencils, paper

1. Ask students to choose a habitat.
2. Have them decide one way their chosen habitat can change.
3. Model for students how to draw a comic strip.
4. Discuss with students how they can put habitat changes in order using the pictures in their comic strip.
5. Have students communicate by sharing their comic strips with the class.

Animals can become endangered when people hunt them or build on their habitats.

When habitats change, some animals have adaptations that help them live in their new habitat. Animals may find new places to get food and live.

Quick Check

2. Circle true or false.

Animals become endangered when their habitats change and they can no longer meet their needs.

(True) False

People have taken over many rivers where manatees live. Fishing nets and powerboats also hurt manatees.

FACT People helped American alligators survive so they are not endangered anymore.

Classroom Equity

Understanding the many skills scientists use every day can encourage students who lack confidence to participate in class discussions and activities. Guide a classroom discussion on what inquiry skills scientists use to learn where plants and animals live. For example, scientists use such skills as observation, how to draw conclusions, and making predictions.

Address Misconceptions

Students may think that once an animal is endangered, it is always endangered, but this is not always the case. For example, at one time American alligators were becoming extinct. They were hunted for their skins, which were used for shoes, belts, and handbags. The alligators also lost much of their habitat when more people moved to areas where they lived and made buildings.

FACT **People helped American alligators survive so they are not endangered anymore. Show students a picture of an American alligator. Ask: What ways do you think people have helped these animals?** Possible answer: People made laws to protect them.

Explore the Main Idea

ACTIVITY Have students research one endangered animal and create a postage stamp design to celebrate the animal. Have them find out why the animals is endangered and what is being done to protect it. Have students draw a picture of their animal in its habitat. The should also summarize what they learned about the animal.

How can we tell what a habitat used to be like?

Discuss the Main Idea

Main Idea Fossils give us clues about what habitats were like in the past.

Read the blue question and invite students to respond. After reading, ask:

- **Why are fossils important?** Possible answers: They help us learn about how habitats were in the past.
- **What do fossils tell us about animals?** They can tell us how the animal looked or moved.

Use the Visuals

Look at the pictures. Invite students to answer the questions. Ask:

- **What is the clue to finding out what the habitat used to be?** the fossil of the fish
- **How has the habitat changed?** It is no longer a water habitat.
- **How does the fossil help us know about the animal?** We can see its parts.

How can we tell what a habitat used to be like?

Scientists study fossils to learn about Earth's past. A **fossil** is what is left of a living thing from the past. Scientists get clues about habitats of the past from the plant and animal fossils they find.

When fossils do not match the habitat where they are found, scientists can tell the habitat has changed.

Look at the fossil found here. What do you think the habitat used to be? ▶

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Have students make crayon rubbings of different items, such as leaves, coins, paper clips, corrugated cardboard, cement or pavement, or embossed books. Model how to rub objects gently to get prints. Ask students to describe how the print is like a fossil. They should note that fossils leave imprints in rocks just as their rubbings leave prints on paper.

ENRICHMENT Ask students to research animals that have become extinct. Invite them to make miniature models of the animals using construction paper, crayons, markers, yarn, glue or tape. Have students write on index cards why the animals become extinct. Ask each student to make a mobile by tying the animal models and the index cards to a hanger with string.

Some plants and animals that lived long ago still live today. Some have died out, or become **extinct**. Now we only have their fossils. Fossils can help tell how animals may have looked or moved.

Quick Check

3. What can fossils tell us about habitats long ago?

Possible answers: They can tell us whether the habitats have changed from long ago; they can tell us what lived there.

Develop Vocabulary

fossil ***Word Origin*** Explain to students that the word *fossil* comes from the Latin word *fossilis*, which means "to be dug up." Ask: **How is the Latin word meaning related to the word *fossil*?** Possible answer: Scientists "dig up" fossils from the ground.

extinct ***Word Origin*** Tell students that the prefix *ex-* means "remove or out of." Explain that when animals become *extinct*, they "die out." Make a list of other words with the prefix *ex-*, such as *exit* or *exchange*. Have students infer their meanings.

3 Close

▸ Using the KWL Chart

Review with students what they have learned about habitats and how they can change. Record their responses in the What We Learned column of the class KWL chart.

▸ Using the Reading Skill
Cause and Effect

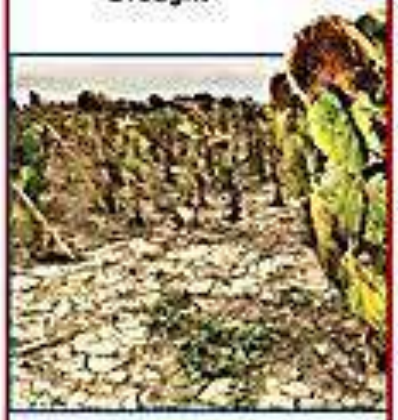
Use the reading skill graphic organizer to identify causes and effects in the lesson. Ask: **How does a fire affect a forest environment?**

Cause	Effect
A habitat changes over thousands of years.	Fish fossils are found in land habitats.

Visual Summary

Write about what you learned.

Drought



Changes in Habitats

Possible answer: People, animals, plants and weather can all harm the living things in a habitat. When a habitat is changed, animals may not be able to get the things they need. Some animals may die or become endangered.

Habitats in the Past

Possible answer: Fossils help scientists learn about the past. Fossils can leave clues about habitats from the past. Scientists learn how animals may have looked or moved and how habitats have changed.

Think, Talk, and Write

1. **Cause and Effect.** What happens to plants and animals when their habitats change?

Habitats of plants and animals change →	Possible answers: Plants and animals can die and become endangered. Animals may move to find food and new homes.

2. What are some ways animals can stay alive when their habitat changes?

Possible answers: Some animals have adaptations that help them live in a new habitat. Other animals may find new places to live.

Essential Question What can cause habitats to change?

Possible answers: People can change habitats by building things on the land. Weather can affect habitats if there is not enough rain or if lightning starts a fire. Animals can use up or move plants and land.

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

Provide resources about different habitats for students. Ask them to choose one. Suggest that students show in their picture how they will get food, water, and shelter.

Reading in Science

Objective

- Relate how scientists study different fossils around the world.

Meet Mike Novacek

Genre: Biography A story about a real person's life.

Have students look at the photos and map and read the captions. Ask:

- **Who will you read about?** Mike Novacek
- **What does the map show?** where Mike Novacek has traveled to study fossils

Before Reading

Write the word *fossil* on the board. Have students share what they know about fossils. Explain that a fossil is what is left of a living thing from the past.

Discuss with students what it would like to be a scientist and study fossils. Ask:

- **Would you like to travel around the world to look for fossils? Why or why not?** Answers will vary.

During Reading

Read the text together. Have students trace Mike Novacek's travels on the map as they read. Ask:

- **Why does Mike Novacek travel around the world?** to find fossils
- **Why does Mike Novacek study fossils?** to learn about the past
- **What kinds of fossils does Mike Novacek collect?** dinosaurs, mammals, reptiles

Real World

Reading in Science

Meet Mike Novacek

Mike Novacek grew up in Southern California. When he was young he visited the La Brea Tar Pits in Los Angeles. He loved to learn about the fossils he saw there. He learned about animals that lived long ago.

▼ **Mike travels to the Gobi Desert in China to look for new fossils.**

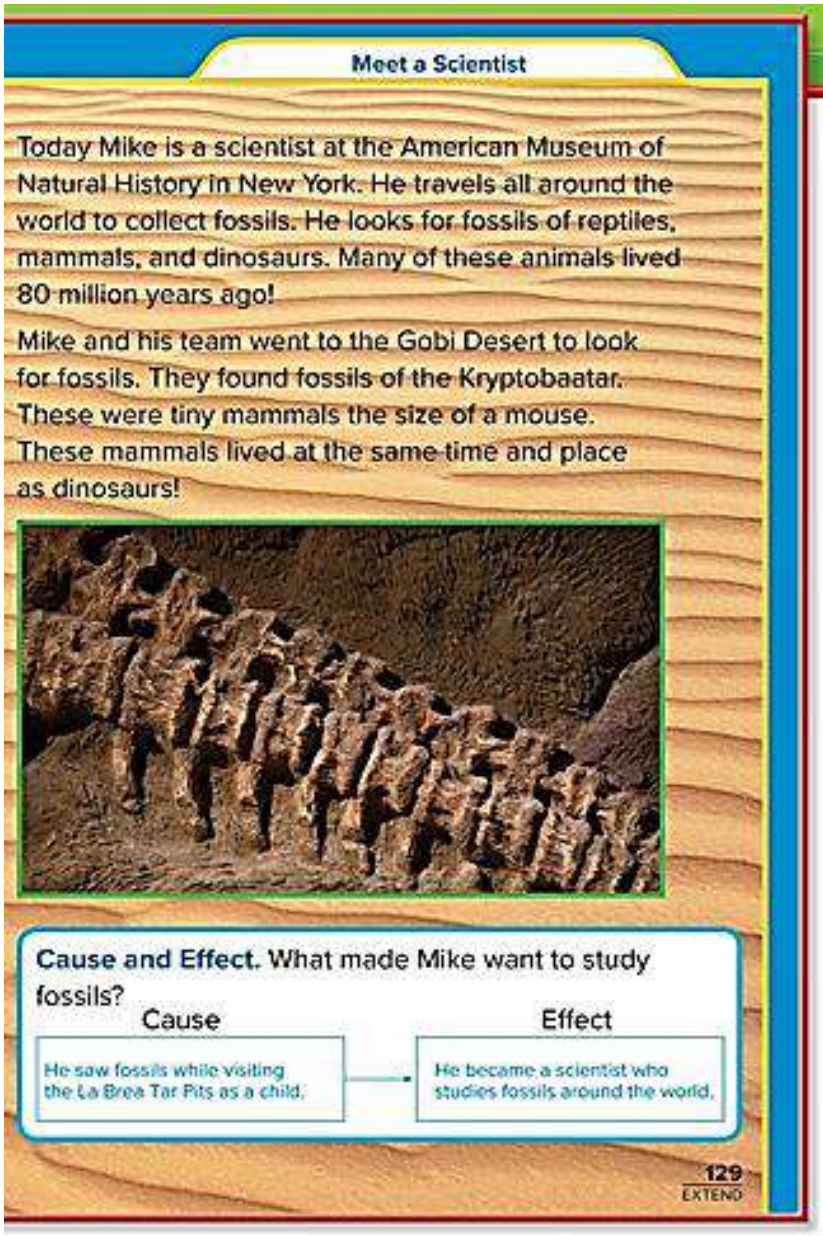
LA Support

Use a Map Point to Los Angeles and say: *Mike saw fossils here when he was young.* Have students repeat the sentence. Review the word *fossils*. Describe what Mike Novacek does in New York and in the Gobi Desert. Have students repeat each sentence. Follow up with comprehension questions, such as: What did Mike and his team find in the Gobi Desert? How big were the mammals? When did these mammals live?

BEGINNING Ask students to point to places on the map and repeat sentences describing what Mike did in each place.

INTERMEDIATE Have students point to the map and describe in a complete sentence what Mike found in the Gobi Desert.

ADVANCED Ask students to use complete sentences to describe Mike's activities in each place, starting with Los Angeles.



Meet a Scientist

Today Mike is a scientist at the American Museum of Natural History in New York. He travels all around the world to collect fossils. He looks for fossils of reptiles, mammals, and dinosaurs. Many of these animals lived 80 million years ago!

Mike and his team went to the Gobi Desert to look for fossils. They found fossils of the Kryptobaatar. These were tiny mammals the size of a mouse. These mammals lived at the same time and place as dinosaurs!

Cause and Effect. What made Mike want to study fossils?

Cause	Effect
He saw fossils while visiting the La Brea Tar Pits as a child.	He became a scientist who studies fossils around the world.

129
EXTEND

▶ Address Misconceptions

Students may believe that all dinosaurs are extinct. Many dinosaurs did become extinct around 65 million years ago. Nevertheless, there are still living relatives of dinosaurs that exist today, such as birds. Fossil finds within the last decade confirm that many ancient dinosaurs were covered in feathers, laid eggs, and had body structures similar to modern-day birds. The dinosaurs that became extinct are now considered non-avian dinosaurs.

After Reading

Review with students why Mike Novacek decided to become a scientist. Draw a cause and effect graphic organizer on chart paper. Remind students that a cause is why an event happens. Ask:

- **What event in Mike Novacek's life helped him decide to become a scientist?**

Write students' responses in the left-hand box of the graphic organizer. Remind students that an effect is the event that happens. Ask:

- **What did Mike Novacek become when he got older?**

Write students' responses in the right-hand box of the graphic organizer.

Cause	Effect
He saw fossils while visiting the La Brea Tar Pits as a child.	He became a scientist who studies fossils around the world.

Tell students that people usually choose a career that matches their interests. For example, people who like food may become chefs, food photographers, or farmers.

Discuss Mike Novacek's career with students. Ask them to identify what parts of his job interest them. Have them read the article again and point to the part that tells about how Mike Novacek first became interested in fossils.

CHAPTER 4 Review

Vocabulary

Use each word once for items 1–5.

drought
endangered
food chain
habitat
prey

1. When there are not many of one kind of animal left, the animal is called endangered.
2. When it does not rain for a long time, there is a drought.
3. A place where animals and plants live together is called a habitat.
4. The grasshopper in the picture to the right is the prey.
5. The picture below shows part of a food chain.

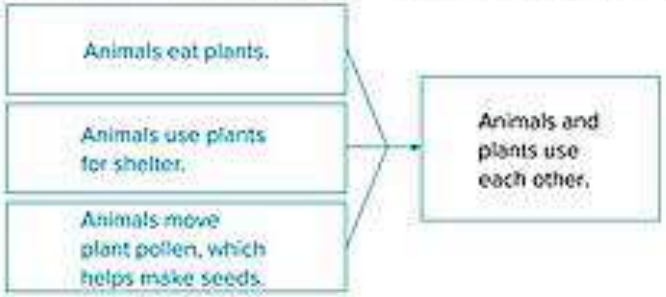
▶ Use the KWL Chart

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

Science Skills and Ideas

Answer the questions below.

6. **Summarize.** How do plants and animals use each other?



7. Compare the pictures below. How are they different? What do you think happened?

The sunflowers are alive in the picture on the left and dead or dying in the other picture. The flowers on the right do not have enough water or have been wilted from hot weather. It looks like there might be a drought because the ground is dry and cracked.

CHAPTER 4 Review

Science Skills and Ideas

10. Students should address concepts taught in each lesson: describing weather conditions and other features of different habitats; explaining how habitats are used to meet the needs of plants and animals; describe animal homes in habitats; discuss how habitats change.

8. **Put Things in Order.** Put this food chain in order.

rabbit | Sun | fox | grass

The Sun helps the grass grow.

↓

The rabbit eats the grass.

↓

The fox eats the rabbit.

9. What happens to animals and plants when habitats change?

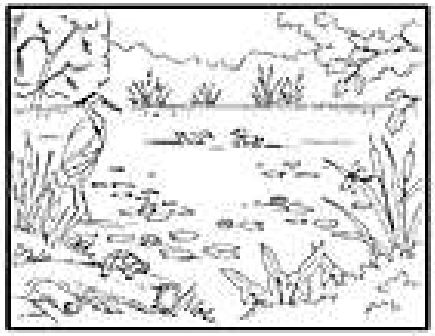
Possible answer: When habitats change, animals may die or move to find new places to get food and shelter. Plants may die if they are cut down or there is a drought.

10. What is in a habitat?

Accept all reasonable answers.

Test Prep

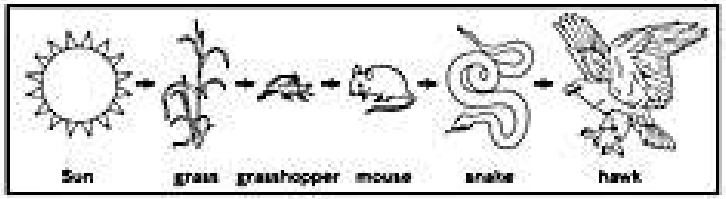
1. Look at the picture.



Which pair of words best describes this habitat?

A grassy and cold
B wet and grassy
C cold and snowy
D hot and dry

2. Look at the food chain below.



What does the snake eat?

A the hawk
B the mouse
C the grasshopper
D the grass

3. An animal fossil does not match the habitat where it was found.

What does this tell a scientist?

A how the animal looked
B what the animal ate
C when the animal lived
D how the habitat changed

Test Preparation

1. There are a lot of grasses and other plants in the picture, which need water and warm weather to survive.
2. The arrows in the diagram point from prey to predator. There is an arrow pointing from the mouse to the snake.
3. A scientist cannot tell how an animal looked or what it ate by looking at whether a fossil matches the habitat. A scientist cannot tell when the animal lived unless they look at the land it was found in.

Depth of Knowledge

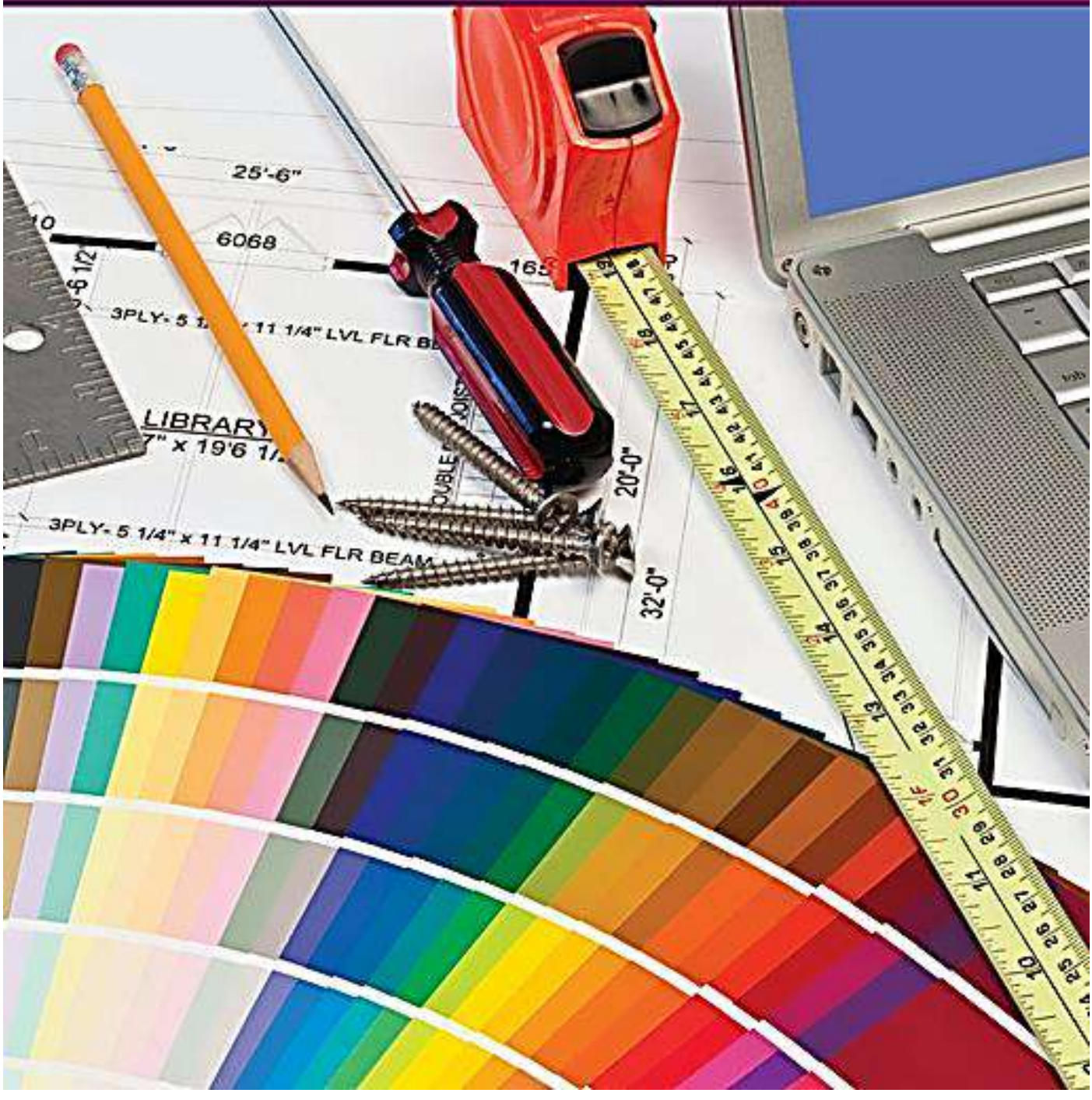
Level 1 Recall Level 1 requires memory of a fact, a definition, or a procedure. At this level, there is only one correct answer.

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.

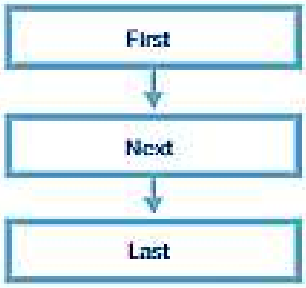
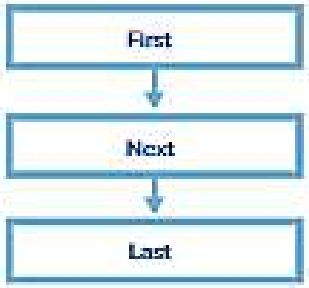
Level 3 Strategic Reasoning Level 3 requires the use of reasoning and analysis, including the use of evidence or supporting information. At this level, there may be more than one correct answer.

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.

Science, Technology, and Engineering



CHAPTER 5 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
1 We Use Tools PACING: 2 lessons *FAST TRACK:* 1 lesson	▪ Identify different types of tools. ▪ Describe how technology helps people do work.  **Reading Skill** Sequence	tools technology
2 The Design Process PACING: 2 lessons *FAST TRACK:* 1 lesson	▪ Recognize that people design things to solve problems. ▪ Understand that people follow certain steps in the design process.  **Reading Skill** Infer	solution design brainstorm model

Activity Planner

EXPLORE Activities

Explore

PACING: 25 minutes

Objective Explore a simple tool and its uses.

Skills investigate, draw conclusions

Materials ice cubes, two plastic cups per grouping, stopwatches or clocks, pencils, paper

PLAN AHEAD Gather paper towel tubes.

Explore

PACING: 30 minutes

Objective Experiment with materials to determine which material is most suitable for a juice box.

Skills investigate, draw conclusions

Materials newspaper, aluminum foil, bubble wrap, ice cubes, tape

PLAN AHEAD Keep ice cubes in the freezer until needed.

QUICK LAB Activities

Quick Lab

PACING: 25 minutes

Objective Identify items that illustrate how tools and technology make our lives easier.

Skills observe

Materials a variety of tools

PLAN AHEAD

Quick Lab

PACING: 15 minutes

Objective Brainstorm ideas to design the perfect desk.

Skills brainstorm, communicate

PLAN AHEAD

Language Acquisition Support

Academic Language

While 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
Vocabulary tools technology solution design brainstorm model	Inquiry Skills investigate draw conclusions brainstorm communicate observe

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 *Tools* are handheld devices used to help accomplish a task.

Example We use brooms to help remove items from the floor.

Ask What are examples of other tools we use in our homes?

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

Vocabulary Activities

Help students understand how tools are used to simplify tasks.

BEGINNING Write the word tools. Have students read it with you. Then have students watch as you use a tool to help accomplish a task. Explain how using the tool helps complete a task that would prove more challenging or time consuming without using the tool. Encourage students to try the task with and without the tool, and discuss the results as a class.

INTERMEDIATE Form groups. Encourage groups to make a list of tools they use at home and at school. Then have the groups create a Venn Diagram comparing and contrasting tools only used at home, tools only used at school, and tools used at both at home and at school. Have groups exchange lists and compare whether their lists are the same or different.

ADVANCED Have students create a tool that could help simplify at task at school or at home. Encourage them to illustrate their example and share their ideas with the class. If time allows, students can use modeling clay to create an example of their design.

CHAPTER 5

Technology and Design

THE BIG IDEA How can technology help meet our needs?

Chapter Preview Have students look at the Essential Questions 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, and then. Ask:

- **What technology do you use?**
- **How does technology help you in your daily life?**
- **What do people do to create and design new tools and technology?**

Answers shown represent sample students' responses.

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

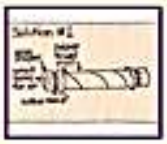
CHAPTER 5

Technology and Design

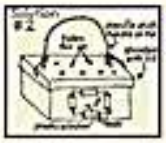
The Big Idea How can technology help meet our needs?

Vocabulary

technology all the tools we use to make life better



design to draw, plan, build, or test an idea



solution a way to fix a problem

model a sample of a product or idea used for testing

Differentiated Instruction

Instructional Plan

Chapter Concept Technology helps us meet our needs.

EXTRA SUPPORT Students who don't understand what technology is and how it helps us should cover **Lesson 1** in depth before reading on in the chapter.

ON LEVEL Students who have a basic understanding of how technology helps us may want to review **Lesson 1** before moving into **Lesson 2** and learning about the design process.

ENRICHMENT For students who are ready, **Lesson 2** introduces the way in which new technology is designed.

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.

Technology and Design

What We Know	What We Want to Know	What We Learned
Technology helps us communicate.	How do people design new technology?	Technology is all the tools we use to make life better.
We use tools every day.	How has technology changed?	Technology improves over time.
We can use technology to give us tools every day.	What are examples of technology in our classroom?	Technology helps us communicate and learn.

Vocabulary

- Have a volunteer read the **Vocabulary** words aloud to the class. Ask students to find one or two of the words in the chapter. 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.

Lesson 1 We Use Tools

Objectives

- Identify different types of tools.
- Describe how technology helps people do work.

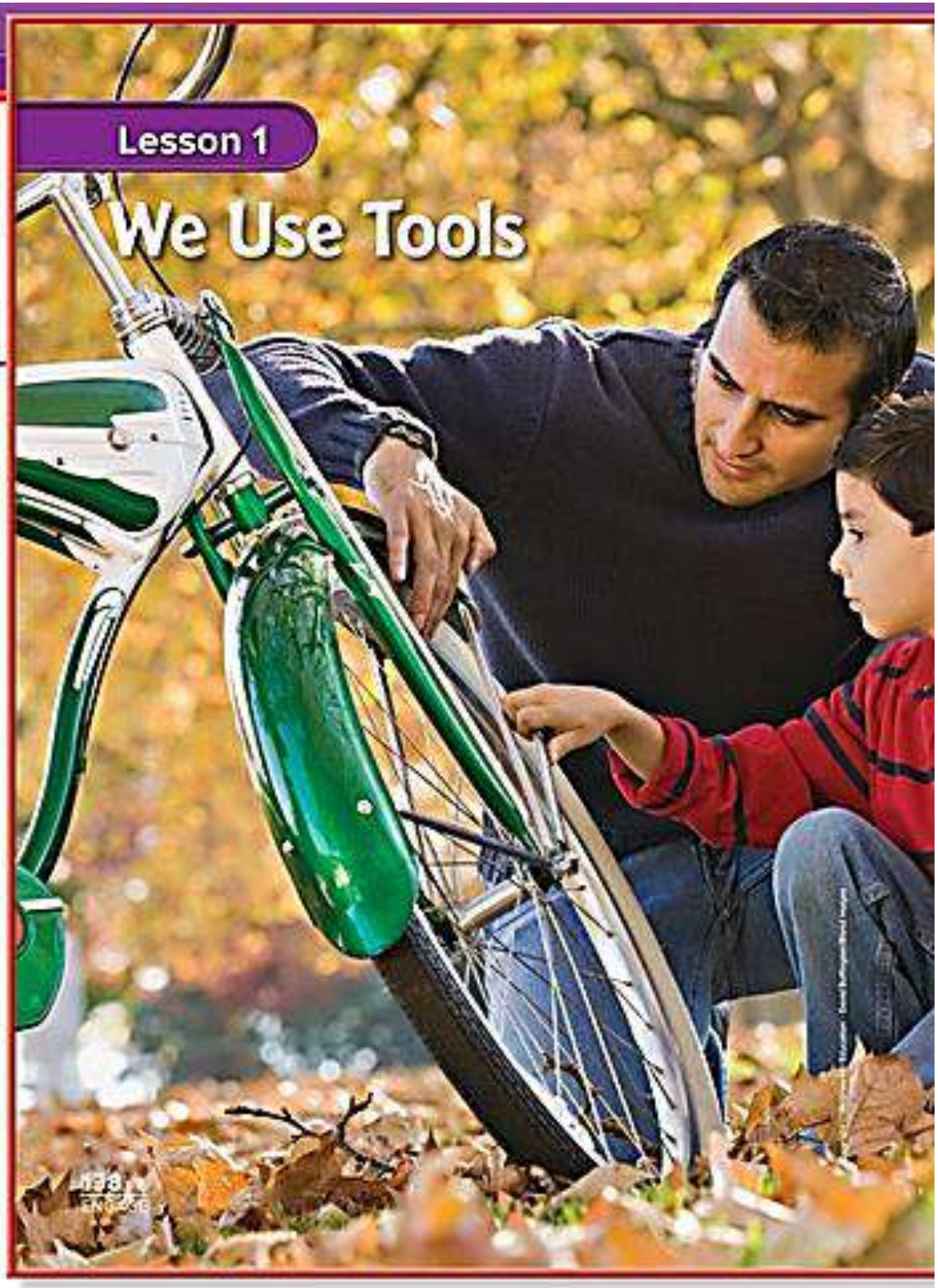
1 Introduce

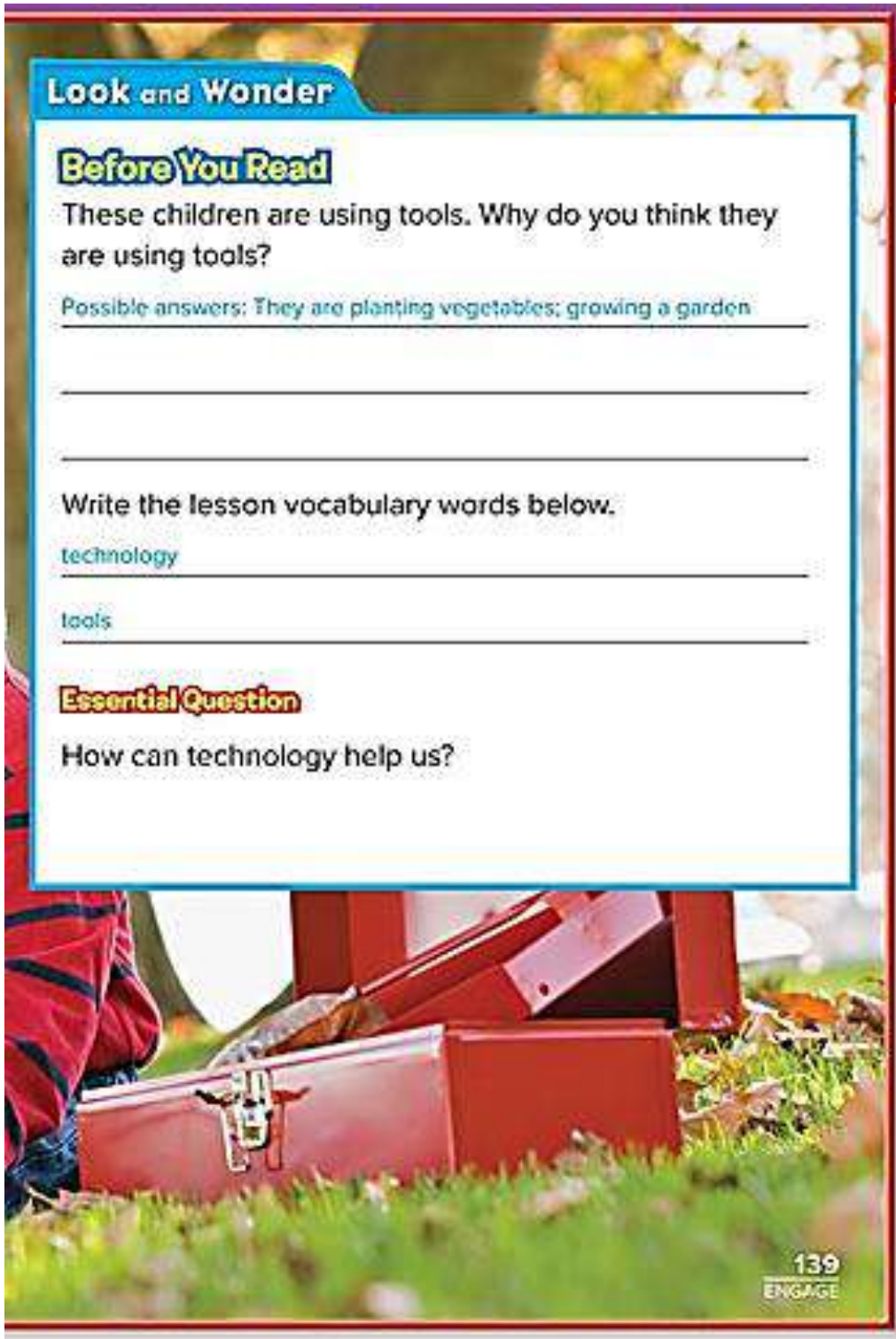
▶ Assess Prior Knowledge

Have students share what they know about tools and technology. Ask:

- **What are some tools you use at home?** Possible answers: toothbrush, hammer, vacuum cleaner
- **How do tools make a job easier?** Possible answer: A hammer can push a nail into wood. You would not be strong enough to push it in without a tool.
- **What are some types of technology?** Possible answers: computer, television, microwave oven

Have students record their answers in the What We Know column of the KWL chart. Then have students think of questions they have about tools and technology. Have them record their questions in the What We Want to Know column of the KWL chart.





Look and Wonder

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

- **What do you notice about the tools in the picture?** Possible answers: The tools are used for gardening.
- **Based on the photograph, what are the ways these tools are used to make gardening easier? Why do you think so?**

  Possible answer: The shovels are used to help dig holes.

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.

Explore

whole class · 20 minutes

Plan Ahead Gather enough paper towel tubes for each student to have one.

Purpose Through this activity, students will explore a simple tool and its uses. They will design a simple tool and evaluate the effectiveness of that tool.

Structured Inquiry **What to Do**

1. Show students a broom. Allow a student to demonstrate how this tool is used. Point out the handle and discuss its purpose.
2. Allow students to investigate the bristles on the broom. Discuss the purpose of the bristles and why their size and placement help the broom to be more effective. Ask: **What would happen if the bristles were too far apart?** Possible answer: Objects would go between the bristles and not be swept up.

Explore

How can we use tools?

You need


paper towel tube


scissors


glue


paper

What to Do

1. Use a paper towel tube as the handle for a broom.
2. Cut paper. Put it on the end of the paper towel tube. Be sure to cut the paper so that it looks like the bristles of a broom.

Inquiry Activity

3 **Investigate.** Use your broom to sweep an area of your classroom. How well did your tool work?

Possible answer: The model broom swept up some dirt, but it left some dirt on the floor.

Explore More

4 **Draw Conclusions.** How is your tool like a real broom?

Possible answer: My tool looks different and is made from different materials, but it works like a broom.

Open Inquiry

Investigate ways to improve your model.
My question is:

Sample question: What materials can I use to improve my broom model?

3 **Investigate** Students may wish to place a variety of objects on the floor to sweep up, such as rice, a clean tissue, or blocks. Ask: **Did your broom work better on some objects than others? Why?** Possible answer: The broom worked better on lighter objects. The broom was not strong enough to move heavier objects like blocks.

4 Possible answers: it has a handle and bristles like a real broom does.

Open Inquiry

Provide students with the time to investigate ways to improve their model. Allow students to brainstorm a list of questions. Sample Question: What materials can I use to improve my broom model?

FAST TRACK

Alternative Explore

What are some outside tools?

Display photos of different kinds of outside tools, such as a rake, a snow shovel, a saw, and an ax. Have students look at the pictures and describe what they see.

Ask students to draw pictures of people using each tool, label the pictures, and write a short description of how the tool is being used.

Have students communicate how these outside tools make work easier.

2 Teach

Read and Respond

Reading Skill Sequence The order in which things happen.

What are tools?

▶ Discuss the Main Idea

Main Idea Tools are used every day to help people do work.

Read the text together, and then ask:

- **What are some tools in our classroom?** Possible answers: pencil sharpener, scissors, computer, projector
- **What are some body parts that are used as tools?** Possible answers: hands to grasp, feet to walk, teeth to grind and chew food

▶ Develop Vocabulary

tool ***Word Origin*** Tell students that the word *tool* comes from the Old English word *toole*. Mention that *tool* not only refers to the usual machines that come to mind for doing work, such as a hammer, screwdriver, and shovel, but also to any instrument that is used to do some kind of work. For example, a computer is a tool for learning, and a pencil is a writing tool.

Read and Respond

What are tools?

Circle in the text the different types of tools you can use.

Tools help us do things. You use tools every day. Some tools can help you do work, like a hammer, knife, and shovel.

You can use some tools for learning. A computer can help you find information. A pencil is used as a writing tool.

▲ You need a hammer to build a bird house.

▲ You can use a shovel to dig in soil.

Science Background

Tools The simplest tools date back to prehistoric times. Cave drawings depict early people using tools for hunting. Most early tools were fashioned from materials taken from the natural surroundings, such as rocks and animal bones. More complex and stronger tools were possible when the ability to use metals was developed. As the centuries passed, technology grew. Technology that grew out of the Industrial Revolution has helped to create today's civilization with all its conveniences and problems.

Your body has tools. Your hands are tools you can use to grab and pick up things. Your hands can also carry things.

Your teeth are also tools. Each tooth has a special job. Your front teeth are used to bite and tear food. Your back teeth are used to grind and chew food.

Quick Check

1. Draw two tools that you use.
2. How do the tools make things easier?

Answers will vary.

▲ You can use your hands as tools to grab and hold things

◀ Your teeth are used as tools for chewing food.

▶ Use the Visuals

Have students look at the pictures. Read the captions. Ask:

- **How do the shapes of the tools in the pictures help the people do work?** Possible answers: The pointed end of the shovel helps it to go into the dirt or sand; the flat part helps it to scoop up dirt or sand. The handle of the hammer allows us to grasp and drive the nail into wood.
- **What are some other body parts pictured that are tools?** Possible answer: Your ears help you to collect sound. Your eyelashes help to keep dirt and other objects out of your eyes.

LA Support

Act Out Demonstrate using several tools. Say the name of the tool and tell how it helps people to work.

BEGINNING Invite students to guess the tool. When someone guesses correctly, have everyone act out using the tool and identify the tool.

INTERMEDIATE Have students draw a picture of the tool and label it. Invite them to act out using the tools illustrated by others.

ADVANCED Ask a volunteer to act out using a tool, and have others identify it. Repeat the activity with another volunteer. Ask students to compare and contrast the two tools.

What is technology?

Quick Lab

Tools and Technology

Objective Identify items that illustrate how tools and technology make our lives easier.

▶ Discuss the Main Idea

Main Idea Technology helps to make our lives better. Science is used to create new technology.

Read the question at the top of the page and discuss the different types of technology. Read the text together. Ask:

- **What types of technology have you used today?** Possible answers: computer, television, telephone
- **How does technology depend on science?** Possible answer: People use what they have learned from science to make tools.

▶ Develop Vocabulary

technology Explain that *technology* refers to using what is learned in science to meet the needs and wants of society.

What is technology?

All the tools and ideas we use are called **technology**. Technology can make our lives better. Technology helps us communicate and learn.

New ideas and tools can make work easier. Technology can change over time. Tools may be improved to work better.

Technology depends on science. People use what they know from science to make tools. Tools like the telephone allow us to communicate with each other.

Quick Lab

Learn more about tools and technology.

Read a Photo

How are these tractors different?

The photo shows that plows were once pulled by mules and horses. Now farmers use mechanical tractors to pull the plows.

Tools Then and Now

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Discuss several activities the students have completed during the day, and ask them to identify what technology they used. Then ask them to discuss how their day would have been different without the use of technology.

ENRICHMENT Brainstorm different technologies that were invented in a variety of time periods. Ask students to select five technologies. Then, guide the students in researching when these technologies were invented and creating a timeline to show their development.

Science depends on technology too. Tools can be used to learn more about science. Tools help scientists experiment and explore. A telescope can help scientists learn more about things in space.

▲ The telephone lets you talk to others when you are not near them.

▲ Technology can help us learn.

Quick Check

3. How does technology depend on science?

People use what they have learned from science to make tools.

Read a Photo

Point out that the photos show farming technology from many years ago and from modern times. Ask:

- **How do the photos help you see how farming technology has changed in recent years?**

▶ Use the Visuals

Have students look at the photographs and read the captions. Ask students to use the word *technology* to describe the tools that are being used in the photographs. Ask:

- **Which photos show forms of technology that a scientist might use?** Possible answers: the computer and the telescope
- **How has technology changed phones over time?** Possible answers: They are smaller. They no longer need cords. Cellular phones allow you to talk almost anywhere.

Classroom Equity

If not controlled, the most verbal students can dominate classroom discussions. To assure that you are engaging students equitably, utilize a participation strategy. One strategy is to visualize the classroom as sections and purposefully ask questions from each section during the lesson. Participation strategies such as this will help to insure that you are involving all students equitably in classroom conversations.

3 Close

▶ Using the KWL Chart

Review with students what they have learned about weather, precipitation, temperature, and wind. Add what they have learned to the class KWL chart.

Visual Summary

Write about what you learned.

Tools

Possible answer: Tools help us do things. Some tools, like a hammer, knife, and shovel, can help us work. Other tools help us learn.

Technology

Possible answer: Technology is all the tools we use to make life better. Technology can help us communicate and learn. Technology can change over time.

Think, Talk, and Write

1. **Vocabulary.** What are tools?

objects or body parts that help us do work

2. **Sequence.** List in order the tools you use to pick up and take a bite out of an apple.

Possible answer: I use my hands to grab and pick up an apple.

↓

Possible answer: I use my front teeth to bite into the apple.

↓

Possible answer: I use my back teeth to grind and chew the apple before I swallow it.

3. How has the telephone improved how we communicate?

Possible answer: The telephone has made it possible for us to talk to people who are not near us.

Essential Question How can technology help us?

Possible answer: Technology can make our lives better by helping us communicate and learn.

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 choose a tool that is not shown in the lesson. Have them show how the tool makes our lives better or easier.

Reading in Science

Objective

- Summarize the key ideas in an article about X-rays.

A Tool to Look Inside

Genre: Nonfiction Stories about real people and events.

Have students look at the pictures in the article. Ask:

- **What real things will you read about in the selection?** Possible answers: tools, technology, X-rays, doctors, dentists

Before Reading

Preview the title and photos with the students. Ask:

- **Do you know anyone who has broken a bone? How did he or she know it was broken?** Possible answers: My friend had a fall and hurt her arm. Her mom took her to the doctor's office, where she had an X-ray taken.
- **What tool could help a doctor know if an arm is broken?** an X-ray machine

During Reading

Explain that doctors and dentists use X-rays as a tool. As students read, remind them to think of ways that doctors and dentists use X-rays. Ask:

- **What is an X-ray?** Possible answer: a machine that takes pictures of bones in the body
- **What are some ways that X-rays help doctors and dentists?** Possible answers: An X-ray helps doctors and dentists to see inside your body to know what is wrong. The X-rays show them cavities and broken bones so they can fix them.

Real World **Reading in Science**

A Tool to Look Inside

Sometimes doctors need to see inside a patient's body. They can take pictures of the inside of a patient's body using X-rays. X-rays are a type of energy that can pass through skin and muscle. They don't pass through bones. Your bones show up on X-ray pictures. Doctors can look at the pictures to see if any bones are broken.

▲ This is an X-ray of a hand with a broken bone.

X-rays help doctors see inside a patient's body. ▼

LA Support

Ask Questions Have students read the article with a partner and find two ways that X-rays are used. Ask comprehension questions such as *How do X-rays help doctors? How do X-rays help dentists?* Let students find answers in the text.

BEGINNING Students can make a simple, labeled drawing of something an X-ray might show a doctor.

INTERMEDIATE Students can use short phrases to explain what X-rays can tell doctors and dentists.

ADVANCED Students can use sentences to explain why X-rays are important tools for doctors and dentists.

Dentists use X-rays too. X-rays can tell a dentist a lot about your teeth. They use X-rays to see how your teeth are growing. They also use X-rays to look for cavities.

Doctors haven't always used X-rays. Wilhelm Roentgen discovered the X-ray in 1895. Scientists have made improvements to X-ray machines over time. Scientists continue to make X-ray machines better. This will help doctors try to fix what is wrong with their patients.

▲ This boy is getting an X-ray of his teeth.

Summarize. List the most important ideas. Then summarize the article.

Idea 1
Possible answer: Doctors can use an X-ray to look inside you if you have had a bad fall or bump.

Idea 2
Possible answer: Dentists might want to see inside your teeth to see how they are growing or if there are any cavities.

Summarize
Possible answer: Doctors and dentists use a tool called an X-ray. This tool helps them try to fix what is wrong with their patients.

▶ Address Misconceptions

Students may believe that since X-rays see inside of them that they are painful. Explain that when a doctor or dentist uses an X-ray, it is similar to taking a picture. X-rays that are used by doctors are painless and can not be felt.

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 review the article with a partner. Have one student describe ideas in the article. Then have partners change places.

Draw a Summary graphic organizer on the board or on chart paper. As a class, choose two key ideas from the article. Ask:

- **What important ideas did you learn in the article about what X-rays are and how they are used?**

Write these in the Idea boxes. Then, guide the students in using these ideas to write a summary statement. Remind students that a summary tells what the entire article is about.

Lesson 2 The Design Process

Objectives

- Recognize that people design things to solve problems.
- Understand that people follow certain steps in the design process.
- Recognize that if a model does not work, it can be revised and retested.

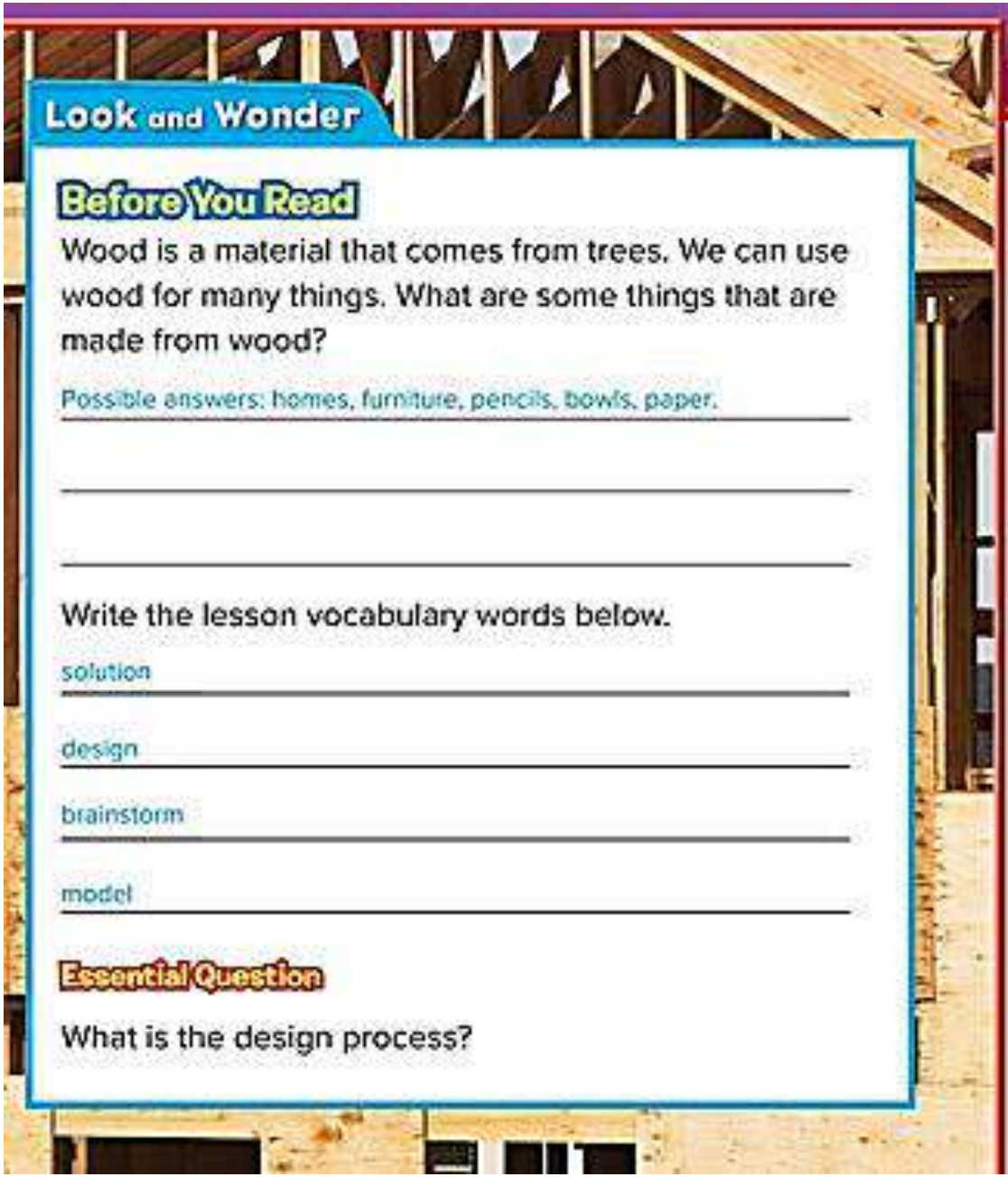
1 Introduce

▶ Assess Prior Knowledge

Have students share what they know about the design process. Discuss the photo. Ask:

- **How do you think this building project began?** Possible answer: It started with an idea. Someone wrote the idea on paper. Many people looked at it and gave their suggestions to make it better. Then they revised the plan.
- **Why do you think this building is being made? What problem might it solve?** Possible answer: The building is a home. It provides shelter for a family.
- **What might the designers do if they found out a certain wood was not strong enough?** Possible answer: They might revise their plan and try a different kind of wood.

Have students record their answers in the What We Know column of the KWL chart. Then have students think of questions they have about the design process. Have them record their questions in the What We Want to Know column of the KWL chart.



Look and Wonder

Before You Read

Wood is a material that comes from trees. We can use wood for many things. What are some things that are made from wood?

Possible answers: homes, furniture, pencils, bowls, paper.

Write the lesson vocabulary words below.

solution

design

brainstorm

model

Essential Question

What is the design process?

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Look and Wonder

Read the Look and Wonder question about wood. Invite students to share their responses to the question. Ask:

- What are some things made from wood?
- Why do we use wood to build homes?

Write students' responses on the class KWL chart and note any misconceptions they may 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.

ENGAGE | EXPLORE | EXPLAIN | EVALUATE | EXTEND

Explore

whole class | 30 minutes

Plan Ahead Keep ice cubes in the freezer until needed. Cover the work area with newspaper or have students set their wrapped ice cubes in a plastic tray to catch drips. You may wish to precut equal-size squares of materials for the students to use. Have students work in groups of three.

Purpose Through this activity, students will determine which material would be best to design a juice box.

Structured Inquiry **What to Do**

1. Distribute precut squares of materials for students or guide the students in cutting equal-size squares. The students in each group should cover their ice cube at the same time. Each student in the group should use a different material. Emphasize that using the same size of material and wrapping the ice cubes at the same time helps to make the comparison a fair test.
2. **Observe** Assist students in determining when one hour has elapsed. Ask: **What do you think we will observe when we unwrap the ice cubes?** Possible answer: The ice cube wrapped in newspaper will have melted the most because it had the thinnest covering to protect it from the heat.
3. **Communicate** The ice cube wrapped with the thickest covering melted last; the ice cube with the thinnest covering melted the most.

Explore

Which material would work best when used for a juice box?

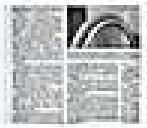
What to Do

1. Wrap three ice cubes in three different materials. Use the same amount of material each time.

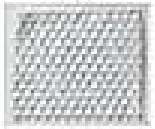
2. **Observe.** Wait one hour. Unwrap each ice cube.
3. **Communicate.** Describe what happened. Which ice cube melted the most? Which one melted the least?

Possible answer: The ice cube wrapped in newspaper will have melted the most. The ice cube wrapped in bubble wrap will have melted the least.

You need


newspaper


aluminum foil


bubble wrap


ice cubes


tape

Inquiry Activity

Explore More

4 **Draw Conclusions.** Which material would be the best for keeping juice cool? Why?

Possible answer: The bubble wrap would be best for keeping juice cool because it has the thickest covering to protect it from the heat.

Open Inquiry

Investigate which materials should work best to keep liquids warm. My question is:

Sample question: What material would work best to keep a cup of hot soup warm?

4 **Draw Conclusions** Possible answer: The bubble wrap would be best for keeping juice cool because it has the thickest covering to protect it from the heat.

Open Inquiry

Sample question: What material would work best to keep a cup of hot soup warm?

TRACK

Alternative Explore

Which containers keep cold drinks colder?

Put an ice cube and the same amount of water in each of the following containers: a thermos, a plastic bag, a metal cup, and a mug.

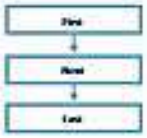
Ask students which containers they think would best keep the ice from melting and would keep the drink colder. Have them discuss with a partner which containers they think are best. Record their answers on the board.

Have students observe the containers after one hour and compare the results with their predictions.

2 Teach

Read and Respond

Reading Skill Sequence **The order in which things happen**



How can you design a solution?

▶ Discuss the Main Idea

Main Idea You can create a design to solve a problem.

Read the text together. Ask:

- **What was Asma's problem?** She needed a way to carry her pet hamster to the animal doctor.
- **How many ideas did Asma come up with?** three
- **How can Asma know which of her ideas for solving her problem will work?** Asma needs to design and test her solutions.

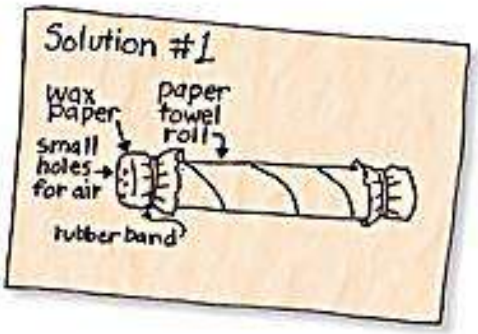
Read and Respond

How can you design a solution?

Underline the part of the text that tells you the steps in the design solution.

Asma had a problem. She had to bring her pet hamster to the animal doctor. She needed something to carry him in.

Asma needed to design a **solution**, or a way to fix her problem. To **design** is to draw, plan, build, and test an idea. Scientists follow several steps to design solutions to needs or problems.



Science Background

Design Process The design process is a creative, methodical approach to solving a problem that incorporates aspects of the scientific method. It can involve repetition of steps based on feedback and testing. After identifying a problem, the scientist brainstorms possible solutions and sketches or jots them down. The possible solutions are then tested and assessed. If none are feasible, more possibilities are generated. The scientist selects a final design to the problem based on the most useful and practical possibilities.

Asma brainstormed different ideas for a hamster carrier. To **brainstorm** is to think of as many ideas as possible. These ideas are possible solutions to her problem.

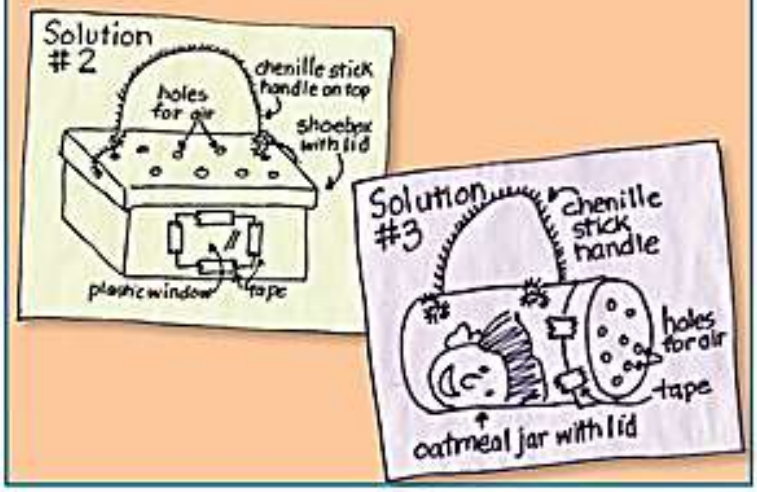
Asma drew pictures of her ideas. She included the materials she would like to use for each idea. Each solution includes different materials.

Read a Diagram

How are these two solutions the same? How are they different?

Possible answers: Both solutions look like they will give the hamster room to move and breathe. They use different containers, materials, and designs.

Brainstorming Solutions



Develop Vocabulary

solution ***Word Origin*** The word *solution* comes from the Latin verb *solvere*, which means "to loosen." Explain that a solution loosens or frees you from a problem.

design ***Word Origin*** The word *design* comes from the Latin verb *designare*, which means "to mark out." Ask: **How does this meaning connect to what we read about designing a solution?**

brainstorm Help students understand that a *brainstorm* is like a storm in your head. Just as rain falls down in a thunderstorm, ideas fall down in your head.

Use the Visuals

Follow the sequence from idea to design by studying the visuals. Help students see that people often think up several solutions to a problem. They decide what materials to use for each solution. Then they make a model of the design that they think will work best.

Read a Diagram

Refer students to the Visual Literacy Skills Practice.

Review the title of the diagram. Remind students that Asma thought of many different ideas as she brainstormed. Ask students to look at Solution #2 and #3. Ask:

- **How are the these designs different?**

Differentiated Instruction

Leveled Activities

EXTRA SUPPORT Invite students to make a list of several inventions. Have them write what problem the invention solved. For example, the invention of the light bulb allowed people to see at night without candles or gas lamps.

ENRICHMENT Explain that every invention helps people in some way. Challenge students to find out about an invention that changed the world in a big way. Ask students to write several sentences about the invention, what problem it solved, and how it changed the world.

How is testing a model important?

▶ Discuss the Main Idea

Main Idea Making and testing models is an important part of the design process.

Read the question at the top of the page and discuss Asma's model and why she made it. Read the text together. Ask:

- **What is a model?** a sample or copy of the real thing
- **Why is making a *model* and testing it important?** Possible answer: Making and testing the model can show you problems you didn't see in your drawings. It can tell you if your idea works.

▶ Develop Vocabulary

model Explain that the word *model* has several meanings, but on this page, the word means "a copy or sample of something." Models are used to show how things look or work. A model can also be used to show things that are too small to see with our eyes (a germ, for example), or to show things that are too large to see with our eyes (our solar system, for example), or not possible to see with our eyes (Earth's center, for example). Make a list of models with students and describe what each one shows.

How is testing a model important?

Asma selected the shoebox as the solution for her hamster carrier. She followed her drawing and created a model. A **model** is a sample of a product or idea used for testing.

Asma then needed to test, or try out her idea. Like a scientist, Asma tested her model to be sure it would solve her problem.

Quick Check

2. Something that is made to show an idea is a called a material map model

LA Support

Sequence Steps of the Design Process Write the following steps of the design process on the board in random order: *draw a plan*, *make a model*, and *test the model*. Read each step aloud.

BEGINNING Call out each step and have students respond "first," "second," or "last" to tell the order of the steps.

INTERMEDIATE Have students write the steps in order.

ADVANCED Have students write the steps in order, write a sentence or two to describe each step, and share their sentences with the class.

Once Asma tested her model, she realized she had to make changes. Asma improved her solution by moving the handles. She put them on the box instead of on the lid.

Quick Lab
Learn more about brainstorming ideas.

Asma tested her improved model again. She successfully designed a solution to carry her hamster to the doctor.

Quick Check

3. Why do you think it is important to test your ideas?

Possible answers: I would test my idea to see if it works like I planned.

I would need to see if I need to change anything about my model.

Quick Lab

Individual 15 minutes

My Perfect Desk

Objective Brainstorm ideas to design the perfect desk.

Use the Visuals

Have students look at the photographs on the pages. Ask students to use the word *model* to describe the designs that the student created. Ask:

- **What problem did the student notice when she made her first model?**
- **How did she improve her model?**
- **Do you think the last model solves her problem?**

Differentiated Instruction

Leveled Activities

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

- **What design process steps did the student use?** Possible answers: brainstorm, draw a plan, make a model, test the model
- **Why did the student make a model?** Possible answer: to see what needed to be changed

ENRICHMENT Ask questions such as these to develop students' higher-order thinking skills.

- **How would you improve the student's model?** Possible answer: make it out of a plastic tub
- **How might the student redesign the carrier for another animal?** Possible answer: make it able to hold water

Art Link

First, have students list the steps of the design process as you record them on chart paper. Have them help you number the steps from first to last before students make their own posters.

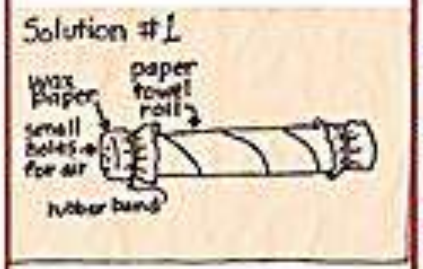
3 Close

▸ Using the KWL Chart

Review with students what they have learned about the technology and the design process. Fill in the What We Learned column of the class KWL chart.

Visual Summary

Write about what you learned.



Design a Solution

Possible answer: If you would like to solve a problem, you can design your solution by drawing, planning, building, and testing an idea.

Making and Testing a Model

Possible answer: Models show how things look or work. You can test a model to see if your idea needs to be improved. You can change the model and test it again.

Think, Talk, and Write

1. **Vocabulary.** What is a model?

a sample of a product or idea used for testing

2. **Sequence.** Write the steps taken to create a new toy.

Possible answer: Plan and draw an idea for a new toy.

↓

Possibe answer: Build a model of the toy.

↓

Possible answer: Test my model to if it works. If it does not work, I need to change and rebuild my model until I have a solution

3. Why is it important to draw pictures of your ideas?

Possible answers: to determine what supplies you need to build your design; to explain your ideas to others

Essential Question What is the design process?

Possible answer: The design process is a way to create a solution or fix a problem.

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.

Focus on Skills

Inquiry Skill: Science and Technology: The Design Process

▶ Learn It

Read the page together. Ask students what it means to design something. Have them think about a problem they have tried to solve.

- **Ask: If you were going to create something to solve a problem, what would you do first?** Possible answer: I would think of many different solutions and then figure out which one is the best.
- **Look at the text under Learn It together. Ask: What are the steps of the design process?** Identify a problem, think of a solution, and design the solution.
- **What problem are you going to try to solve?** how to store and keep track of school supplies

Focus Skills

Science and Technology:
The Design Process

Have you ever had a problem? How did you solve it? Scientists use the **design process** to solve problems.

▶ Learn It

When you use the design process, first you identify a problem. Next you think of a solution. A solution is a way to fix a problem. You can get ideas from your friends, a teacher, or books. Then you design your solution. To design is to draw, plan, build, and test your idea.

Do you have trouble finding your school supplies? You can design a way to keep track of your pencils, crayons, and other supplies.

Skill Builder

▶ Try It

Rasheed designed a box to hold all of his school supplies. Rasheed's box had a place for his pencils, crayons, glue, and erasers.

Design a way to store your school supplies. Make a sketch of your idea. Share your idea with your teacher. Gather the materials that you need for your design. Build your invention and test your design.

1. How did your design compare to Rasheed's?

   Answers may vary. Students may use a larger shoebox or include more sections.

2. Did your design solve your problem?

   yes

3. How could you change your design to make it better?

   Answers may vary.

▶ Try It

Read the Try It section with students. Explain that they should determine a solution for the problem of having disorganized school supplies. Point out that they are following the design process. First, they are sketching ideas and conferencing with a team member—you. Then they are building the invention and testing it. How might they test it?

1. Answers will vary. Students should explain how their designs are both similar to and different from the invention shown in the photograph.
2. **Have students think carefully about whether or not the design solved the problem. Are their supplies more organized and easier to find than they were? How could the design be even more helpful?**
3. **If time allows, have students take what they have learned to design another solution to the problem. You might work together as a class to create a solution with everyone's input.**

Science and Technology Background

STEM is an acronym for Science, Technology, Engineering, and Math. The study of STEM is intertwined with real-world learning, and its principals allow for an interdisciplinary, applied approach to learning. STEM learning is often hands-on and problem-based. The steps of the design process as outlined here go hand in hand with the tenants of STEM in allowing students to solve problems through the process of design. Even though students are solving a simple problem of school supplies, engineers and scientists use this same system to solve far more complex problems.

CHAPTER 5 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 technology and the design process now with what they knew then. Add any additional information to the What We Learned column of the KWL chart.

Vocabulary

1. solution
2. model
3. design
4. technology
5. brainstorm
6. tool

CHAPTER 5 Review

Vocabulary

Use each word once to complete the sentences.

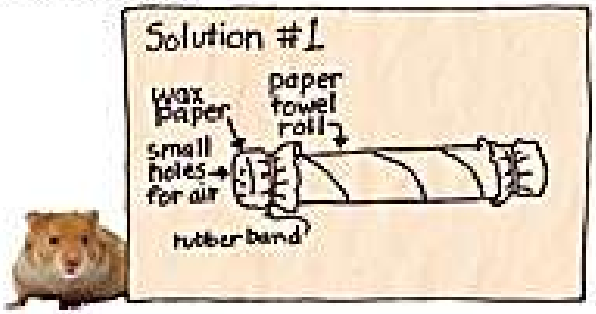
brainstorm
design
model
solution
technology
tool

1. A way to fix a problem is a _____ solution _____.
2. Something made to show an idea is a _____ model _____.
3. To draw, plan, and build an idea is to _____ design _____ it.
4. The tools and ideas we use to make our lives easier are called _____ technology _____.
5. To think of as many ideas as possible is to _____ brainstorm _____.
6. An object or body part that helps us do work is a _____ tool _____.

Science Skills and Ideas

Answer the questions below.

7. **Draw Conclusions.** Look at the picture. Why would this carrier not work?



Possible answer: This carrier would not work because the hamster could chew through the wax paper. Also, a paper towel roll does not give a hamster much room to move.

8. **Problem and Solution.** Design a tool to help you do a chore around the house.

Possible answer: I need to create a tool to help me clean up my toys.

↓

Possible answer: I will brainstorm ideas, and then draw, build, and test my ideas for a new tool.

↓

Possible answer: My solution will help me keep my toys neat.

Science Skills and Ideas

7. **Draw Conclusions** Possible answer: The hamster would not be able to stand in the rounded tube and the tube would be too small. There are no carrying handles on the tube.

8. **Problem and Solution** Answers will vary. Students should explain how the tool helps with a chore.

CHAPTER 5 Review

9. Answers will vary. Students might suggest using the trucks to pull items of various weights or putting weights on top of the truck.

10. Accept all reasonable responses. Possible answer: Technology makes work easier and helps us communicate and learn.

CHAPTER 5 Review

9. How would you test the strength of a new kind of toy truck?

Answers will vary. Children might suggest the trucks pull items of various weights or putting weights on top of the truck.

10. How can technology help meet our needs?

Accept all reasonable responses. Children should include details about how technology makes our lives easier and helps us communicate and learn.

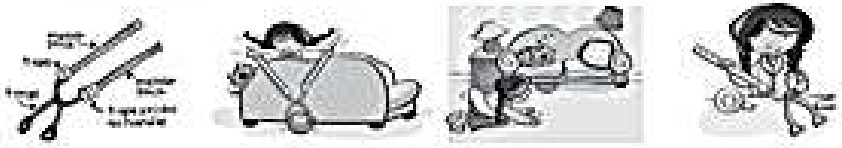
Test Prep

Circle the correct answer.

1. Which tools can help you grab objects and chew food?

   (A) hands and teeth **B** hands and feet
   C knees and teeth **D** legs and teeth

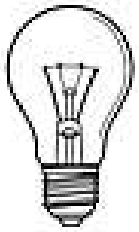
2. The girl in the pictures below is making a tool to get her ball back. Circle the letter that BEST shows the order of the design process.



   A 2, 4, 1, 3 (B) 3, 1, 4, 2
   C 4, 1, 3, 2 **D** 1, 3, 2, 4

3. Look at the picture. How does this technology help us meet our needs?

   A It gives us food.
   B It gives us information.
   (C) It gives us light.
   D It allows us to talk to one another.



1. A: hands and teeth. Parts of the body are tools, too. Hands help you touch and grasp objects and teeth help to bite, grind, and chew food.
2. B: 3, 1, 4, 2. The design process is a series of sequential steps that include drawing, planning, building, and testing ideas to find solutions.
3. C: It gives us light. The tools and ideas we use are called technology. The light bulb was developed to provide light.

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.

Careers in Science

Objective

- Understand how sound engineers engage in the design process.

Sound Engineer

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

Remind students that when they talk about real people and what they do, they are discussing nonfiction.

Talk About It

- **Why is sound important to viewing a film or a television show?** Possible answer: To simulate reality, to add to the scene, to help create a mood.

Learn About It

Read the text about sound engineers together. Ask:

- **What do sound engineers do?** They add sounds to films or television shows.
- **What are other things a sound engineer might create sounds for?** Possible answers: A sound engineer might add sounds to computer programs or radio programs.

Write About It

Tell students that sound engineers look for sounds they can add to increase an audience's understanding of the story or lesson of the video. Have students write about how sounds engineers can influence the way the audience feels about the film. Ask students how the sound of someone laughing versus the sound of someone crying influence the way the audience understands the film.

Sound Engineer

Have you ever wondered who creates sound effects in films? Sound engineers work with many sounds. They might make sound effects that make a monster or a dinosaur roar.

Sound engineers know a lot about sound. They need to know how pitch and volume affect sound. They also work with high-tech computer equipment.

sound engineer

What do sound engineers need to know about their job?

Possible answer: They need to know about different sounds and how pitch and volume affect sound.

Integrate Writing

Diary of a Sound Engineer

Have students imagine they are a sound engineer. Encourage them to think about what they might test, what they might learn, and what changes they might suggest.

Have students write a journal entry that describes one day at work for a sound engineer making a film about building a house. What sounds would need to be added to help the audience learn about building homes?

UNIT

6 Computer Basics

Objective Students are introduced to the Computer Basics chapter and discuss the role of computers in society.

Prerequisites Students should be familiar with basic computer terms and input devices.

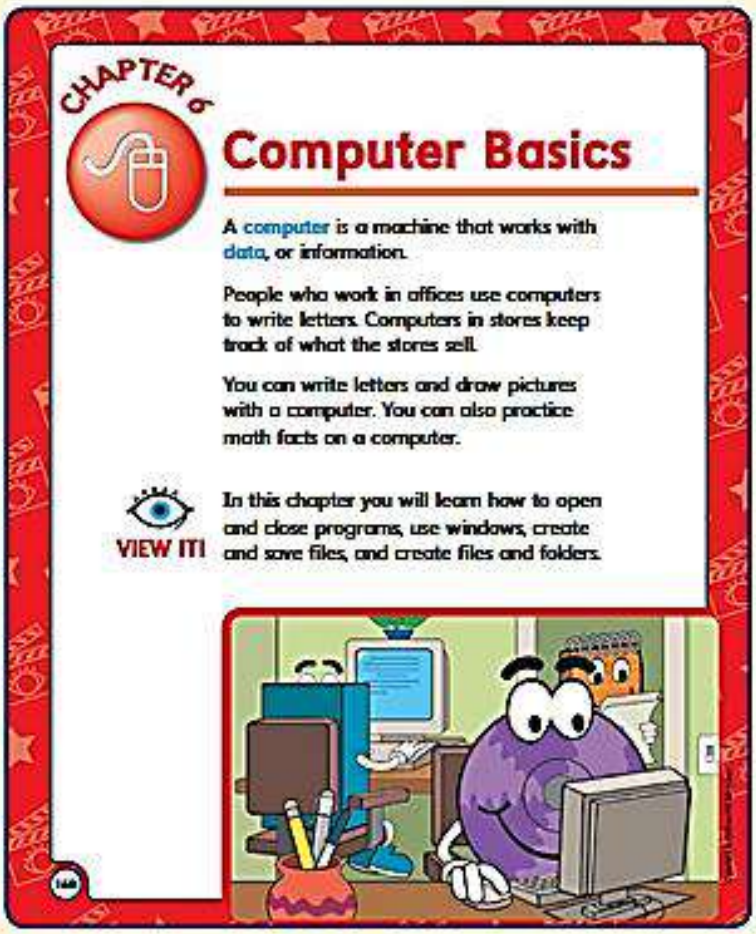
What to Expect Most students will be familiar with computers and some of the terminology even if they do not yet know how to manipulate files and folders.

"A computer works with data such as words, numbers, or pictures."

- Read the Chapter Opener together.
- Brainstorm ways that people use computers.
- Provide students with a copy of the school's computer policies. Review the safety and ethical use policies.
- Students should sign an agreement regarding computer use issues.

Informal Assessment

Have students tell what types of things computers can do.



What Are . . .

Computer Basics

Computer basics are the skills used to operate a computer regardless of its software applications. Computer basics start with learning to "speak the language" of the computer world. But computer basics include more than just vocabulary. They include knowing the rules for the safe and ethical use of computers and understanding how to accomplish the basic tasks associated with opening, closing, saving, naming, and moving files.

LESSON 1

Computer Parts

Objective Students name the parts of a computer and tell the purpose of each.

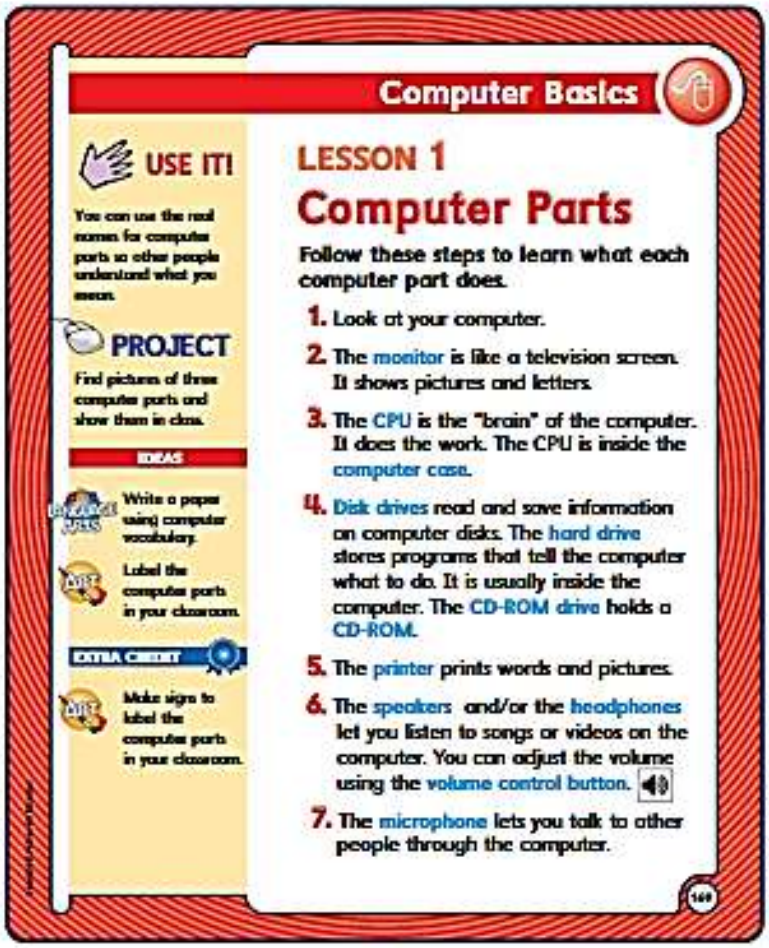
"You can use the real names for computer parts so other people understand what you mean."

- Point to each computer part as you identify it and tell its function.
- Have students point to each part of their computer.
- Explain to students the difference between the hard drive and a CD-ROM. The hard drive can store much more information than CD-ROMs.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Computer components can be classified into four groups: input devices such as the mouse, microphone, and keyboard; output devices such as the monitor, speaker, and printer; processing units such as the CPU; and storage devices such as the hard drive and a CD-ROM. Some computer systems, such as the *iMac*, are integrated into one unit. All of the drives and the CPU are located within the unit.

Informal Assessment

Ask each student to identify a computer part and tell what the part does.



Technology Challenge

Open an old computer and show the students the hard drive.

Language Acquisition

Monitor, Disk drive, Keyboard, Printer, and ***Mouse***

Make flashcards with these key words and tape them to each part as you say the name aloud.

Integration

EXTRA CREDIT

Prepare Ahead

Provide the students with poster board and art supplies. Have them make and decorate signs to label the computer parts in your classroom.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 1

The Mouse

Objective Students use the mouse to point, click, and drag icons on the Desktop.

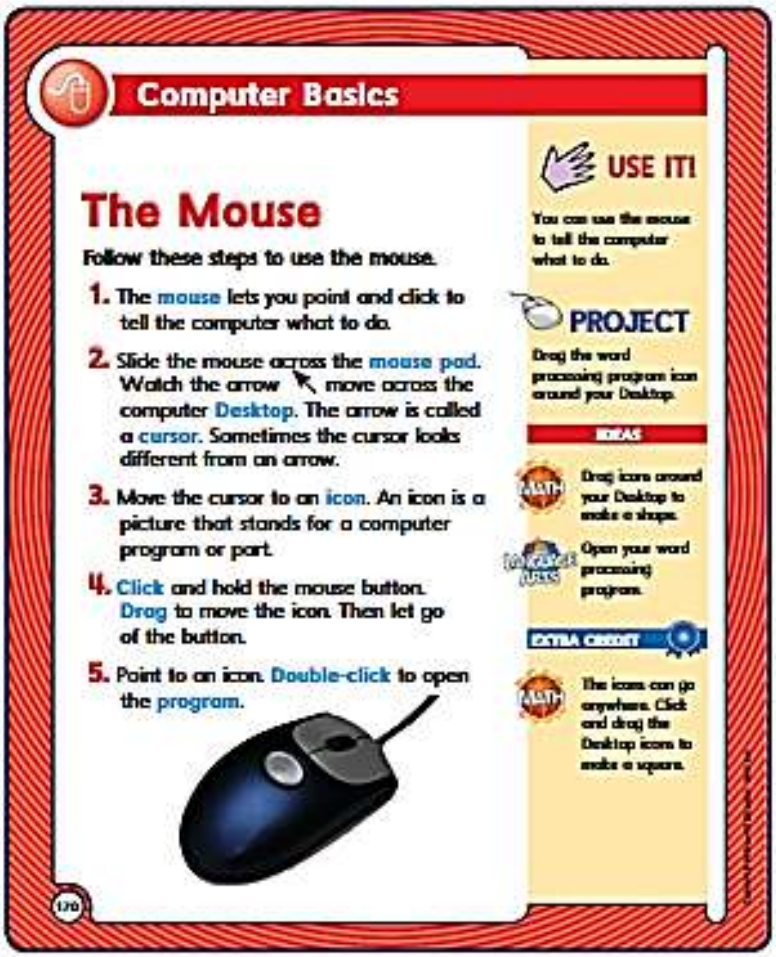
"You can use the mouse to tell the computer what to do."

- Brainstorm reasons why a mouse is called by this name. Demonstrate moving the mouse on the mouse pad.
- Explain that the Desktop is the name for the main computer screen.
- Demonstrate pointing, clicking, and dragging.
- Show how to double-click to open a program such as ***Word***.
- If necessary, give students their user names and passwords to log on.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Place a shortcut for a program, such as ***Word***, on the Desktop if there are no program icons already there. On older computers the mouse uses a roller ball; on others, the mouse uses a light beam. Both types of mouse input information into the computer.

Informal Assessment

Check students' monitors to see that they successfully moved a Desktop icon and opened the correct program.



Technology Challenge

Demonstrate the use of the right mouse button.

Language Acquisition

Icons

Open different types of programs to demonstrate how the icon pictures represent the type of programs to which they are linked.

Integration

EXTRA CREDIT

Prepare Ahead

Set up program or file shortcuts on the Desktop, and have the students drag the icons around to make a square.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 1

The Mouse and Keyboard

Objective Students learn to use the mouse and keyboard to tell the computer what to do.

"You can use the mouse and keyboard to tell the computer what to do."

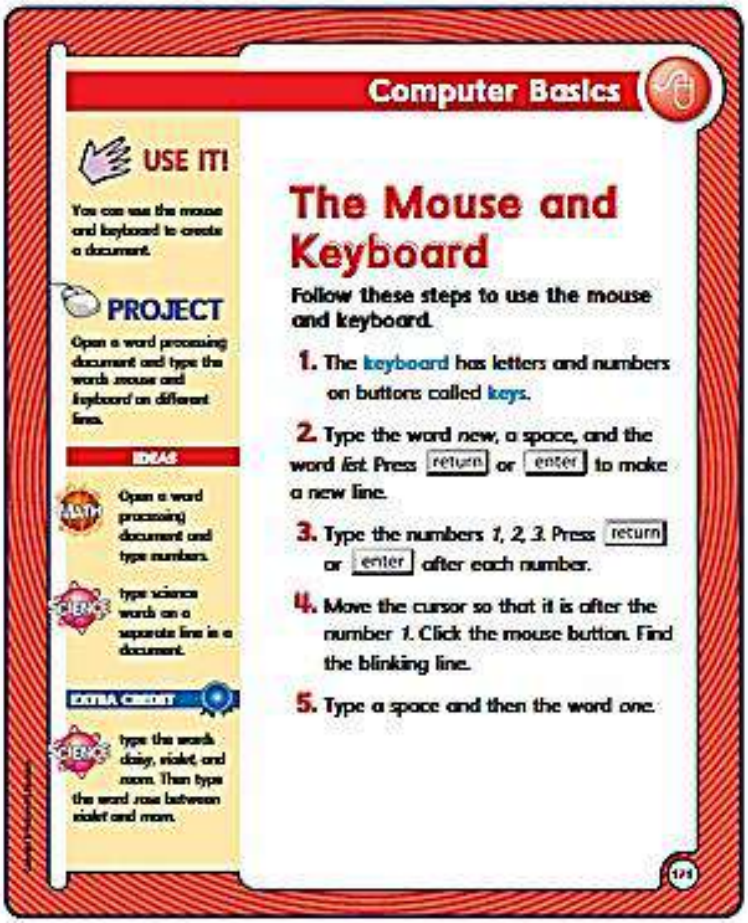
Prepare Ahead Make sure there is a Desktop icon for a word processing program. Make sure that a blank (new) file opens when you double-click the icon.

- Demonstrate how to move the mouse, and show what happens on the screen.
- Show students how to click the mouse button and drag the mouse.
- Demonstrate how to double-click to open a program. Type multiple lines of text into a blank document, and show students how to navigate with the mouse (by clicking to move the insertion point) and Arrow keys.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI The *Macintosh* mouse has only one button to click. The *PC* mouse has a right and left button. Click the left button to move the insertion point or to click a button or menu. Click the right button to open a window with commands.

Informal Assessment

Observe students as they create a document and navigate within it.



Technology Challenge

Allow students to practice opening other programs from the Desktop. Close programs for them or show them how to do it. Allow them to explore using the mouse.

Language Acquisition

Click and ***Double-click***

Explain and demonstrate the word *click*. Then explain that the word *double* means "two." Show students how to double-click.

Integration

EXTRA CREDIT

Have students open a new document, type *daisy*, *violet*, and *mum* on separate lines, and then add the word *rose* between *violet* and *mum*.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 2

Computer Do's and Don'ts

Objective Students discover proper use of computer parts and disks, and understand safety and privacy issues.

"You can use these rules each time you use a computer."

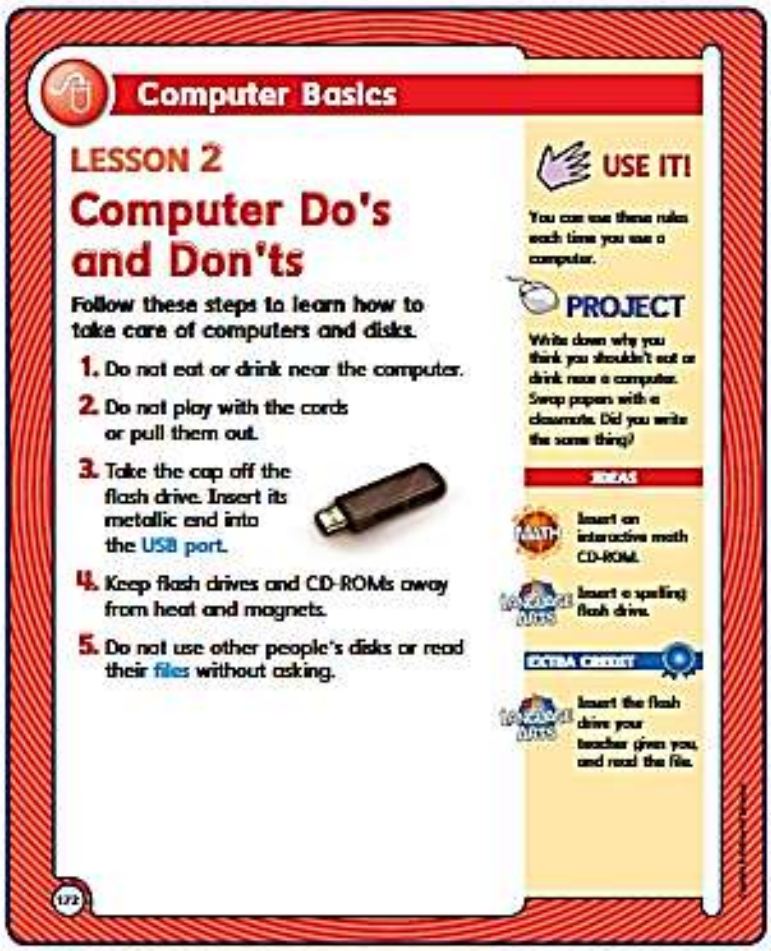
Prepare Ahead Show students a flash drive.

- Demonstrate proper techniques of inserting and ejecting flash drives and CD-ROMs.
- Remind students of your school's computer use policy and the agreement they signed.
- Review the safety and ethical use standards in this book.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Procedures for ejecting disks vary. On the ***Macintosh***, flash drives and CD-ROMs eject by dragging the disk or CD-ROM icon into the Trash. On a ***PC***, press the button near the disk drive to eject a CD-ROMs.

Informal Assessment

Have students demonstrate the correct procedure for inserting a disk and a CD-ROM.



Computer Basics

LESSON 2

Computer Do's and Don'ts

Follow these steps to learn how to take care of computers and disks.

1. Do not eat or drink near the computer.
2. Do not play with the cords or pull them out.
3. Take the cap off the flash drive. Insert its metallic end into the USB port.
4. Keep flash drives and CD-ROMs away from heat and magnets.
5. Do not use other people's disks or read their files without asking.

USE IT!

You can use these rules each time you use a computer.

PROJECT

Write down why you think you shouldn't eat or drink near a computer. Swap papers with a classmate. Did you write the same thing?

IDEAS

Insert an interactive math CD-ROM.

Insert a spelling flash drive.

EXTRA CREDIT

Insert the flash drive your teacher gives you, and read the file.

1/2

Technology Challenge

Teach the students to open flash drives or CD-ROMs using shortcuts.

Language Acquisition

Insert and ***Eject***

Show the students how inserting and ejecting flash drives and CD-ROMs is similar to inserting and ejecting DVDs with movies on them.

Integration

EXTRA CREDIT

Prepare Ahead Provide a word processing file on flash drive for students to insert. Have students read the file.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 2

Open and Close a Program

Objective Students use the mouse to open and close a program.

"You can learn to open and close a program."

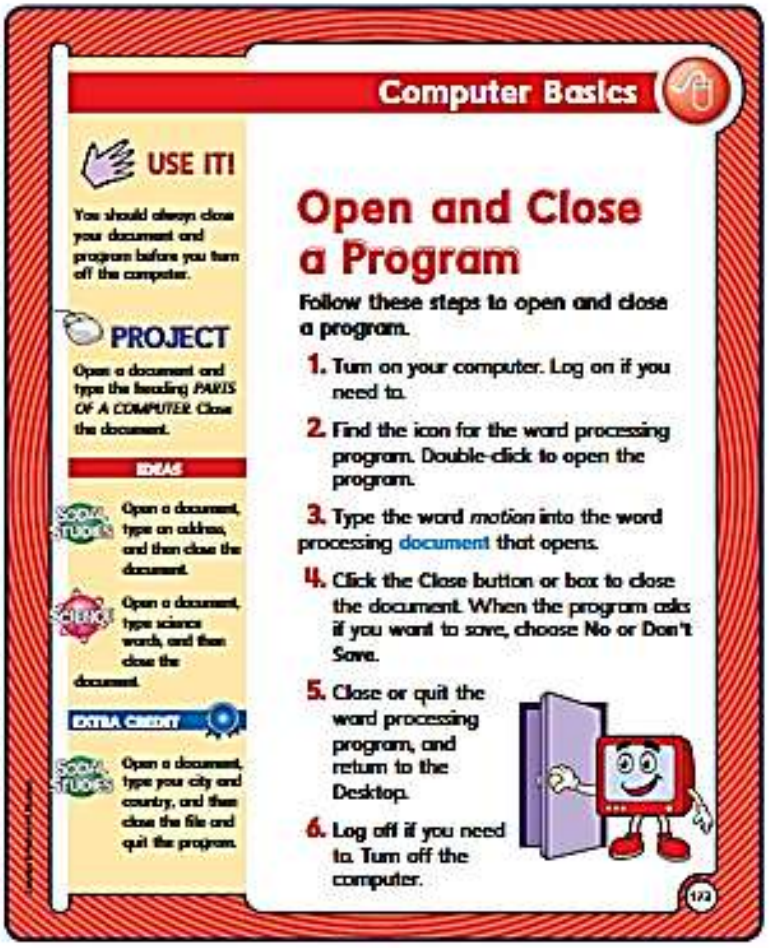
Prepare Ahead Make sure there is an icon for a word processing program on the Desktop.

- Explain to students that a program is a set of instructions that the computer uses to perform tasks. A word processing program allows users to create, edit, and print documents.
- Show students where the **Close** button or box is, and explain how they can use it to close or quit a program.
- Explain that the words *exit* and *quit* mean "to close."
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Closing a document does not automatically close the program. In ***Windows***, click the document **Close** button, then the program **Close** button. On a ***Macintosh***, click the document **Close** box, and then choose **Quit** from the **File** menu to exit the program.

Informal Assessment

Check students' monitors as they open and close a program and a document.



Technology Challenge

Have the students save and name their files so they can open them again through the drop-down menu within the application.

Language Acquisition

Program

Show how software helps the computer do specific activities. Open different programs such as ***Word*** and ***Paint***.

Integration

EXTRA CREDIT

Have the students open a word processing document, type their city and country, and close the file and program.

◆ Award 5 points for completing the Extra Credit.

LESSON 2

Explore the Window

Objective Students explore the elements of a word processing window. They change the window by moving and resizing it.

"You can resize or move a window."

Prepare Ahead Make sure that a shortcut or alias for a word processing program is on the Desktop. Explain that a program must be open to create a new file.

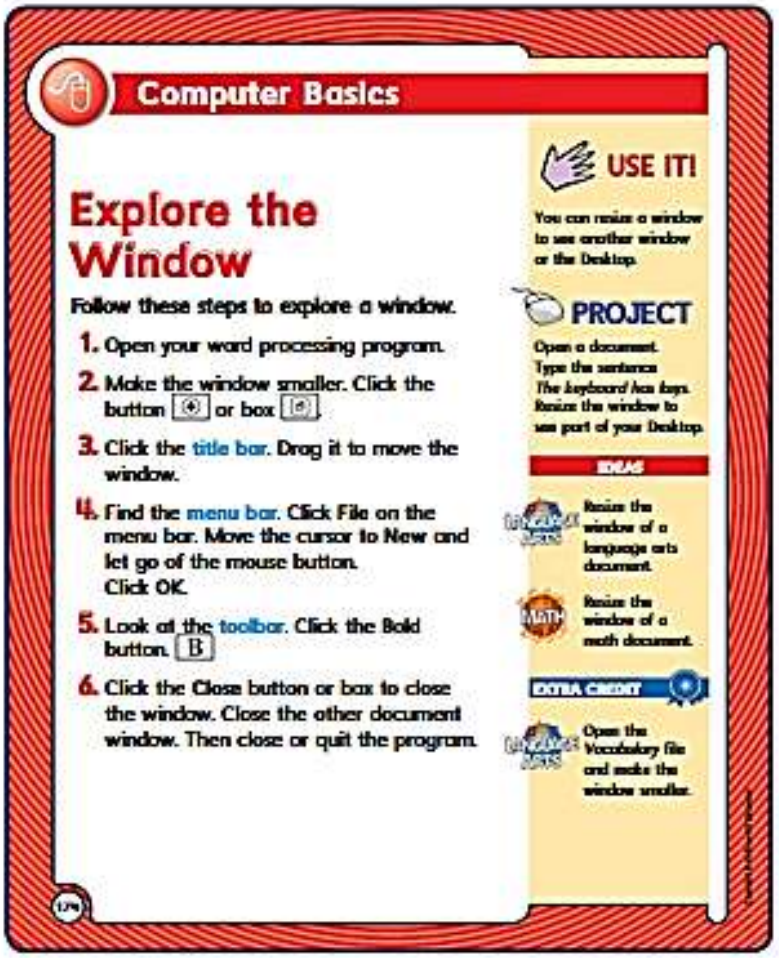
- Using the cursor, locate and identify the title bar, the menu bar, and other parts of the window.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI The same button can be used to make a window both smaller and larger. In ***Windows***, it is the **Restore/Maximize** button; on a ***Macintosh***, it is the **Zoom** button (the green button located at the upper-left corner of a window) .

Windows can be maximized and minimized by using the **Minimize** button. Make sure ***Windows*** users can tell the difference between the buttons for the file and the program. You can also resize windows with the size box in the window's lower, right-hand corner. Move the mouse pointer to a border until the mouse pointer becomes an arrow. Click and drag the border to resize.

Informal Assessment

Have students move and/or resize the document window so that a specified Desktop icon is visible.



Technology Challenge

Teach students to resize a window using the size box in the lower, right-hand corner.

Language Acquisition

Menu

Compare a restaurant menu to the menu bar, pointing out that each provides selections from which to choose.

Integration

EXTRA CREDIT

Prepare Ahead Locate a word processing file, and have the students open the file and make the window smaller.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 3

Open a File

Objective Students open a file using the mouse.

"You can open a file to read it or make changes to it."

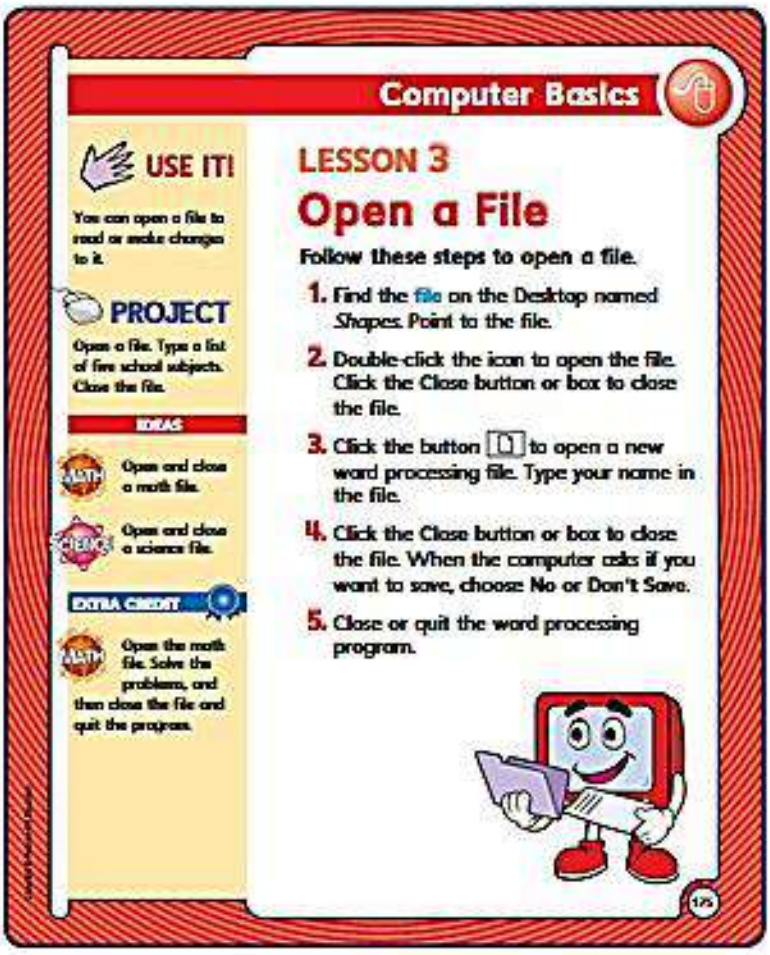
Prepare Ahead Open a word processing file, and type Squares *and rectangles have four sides* in a large font. Save it to the Desktop with the name *Shapes*.

- Tell students where to find the *Shapes* file.
- Explain to students that a file is the same as a document.
- Demonstrate moving the cursor and double-clicking to open a file.
- Save the file for students to use in Lesson 9.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI The words *file* and *document* are used interchangeably when referring to work created in a word processing program. When a file is opened by double-clicking the icon or file name, the software application (program) that can read the file is automatically opened. For Step 3 in the ***Student Edition***, students should click a button on the program toolbar to open a new file. The program will remain open in Step 4.

Informal Assessment

Observe students' monitors as you instruct students to open a file.



Technology Challenge

Have students save their files when they close them.

Language Acquisition

File

Show students a paper file with documents, and compare it to an electronic file with documents.

Integration

EXTRA CREDIT

Prepare Ahead Locate and save a file of math problems. Have the students open the file, solve the problems, and close the file and program.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 3

Drop-Down Menus

Objective Students use drop-down menus.

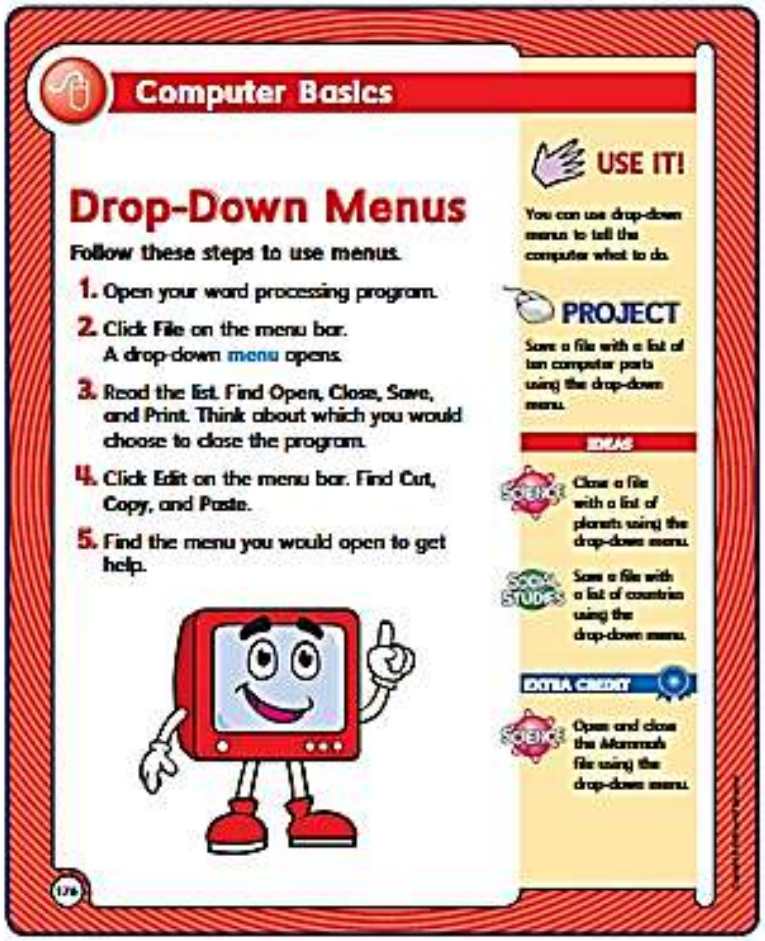
"You can use drop-down menus to tell the computer program what to do."

- Explain that menu bars and drop-down menus are found in most computer programs. Point out that the drop-down menu commands are the same commands that the students are familiar with using but are in a different location.
- Point out the **File, Edit,** and **Format**
- Demonstrate the technique to click and open menu bar options.
- Demonstrate how to exit the menu without selecting a command by clicking outside the menu.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Click outside the menu to escape.

Informal Assessment

Observe students' monitors as you give oral directions to find, open, and navigate drop-down menus.



Technology Challenge

Have students practice clicking outside the menu to escape.

Language Acquisition

Drop-down menu

Drop-down is a hyphenated word. Explain that hyphenated words are different words which, when used together, express one idea.

Integration

EXTRA CREDIT

Prepare Ahead

Type the list *cats, sheep, horses, cows* into a file. Name the file *Mammals* and save it to the Desktop. Once students have opened the file, have them close it using the drop-down menu.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 3

Navigation

Objective Students use the mouse and special keys to navigate through a document.

"You can use the Scroll Bars and special keys to help you move quickly through long documents."

- Tell students where to find the *Shapes* file from Lesson 3.
- On a keyboard, point to the Arrow and other navigation keys.
- Explain to students that when they use the up and down arrows in the Scroll Bar, they move through the document line by line.
- When they click the box in the Scroll Bar they can move through a lot of information quickly.
- When they click above or below the Scroll Box they move through the document one screen at a time.
- Allow students to practice using these methods to navigate.

PROJECT: Prepare Ahead

Make sure you have available on the Desktop for the students, the file with the computer parts created in Lesson 3.

- Have students complete the lesson. Award 15 points upon completion.

FYI Using the Scroll Bar instead of using the Arrow key or the Page Up key is a matter of preference. Students should become comfortable using a variety of navigation options.

Informal Assessment

Call out a location, such as the first line or last word, for students to find in the *Shapes* file.

Technology Challenge

Create a maze for the students, and have them navigate the maze using the options presented in this lesson.

Language Acquisition

Home

Explain the term *home* as the beginning of a document.

Integration

EXTRA CREDIT

Prepare Ahead Name any word processing document *Story*, and save it to the Desktop. Have the students use the Page Up and Page Down keys to navigate through the story.

- Award 5 points for completing the Extra Credit.

LESSON 3

Name and Save a File

Objective Students name and save a new file.

"You can name and save a file so that you can use it again."

Prepare Ahead Have students insert their flash drive into the USB port.

- Explain how to save a file.
- Students might have to scroll in the Dialog box to find the flash drive.
- Check and then delete or move students' files after they have completed the lesson.

PROJECT: Prepare Ahead

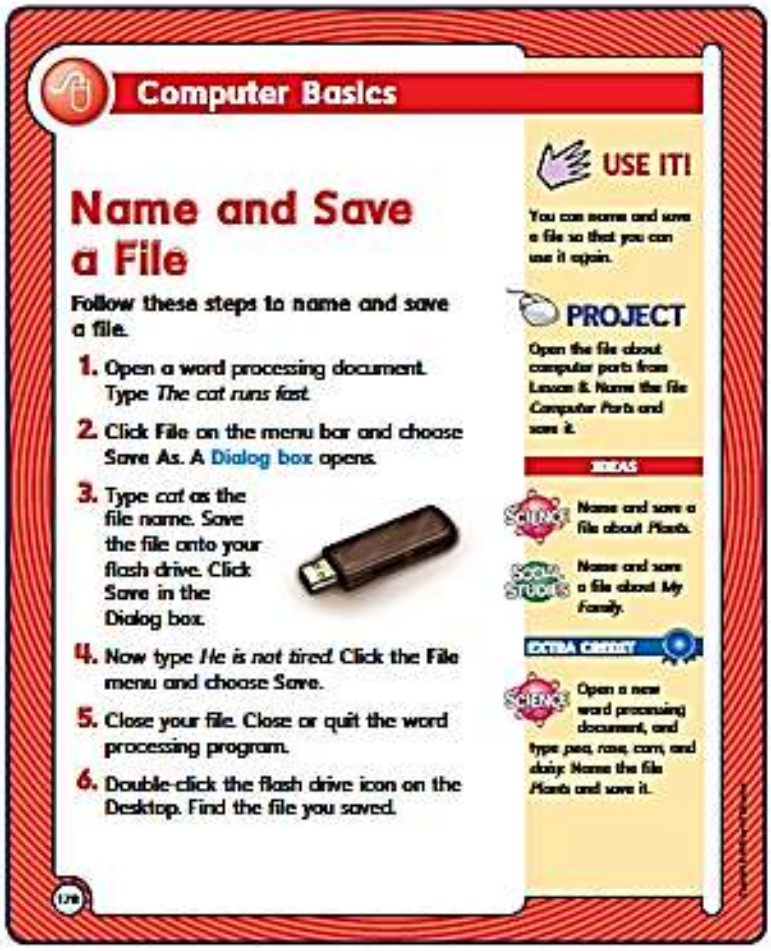
Have the file from Lesson 3 available for students on the Desktop.

- Have students complete the lesson. Award 15 points upon completion.

FYI The **Save As** command can be used to save files for the first time and to copy files. To save a file to a flash drive using ***Windows***, scroll through the choices in the **Save As** box. Select the flash drive. On a ***Macintosh***, open **Finder** and select the flash drive. For this and subsequent lessons, if your computers do not have USB ports, tell students where to save files. The **Save** button on the toolbar can be used.

Informal Assessment

Check to see that students' files have been saved.



Technology Challenge

Teach students to copy files using the **Save As** command.

Language Acquisition

File

Show the students how giving an appropriate name to a file will help them find the file again more easily.

Integration

EXTRA CREDIT

Prepare Ahead Have students open a new word processing document; type *pea*, *rose*, *corn*, and *daisy*; and save the file under the name *Plants*.

- Award 5 points for completing the Extra Credit.

LESSON 4

Create and Name a Folder

Objective Students create, name, and rename folders.

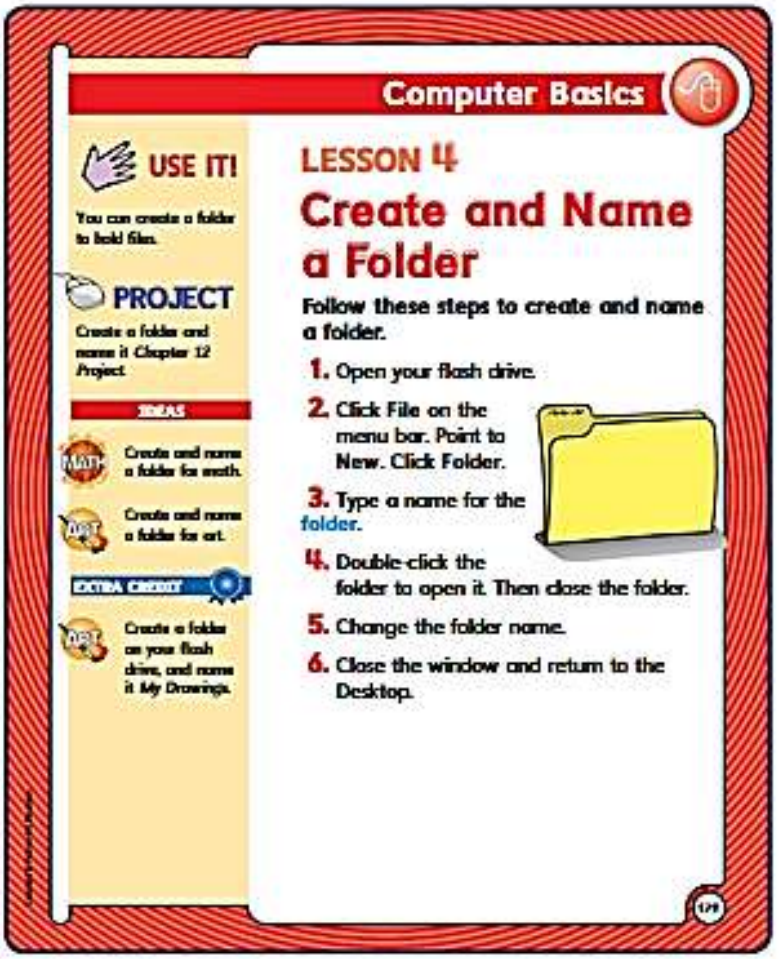
Prepare Ahead Have students double-click the flash drive icon to view the disk's contents. Explain to students what a folder is. Show them a real folder.

- Tell students that they can name a folder to describe its contents. Explain that giving an appropriate name to a folder will help them to organize their files logically.
- Demonstrate how to create a folder and then name it.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Folders help keep computer files organized and make them easy to find. Label folders with short but descriptive names. To rename a folder using a ***Macintosh***, click the box below the folder icon and type a new name. In ***Windows***, select the icon or file name first, and then click the name once and type a new name. It is also possible to change a folder name by right-clicking the folder icon and choosing **Rename**.

Informal Assessment

Have students create and name another folder on their flash drive.



Technology Challenge

Teach students to rename a folder by right-clicking the mouse.

Language Acquisition

Folder

Demonstrate the concept of a computer folder by showing students a manila folder containing documents.

Integration

EXTRA CREDIT

Prepare Ahead Ask students to open their flash drives. Have them create a folder and name it *My Drawings*.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 4

Move a File

Objective Students move a file in and out of folders.

"You can use folders to make it easier to find files."

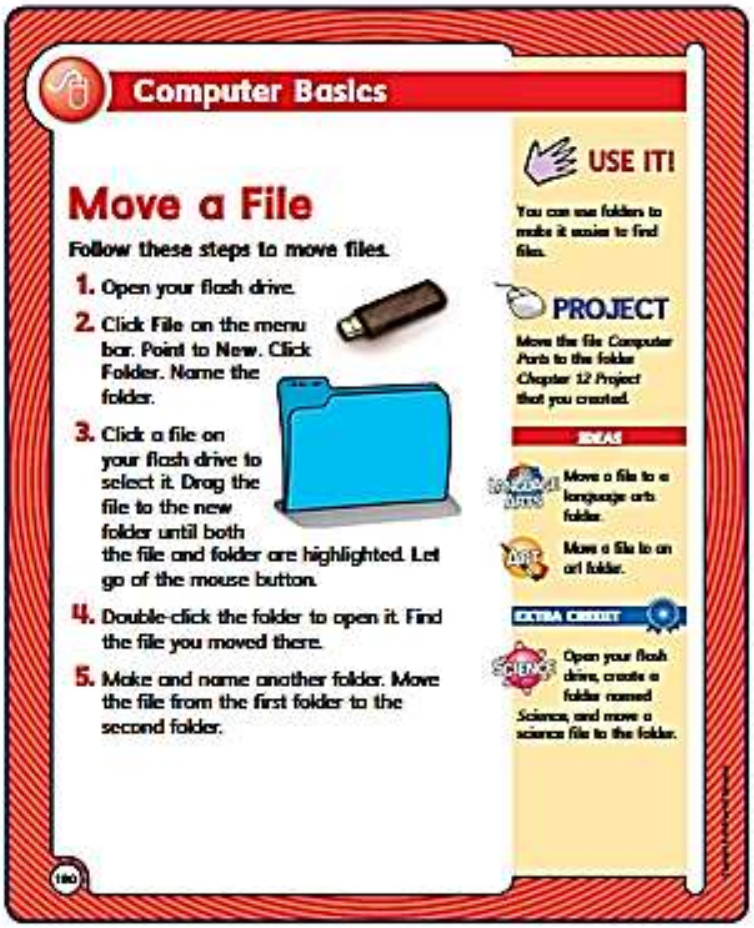
Prepare Ahead If there are no files stored on each student's flash drive, have students open, save, and name a file.

- Explain that files on the same topic can be grouped together in a folder.
- Have students complete the lesson. Award 15 points upon completion.

FYI Folders hold files. They can also hold other folders, which in turn can hold more folders or files. For Step 5 in the ***Student Edition***, students can create a new folder directly on their flash drive or inside the folder they created in Step 2.

Informal Assessment

Observe students' monitors as they move files from one folder to another. You could also check their flash drives.



Technology Challenge

Teach students to move a folder into another folder.

Language Acquisition

Folder

Demonstrate how sorting files into appropriate folders will make it easier to find the files.

Integration

EXTRA CREDIT

Prepare Ahead Open a word processing program. Have students create a file on a science topic and save it to a flash drive. Then have them create a folder called Science and move their file into this folder.

- Award 5 points for completing the Extra Credit.

LESSON 4

Use Save As

Objective Students copy a file using the **Save As** command.

"You can make changes to a file and keep a copy of the original by using ***Save As.****"*

Prepare Ahead Use the Shapes file from Lesson 3: Open a File. Make sure each student has a copy on his or her flash drive.

- Tell students to insert and open their flash drives.
- Explain the use of the **Save As** command to copy and rename a file.

PROJECT: Prepare Ahead

Use the *Computer Parts* file from Lesson 3: Drop-Down Menus.

- Have students complete the lesson. Award 15 points upon completion.

FYI Once a file is saved to a location, such as a flash drive or the hard drive, the computer will automatically save all subsequent versions of the file to that same location. If students need to save the file to a new location, they should use the **Save As** command. Students can also use the **Save As** command to make changes to an existing file while maintaining a copy of the original. Remind students that when a file is renamed using the **Save As** command, the renamed file stays open, while the original file remains in place and unchanged.

Informal Assessment

Check students' disks for the *Shapes* and *Shapes 2* files.

Technology Challenge

Demonstrate the use of **Save As** for saving files to a different location.

Language Acquisition

Save As

Open the original and renamed files to demonstrate that the content is the same.

Integration

EXTRA CREDIT

Prepare Ahead

Make a file of math facts and name it *Math Facts*. Have the students use the **Save As** command to copy the file and rename it *Math Facts 2*.

- Award 5 points for completing the Extra Credit.

LESSON 4

Delete a File

Objective Students delete a file by sending it to the Trash or Recycle Bin.

"You can delete a file that you do not want anymore."

Prepare Ahead Create a file named *I Can Count* and save it to the Desktop.

- Help students find the file they will delete.
- Explain that a file is not deleted until the Trash or Recycle Bin is emptied.
- Deleting files provides more space for the files you want to keep.

PROJECT: Prepare Ahead

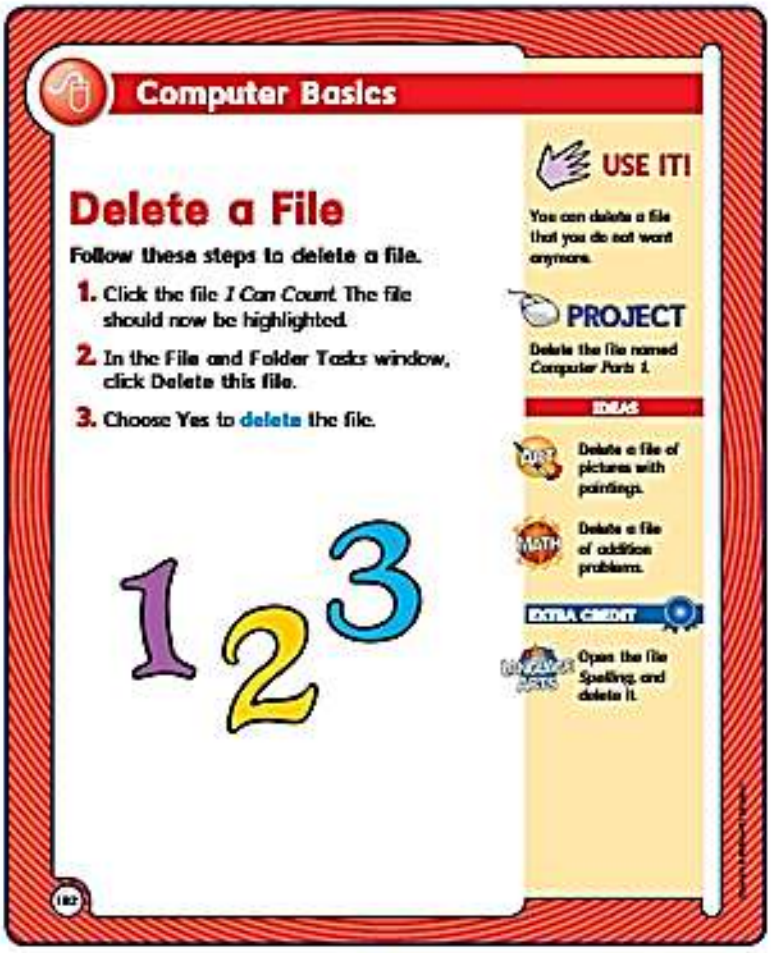
Use the file *Computer Parts 1* from the previous lesson.

- Have students complete the lesson. Award 15 points upon completion.

FYI In ***Windows***, select a file or folder and choose **Delete** from the **File** menu. A Dialog box will appear, asking whether the file should be deleted. The file will go to the Recycle Bin if **Yes** is clicked. On a ***Macintosh***, select a file or folder and choose **Move to Trash** from the **File** menu. ***Windows*** users can also right-click a file and select **Delete** from the pop-up menu.

Informal Assessment

Observe students' monitors as they execute the steps involved in sending a file to the Trash or Recycle Bin.



Technology Challenge

Demonstrate emptying the Trash or Recycle Bin.

Language Acquisition

Delete

Deleting files provides more space for the files you want to keep. Demonstrate the term *delete* by using a trash can or recycling bin to get rid of unwanted items in the classroom.

Integration

EXTRA CREDIT

Prepare Ahead Create a file named *Spelling* and type a list of spelling words. Save the file. Have students open the file and delete it.

- Award 5 points for completing the Extra Credit.

LESSON 5

Use a Password

Objective Students use a password to log on to a computer.

"You can use a password to protect your work."

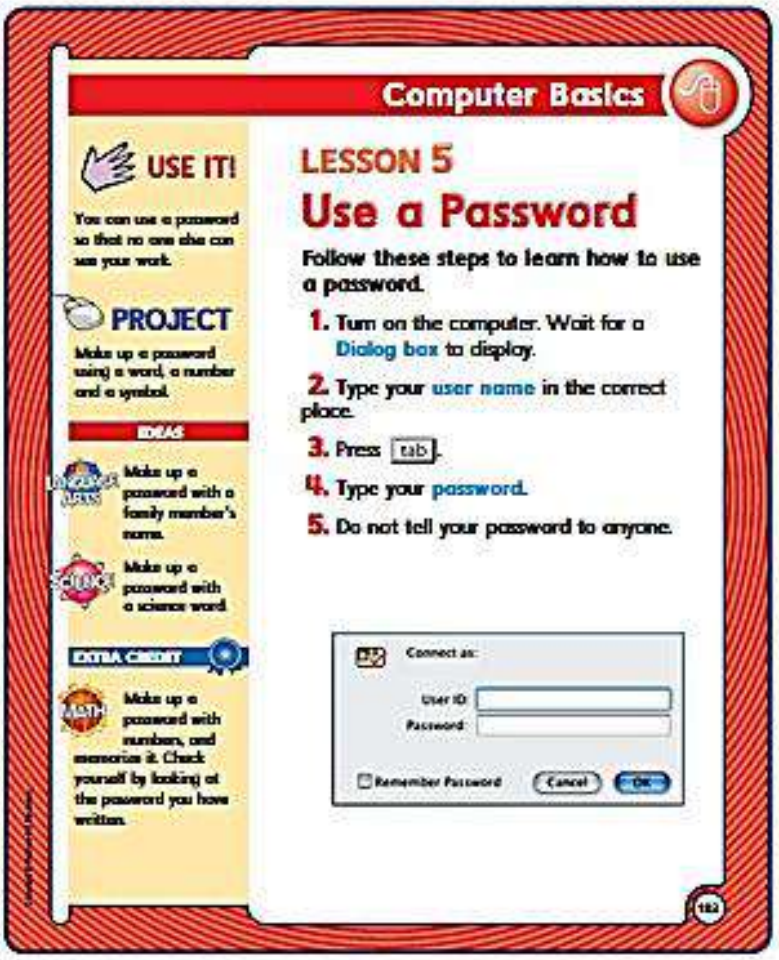
Prepare Ahead Make sure that students have user names and passwords for this lesson. If your school does not use passwords, explain to students how they work, and have students look at the illustration on the student page.

- Explain to students that a password will prevent others from seeing their work. They should never give out their password to anyone.
- Explain to students that a Dialog box is a little window that pops up. A password Dialog box will prompt them for their user name and password.
- Tell students to memorize both their user name and password.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Passwords should not be words or strings of numbers and words that can be guessed easily by other people. A *user name* connects a password to a particular person. It is a special kind of name for someone who uses a computer. It may be similar to the person's real name.

Informal Assessment

Have students demonstrate how to enter a user name and password to start a computer session.



Technology Challenge

Discuss how passwords can be changed and why they might change.

Language Acquisition

Password

Explain what a password is, and translate the term *password* into the students' native languages.

Integration

EXTRA CREDIT

Prepare Ahead Have students write a password with numbers and tell them to memorize it.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 5

Networks

Objective Students determine whether a computer is part of a network. They locate and open a designated file on the network.

"You can find out if other computers you use are part of a network."

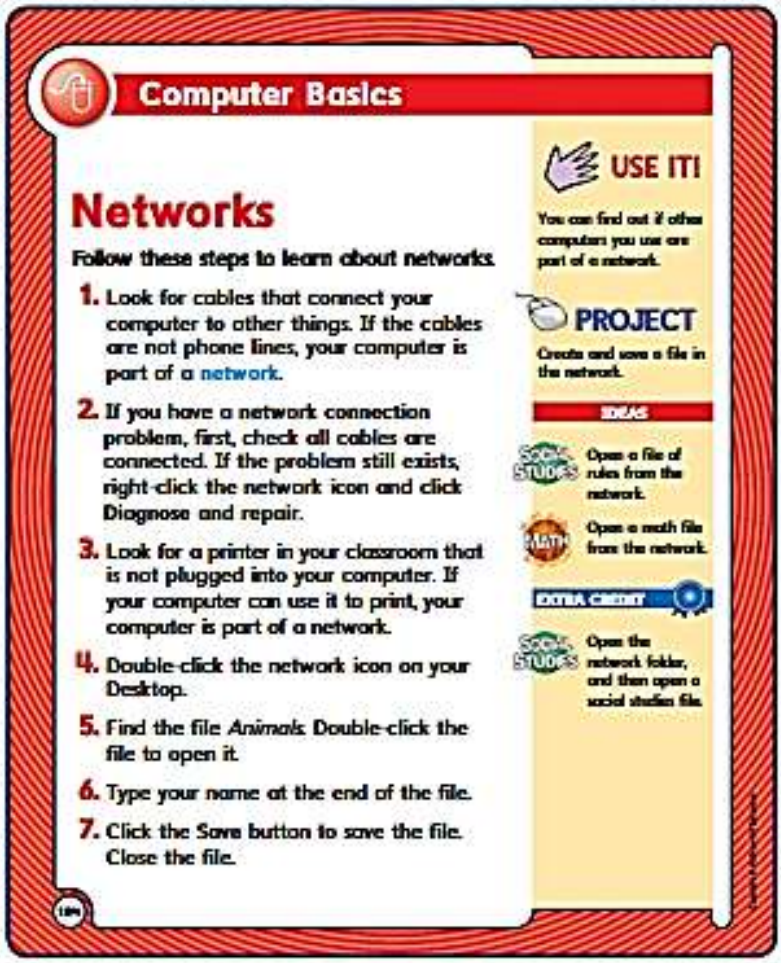
Prepare Ahead Type *Animals have body parts to help them survive*, and save it with the name *Animals* on the network drive. Tell students how to find the file. Create copies in different folders if multiple students are doing the lesson at one time.

- Explain to students that networking allows people to share computer resources, such as files and printers.
- Direct students' attention to the phone or network cable to help them identify the type of connection, if any.
- Describe the difference between phone and network cables.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI School computers with Internet access are usually part of a network. Seek help from your school's computer administrator if you are unsure whether your computers are part of a network.

Informal Assessment

Check students' files to make sure they were changed and resaved on the network.



Technology Challenge

Set up class folders and individual student files within the network.

Language Acquisition

Network

Demonstrate how the network allows users to share files.

Integration

EXTRA CREDIT

Prepare Ahead Save a file on a social studies topic on the network. Have the students open the network icon on the Desktop, find the file, and open the file.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 5

Use the Help Feature

Objective Students use the **Help** feature to find out how to do something.

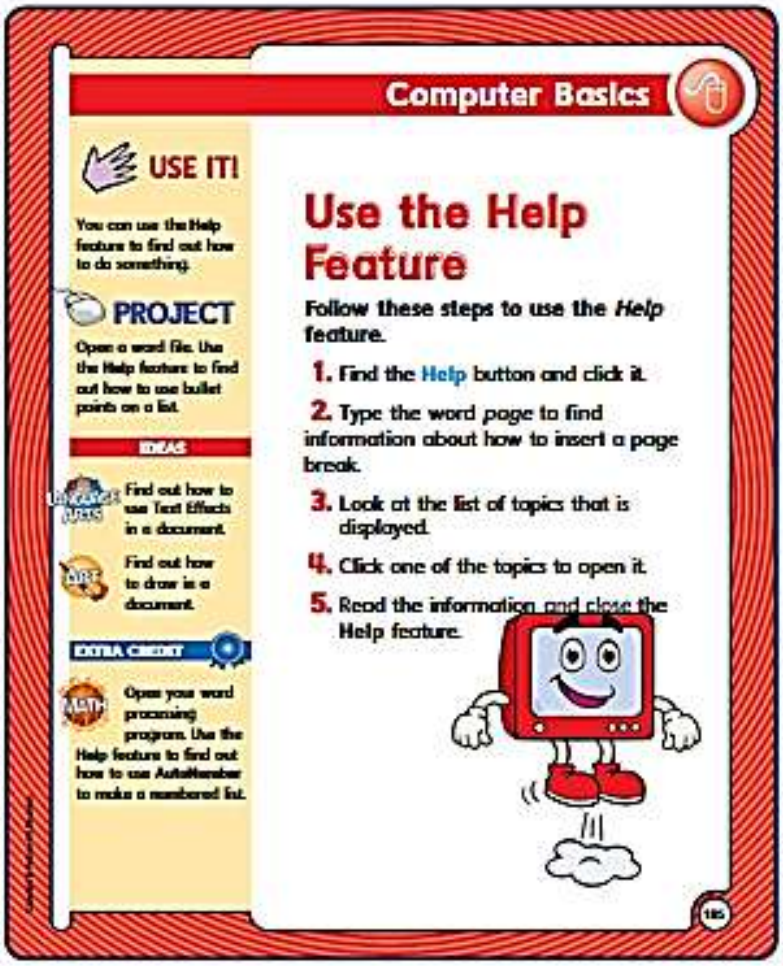
*"You can use the **Help** feature to find out how to do something."*

- Explain to students that **Help** is a feature that contains instructions for completing tasks on the computer.
- Demonstrate how to use your computer's **Help** feature. Explain to students that the **Help** feature might vary slightly on different computers.
- Show students how to use online Help features to evaluate their progress.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI Many **Help** features have different ways to search. The **Index** feature searches for the given word in a predefined list of terms. Generally you must enter the word exactly as it appears in the index. Close matches will show in the results. To access the **Help** feature in a document, select an item from the **Help** menu. Then you might have to select the **Index** tab. Enter a word in the Search box and click **Search** or **Display**. You might have to double-click a topic to open it.

Informal Assessment

Have students demonstrate how to use the **Help** feature by asking them to find information on copying text.



Technology Challenge

Show students how to use other **Help** features, such as a Content search.

Language Acquisition

Index

Show students an index in a textbook, and compare its use to that of the **Index** feature in the **Help** menu.

Integration

EXTRA CREDIT

Have the students open a new word processing file. Have them use the **Help** feature to find out how to use **AutoNumber** to make a numbered list.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 5

Use the Find or Search Feature

Objective Students use the **Find** or **Search** feature to find a file.

*"You can use the **Find** or **Search** feature to find a file on your computer."*

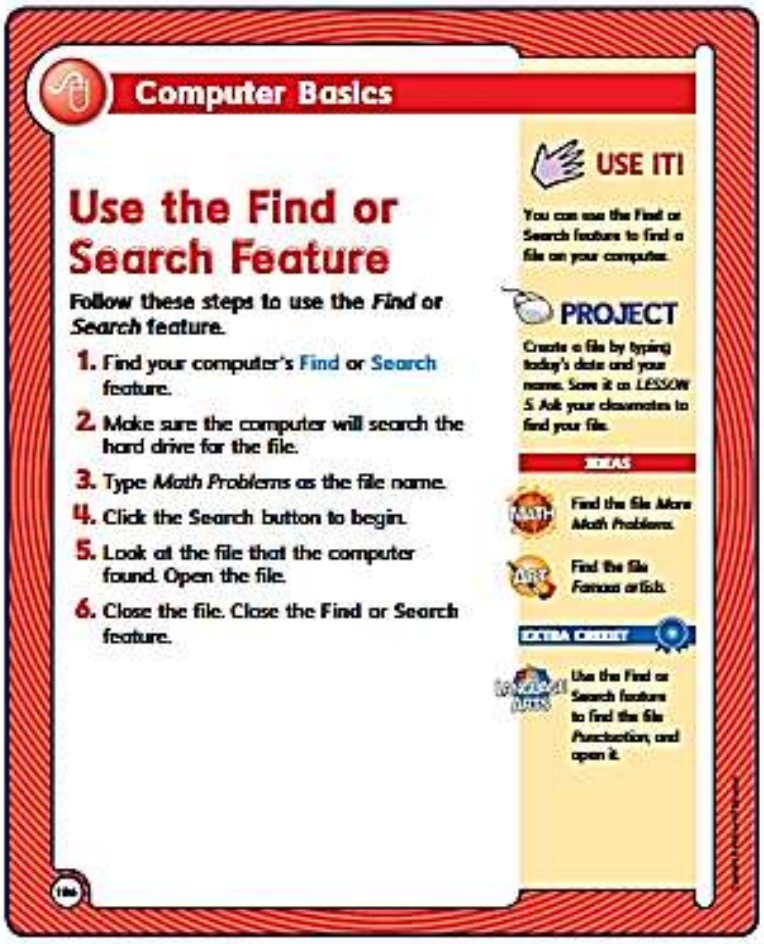
Prepare Ahead Create word processing files for students to search. Name them *Math Problems*, *More Math Problems*, and *Punctuation*. Save the files onto the hard drive or the network.

- Explain to students they can use the **Find** or **Search** feature to locate a missing file.
- Demonstrate how to use your computer's **Find** or **Search** feature.
- Tell students where they should look for files in the lesson.
- ◆ Have students complete the lesson. Award 15 points upon completion.

FYI In Step 5 of the ***Student Edition*** exercises, make sure students have selected *Math Problems* and not *More Math Problems*. To use the **Find** feature in ***Windows***, click the **Start** menu. Select **Search** and then choose **All files and folders**. Enter a file name and select a location to search. Click **Search**. On a ***Macintosh***, use the **Spotlight** feature. Click the magnifying glass icon at the top-right of the screen, and enter a search term.

Informal Assessment

Have students demonstrate how to use the **Find** or **Search** feature by asking them to find a file on the hard drive.



Technology Challenge

Have students find specific types of files (for example, word processing) in various locations on the computer and/or network.

Language Acquisition

Find and ***Search***

Explain that the words *find* and *search* mean the same thing to computers.

Integration

EXTRA CREDIT

Prepare Ahead Have students find the file *Punctuation*.

◆ Award 5 points for completing the Extra Credit.

Performance Assessment

Chapter 6 Test

Objective Students demonstrate an understanding of the material presented in the Computer Basics chapter.

"You can show what you know about opening, changing, saving, and finding files."

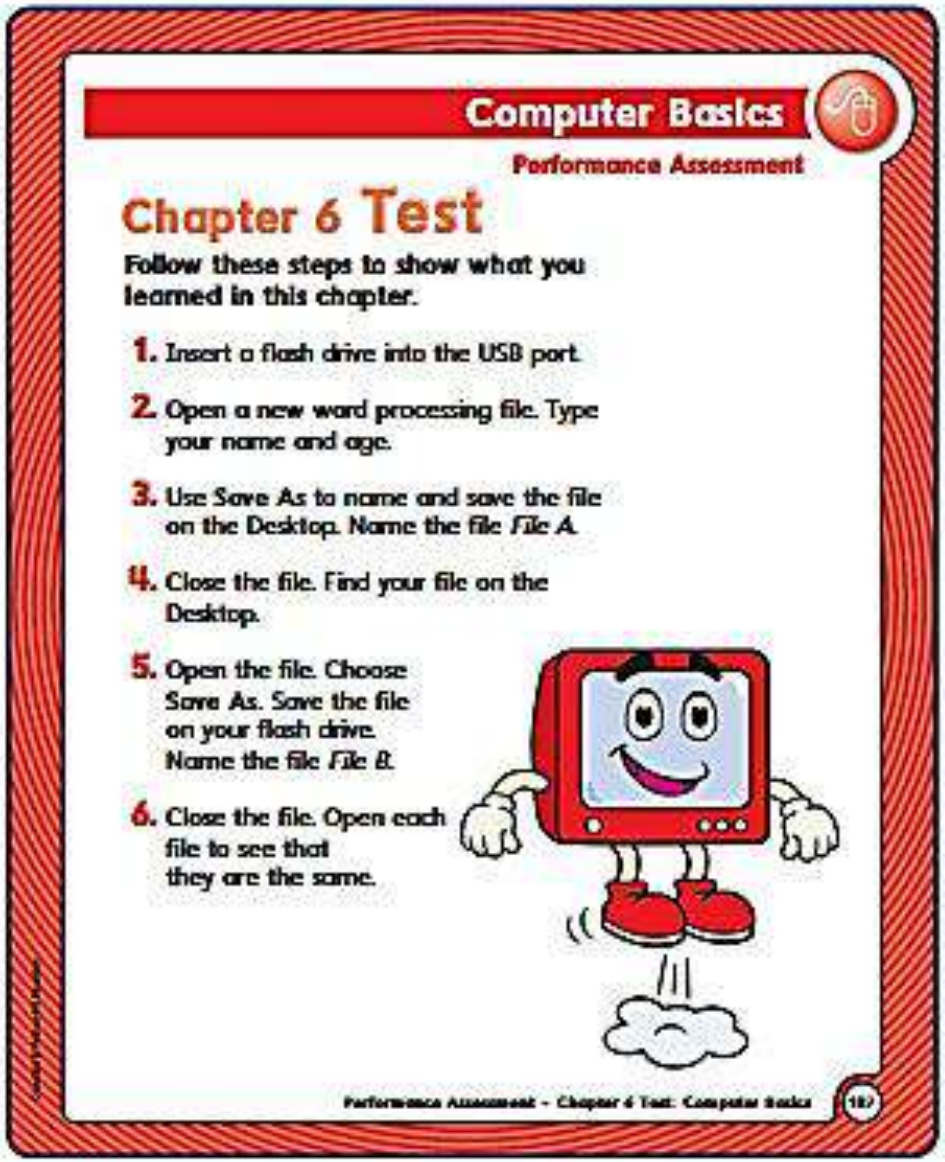
- Review with students how to save a document to the Desktop and to a flash drive.

Formal Assessment

Performance Assessment

Check students' work to see that they accurately performed all tasks. Apply the assessment rubric below.

Scoring Rubric		
Total	Points	
5	5	Successfully completed
	3	Completed three steps
	1	Completed one step
	0	Did not complete



Project

Use Technology to . . .

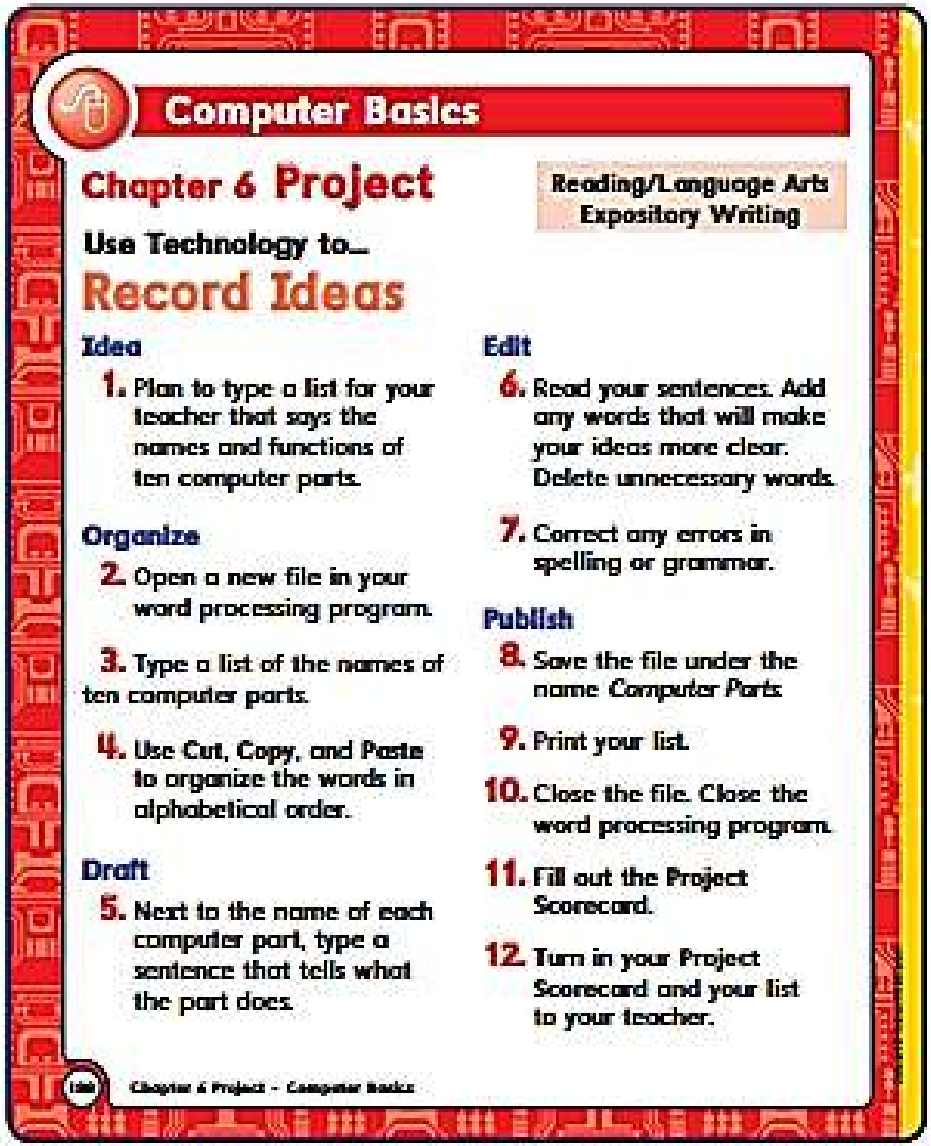
Record Ideas

Objective Students use a word processing program to type a list of computer terms and definitions.

"You can use a word processing program to type a list of names of computer parts and their definitions."

- Explain to students that in the Chapter Project they will apply the basic computer skills that they learned in this unit. They can use these skills every time they use a computer.
- Review with students the names and functions of the computer parts covered in Lesson 1.
- Allow students to adapt the assignment to cover a list of key terms from a core curricular area if it reinforces their current studies.
- Have students complete the Chapter 6 Project using a copy of the **Project Scorecard** a checklist for the project's requirements.

  Approximate time needed to complete the project: 30 minutes.



Computer Basics

Chapter 6 Project

Reading/Language Arts
Expository Writing

Use Technology to...

Record Ideas

Idea

1. Plan to type a list for your teacher that says the names and functions of ten computer parts.

Organize

2. Open a new file in your word processing program.
3. Type a list of the names of ten computer parts.
4. Use Cut, Copy, and Paste to organize the words in alphabetical order.

Draft

5. Next to the name of each computer part, type a sentence that tells what the part does.

Edit

6. Read your sentences. Add any words that will make your ideas more clear. Delete unnecessary words.
7. Correct any errors in spelling or grammar.

Publish

8. Save the file under the name *Computer Parts*.
9. Print your list.
10. Close the file. Close the word processing program.
11. Fill out the Project Scorecard.
12. Turn in your Project Scorecard and your list to your teacher.

Chapter 6 Project - Computer Basics

Project Assessment

Check students' work to make sure that they accurately performed all of the tasks required. Use the **Project Scorecard** as a rubric to assign a final score for each student.

Project Scorecard

Reading/Language Arts
Expository Writing

Use Technology to . . .

Record Ideas

Name: _____ Date: _____

Basic Computer Skills	Point Value	My Score	FINAL SCORE
☐ **Open and close a word processing program. (Steps 2, 10)** Lesson 1: The Mouse Lesson 2: Open and Close a Program	2		
☐ **Use correct computer terms. (Step 3)** Lesson 1: Computer Parts	3		
☐ **Cut, copy, and paste text. (Step 4)** Lesson 1: The Mouse Lesson 3: Drop-Down Menus Lesson 3: Navigation	3		
☐ **Open, save, and close a word processing file. (Steps 2, 8, 10)** Lesson 1: The Mouse Lesson 3: Open and Close a Program Lesson 3: Open a File Lesson 3: Name and Save a File Lesson 4: Use Save As	2		
SUBTOTAL	10		

Language Arts Skills	Point Value	My Score	FINAL SCORE
☐ Use technology to record ideas.	2		
☐ Draft a list of definitions.	1		
☐ Edit a list of definitions.	1		
☐ Understand technology vocabulary.	1		
SUBTOTAL	5		

TOTAL SCORE _____ _____
Teacher Initials

Chapter

7 Keyboarding

Objective Students are introduced to the reasons that people learn keyboarding.

Prerequisites Students should know some computer vocabulary and the letters of the alphabet.

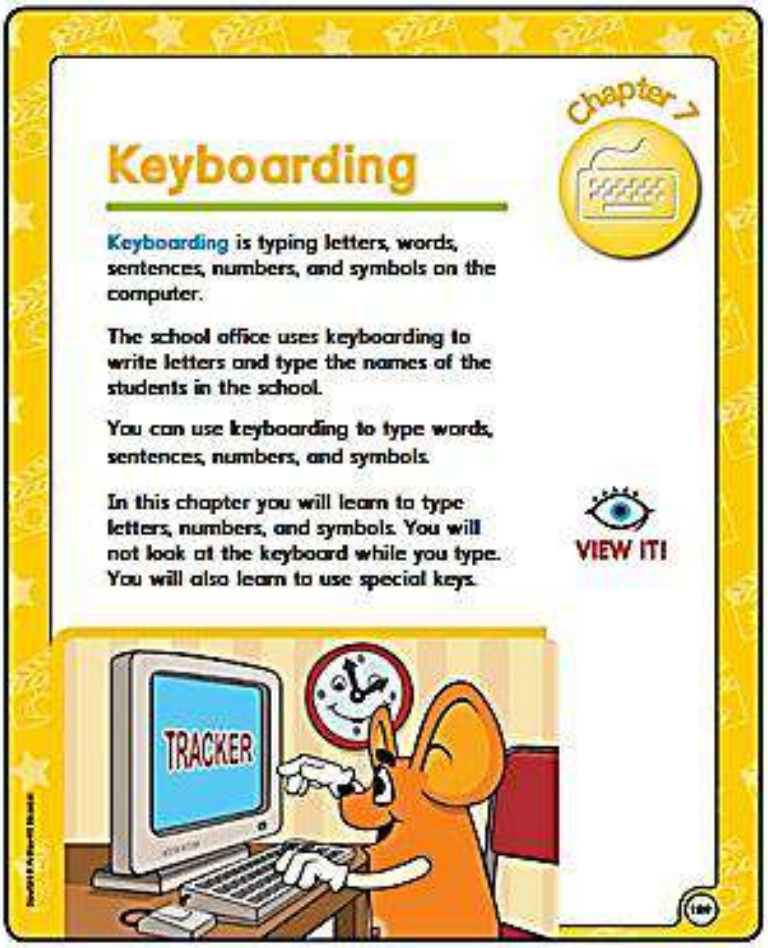
What to Expect Most students will be familiar with the location of some keys, but might not know proper finger reaches for these keys, which will be presented in this chapter.

"You can use keyboarding to write words, sentences, numbers, and symbols."

- Read the Chapter Opener together.
- Ask students why keyboarding might help them with their work at school.

Informal Assessment

Ask students to name some jobs that might require keyboarding skills.



What is . . .

Keyboarding

People often use the word *typing* when they describe working at the computer. You might be wondering if the words *keying* and *typing* mean the same thing. In many ways keyboarding and typewriting are the same. Both methods involve inputting text with a keyboard. The alphabetical and numeric keys on the computer keyboard and the typewriter are arranged in a similar way. The finger positions and techniques for striking keys are also the same.

The fundamental difference between keyboarding and typewriting is that typewriting puts text directly onto paper, while keyboarding puts text into computer memory for later access. The keyboards are also different sizes. The computer keyboard is larger, because it contains computer function keys and a number keypad. While there are correct finger positions for these additional keys, they are not taught at this level.

LESSON 1

Keyboarding Basics

Objective Students practice finding the Home keys and using the Space Bar and Return or Enter key.

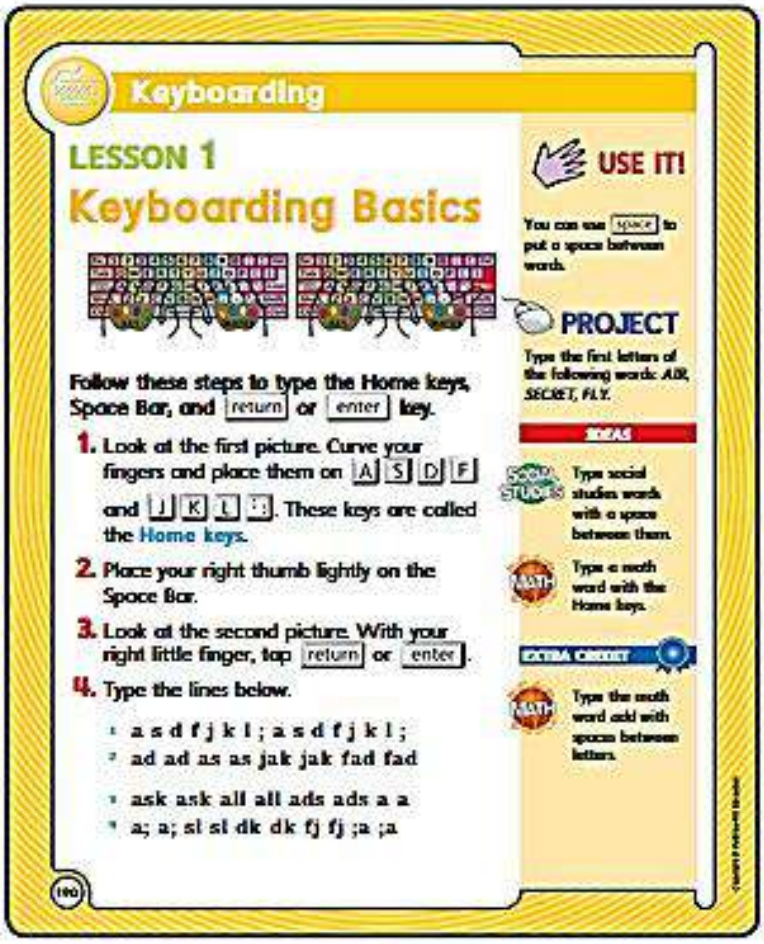
"These keys help you move around the page."

Prepare Ahead Open a word processing document and change the font to a larger size.

- Have students keep their backs straight and both feet directly in front of them, touching the floor and slightly apart. Elbows should rest comfortably at their sides.
- Fingers should be curved with the tips of the fingers placed lightly in the center of each Home key. Each finger should remain in this position unless reaching to tap another key.
- Demonstrate how to tap the keys quickly.
- Thumbs should rest lightly on the Space Bar. Explain that the Space Bar moves the cursor forward and the Return or Enter key moves the cursor to the next line of text.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' posture and hand and finger positions as they practice keying.



Technology Challenge

Help students key a sentence with spaces between words.

Language Acquisition

Space Bar

Demonstrate that the Space Bar makes a blank area, or space, between words, numbers, or symbols.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students key the math word *add* with spaces between the letters.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 1

The Home Keys

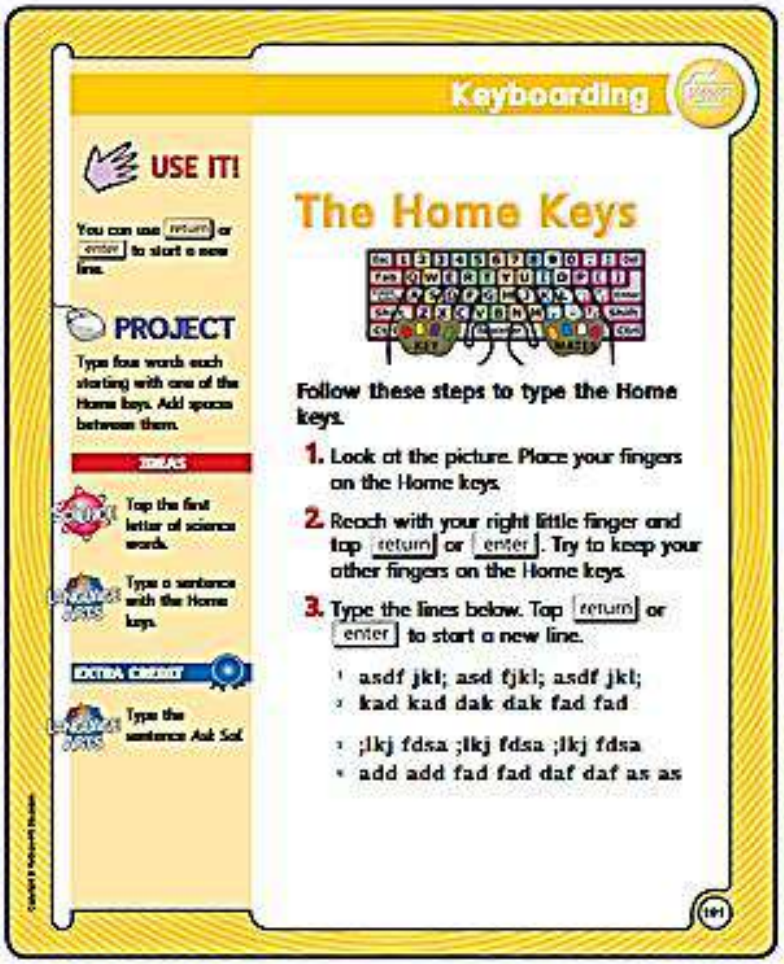
Objective Students key simple words using the Home keys, Space Bar, and Return or Enter key, and use proper reach and finger techniques.

"Practicing using the Home keys makes learning the rest of the keys easier."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Review proper posture, hand and finger position, reach, and keying techniques with the students.
- Explain to students that the ridges on the **F** and **J**, or **D** and **K**, keys allow them to find those keys quickly without looking at the keyboard.
- You might want to review with students the semicolon symbol.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' posture and hand and finger positions as they practice keying simple words using the Home keys, Space Bar, and Return or Enter key.



Technology Challenge

Have students create their own practice lines for the Home keys.

Language Acquisition

Home keys

Demonstrate that the *Home* keys are where the fingers stay when they are not reaching.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students key the sentence, *Ask Sal.*

- ◆ Award 5 points for completing the Extra Credit.

LESSON 2

The E and H Keys

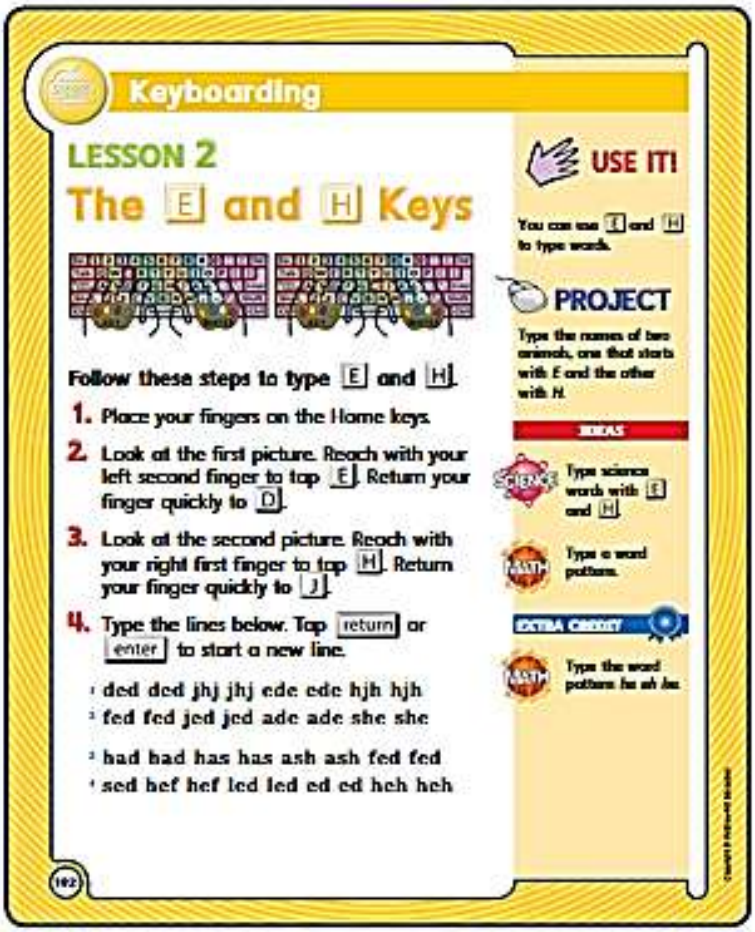
Objective Students key the **E** and **H** and review previously learned keys.

"You will learn to reach the E and H keys."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Review proper posture, hand and finger position, reach, and keying techniques with the students.
- Have them reach with the left second finger to tap the **E** key and the right first finger to tap the **H** key.
- Observe students as they practice reaching from **D** to **E** and then from **J** to **H**. Have students continue practicing these reaches until you direct them to stop.
- If students do not know how to number their fingers, tell them to start counting with their thumbs. The index finger is the first finger, the middle finger is the second, and so on.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students key **E** and **H** in lowercase and uppercase.

Language Acquisition

E and ***H***

Reinforce the alphabet by giving examples of words that begin with the letters E and H.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students tap the word pattern *he eh he*.

◆ Award 5 points for completing the Extra Credit.

LESSON 2

The O and R Keys

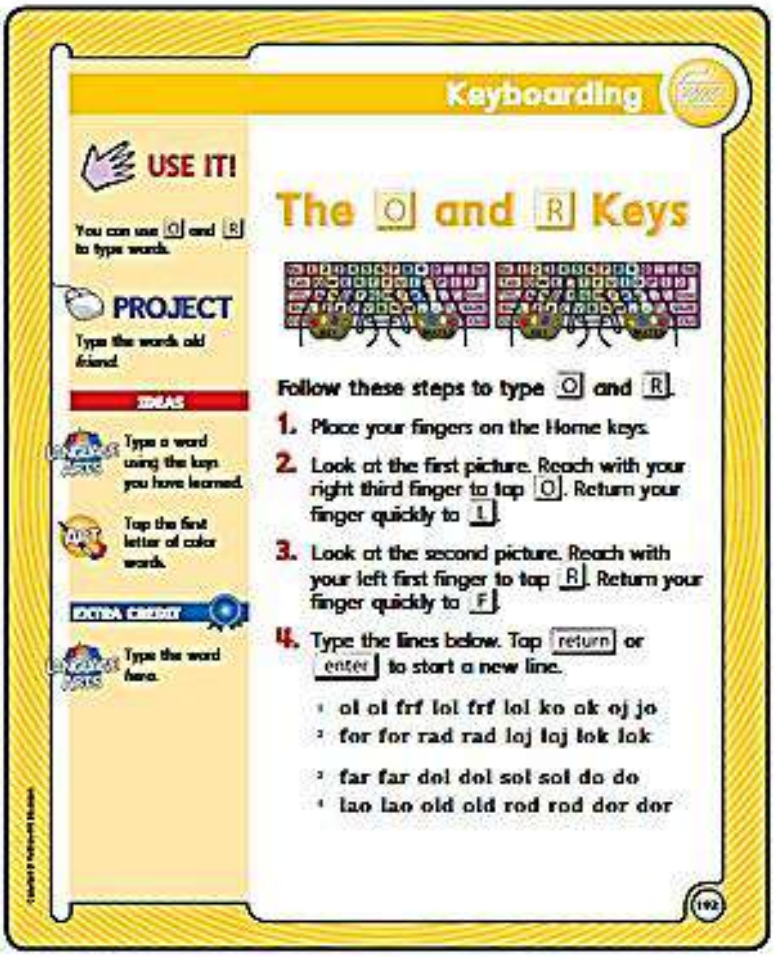
Objective Students learn the **O** and **R** keys and practice them with previously learned keys.

*"You learned to reach the **E** and **H** keys. Now you will learn to reach the **O** and **R** keys."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right third finger to tap the **O** key and the left first finger to tap the **R** key.
- Observe students as they practice reaching from **L** to **O** and then from **F** to **R**. Have students continue practicing these reaches until you direct them to stop.
- As students are keying, remind them to keep their elbows at their sides, wrists off the keyboard, and backs straight.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students key **O** and **R** in lowercase and uppercase.

Language Acquisition

O and ***R***

Reinforce the alphabet by giving examples of words that begin with the letters O and R.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students key the word *hero*.

◆ Award 5 points for completing the Extra Credit.

LESSON 2

The I and T Keys

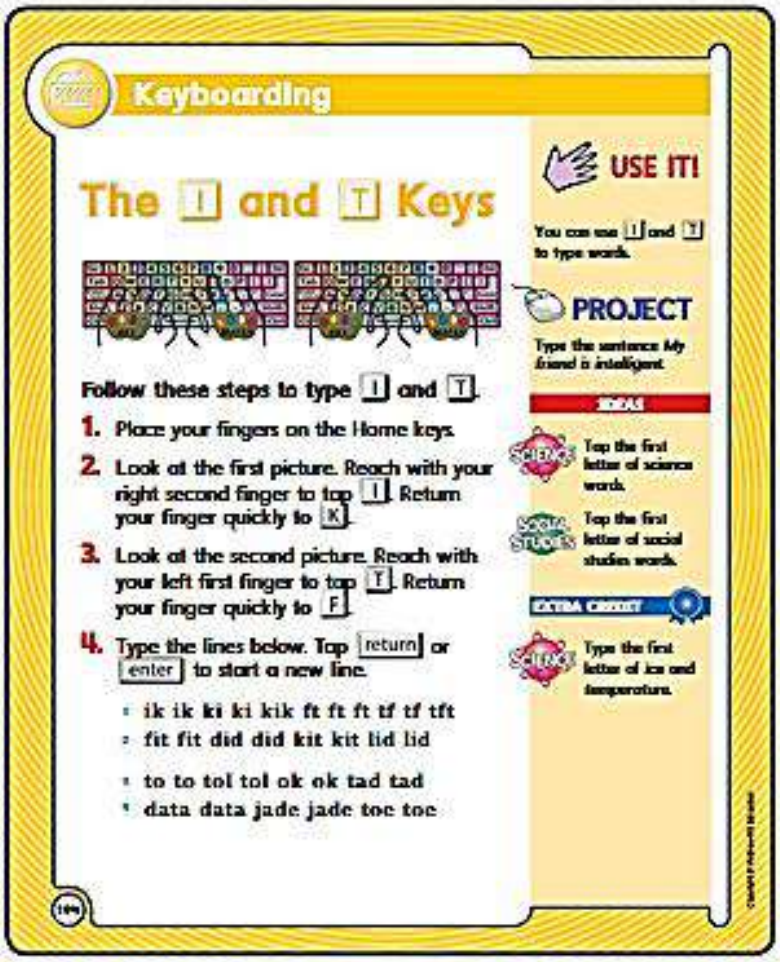
Objective Students learn the **I** and **T** keys and practice them with previously learned keys.

*"You learned to reach the **E**, **H**, **O**, and **R** keys. Now you will learn to reach the **I** and **T** keys."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right second finger to tap the **I** key and the left first finger to tap the **T** key.
- Observe students as they practice reaching from **K** to **I** and then from **F** to **T**. Have students continue practicing these reaches until you direct them to stop.
- As students are keying, remind them to keep their elbows at their sides, wrists off the keyboard, and backs straight.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students key **I** and **T** in lowercase and uppercase.

Language Acquisition

I and ***T***

Reinforce the alphabet by giving examples of words that begin with the letters I and T.

Integration

EXTRA CREDIT

Have students key the first letters of the words *ice* and *temperature*.

◆ Award 5 points for completing the Extra Credit.

LESSON 2

The Left shift Key

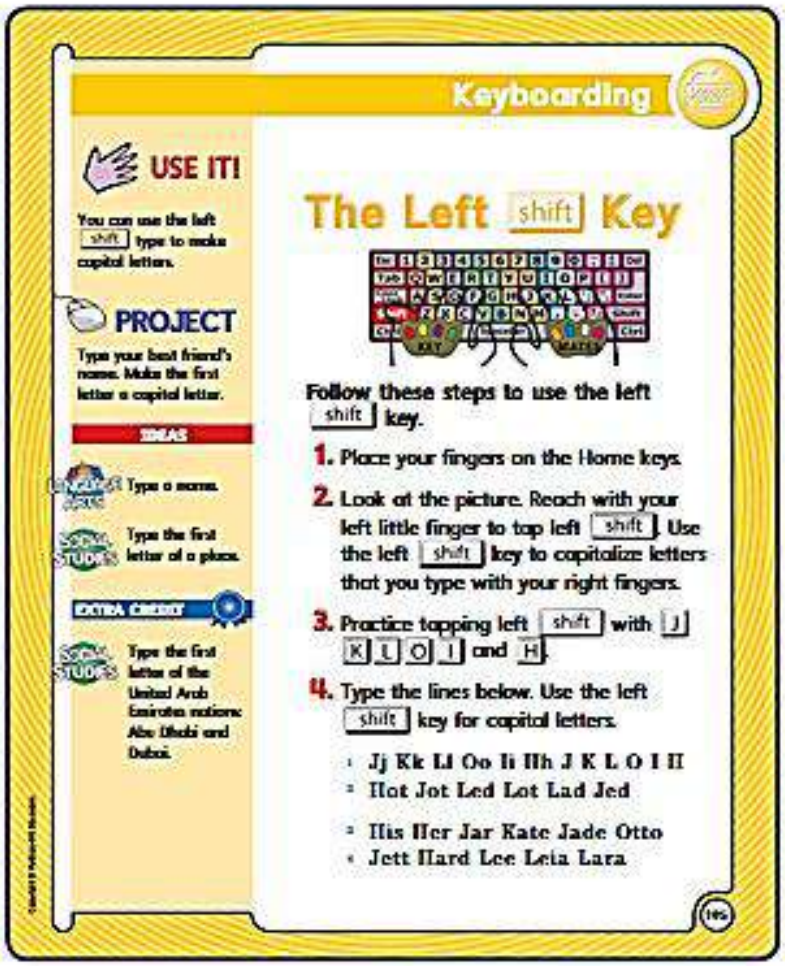
Objective Students use the left Shift key in conjunction with keys previously learned.

"You learned to reach several letters from the Home keys. Now you will learn to reach the left Shift key."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Show students the left Shift key. Explain that when they need to make a capital letter with one of their right-finger keys, they will need to press the left Shift key with the left little finger.
- Observe students as they shift, tap a key, and then release both keys at the same time.
- Remind students to keep their other fingers on, or close to, the Home keys.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students alternate keying lowercase and uppercase using the left Shift key.

Language Acquisition

The Left Shift Key

Explain to students that the left Shift key is used to type capital letters.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students type the first letter of city names that begin with the letters O, I, and H.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 2

The . Key

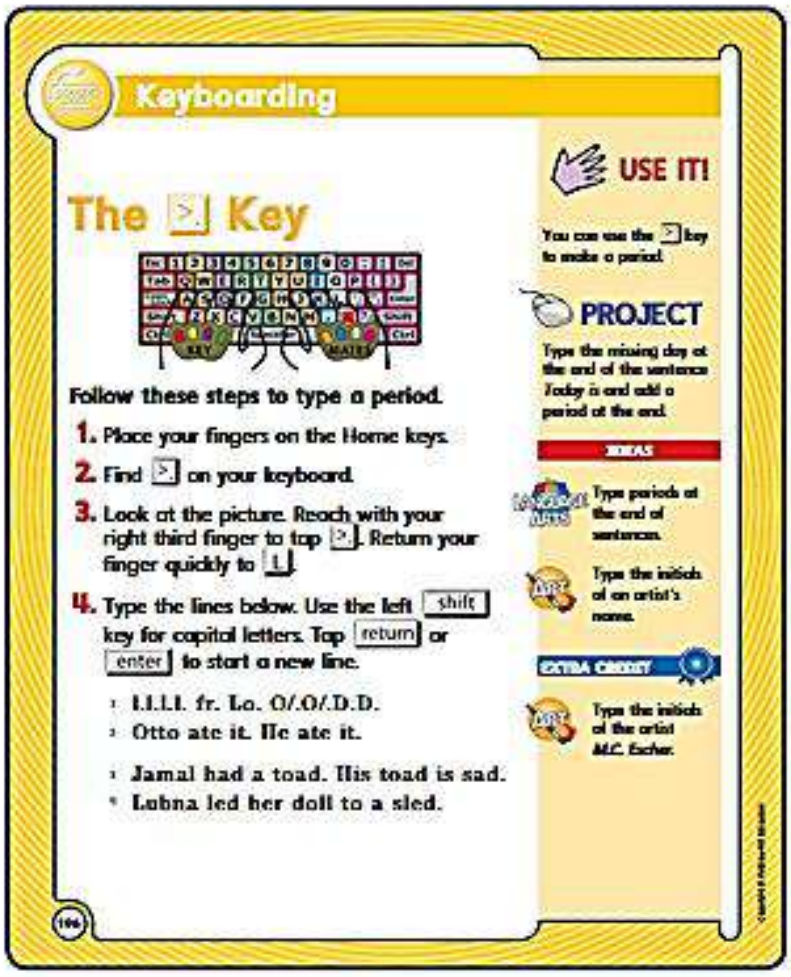
Objective Students key a period and practice it with previously learned keys.

"You learned to reach several letters from the Home keys. Now you will learn to reach the Period key."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Observe students as they reach down with the third right finger to tap the Period key. Have students practice this reach.
- Explain to students that they should type one space after a period.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students use periods at the ends of sentences and in decimals.

Language Acquisition

Period

Explain to students that a period is used at the end of a declarative sentence. Give examples from students' textbooks and from conversation.

Integration

EXTRA CREDIT

Have students open a word processing document. Type the initials of the artist ***M.C. Escher.***

- ◆ Award 5 points for completing the Extra Credit.

LESSON 2

The U and C Keys

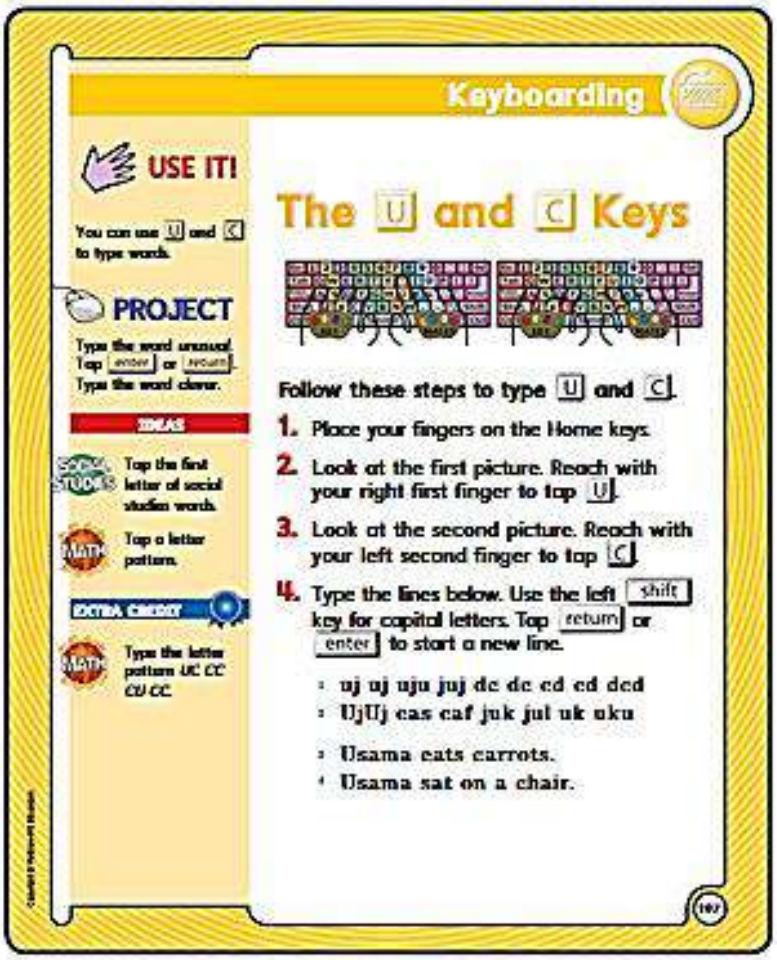
Objective Students learn the **U** and **C** keys and practice them with previously learned keys.

"You learned to reach several letters from the Home keys. Now you will learn to reach the U and C keys."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right first finger to tap the **U** key and the left second finger to tap the **C** key.
- Observe students as they practice reaching from **J** to **U** and then from **D** to **C**. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **U** and **C** in lowercase and uppercase.

Language Acquisition

U* and *C

Review the sounds associated with *U* and *C*. Give examples of words using these letters.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students tap the letter pattern *UC CC CC CU CC*.

◆ Award 5 points for completing the Extra Credit.

LESSON 3

The N and W Keys

Objective Students learn the **N** and **W** keys and practice them with previously learned keys.

*"You will learn the **N** and **W** keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right first finger to tap the **N** key and the left third finger to tap the **W** key.
- Observe students as they practice reaching from **J** to **N** and then from **S** to **W**. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.

Technology Challenge

Help students type **N** and **W** in lowercase and uppercase.

Language Acquisition

N* and *W

Review the sounds associated with *N* and *W*. Give examples of words using these letters.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students tap the first letter of the directions *North*, *West*, and *Northwest*.

- ◆ Award 5 points for completing the Extra Credit.

LESSON 3

The Right shift Key

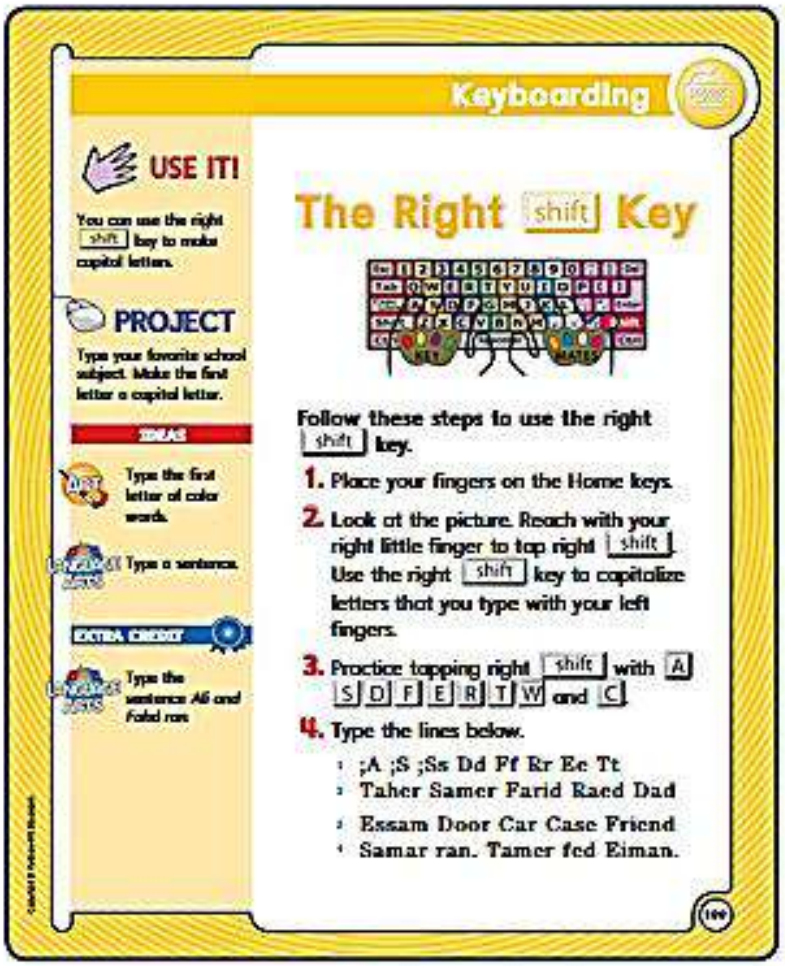
Objective

"You learned to reach several letters from the Home keys. Now you will learn to reach the right Shift key."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Show students the right Shift key. Explain that when they need to make a capital letter with one of their left-finger keys, they will need to press the right Shift key with the right little finger.
- Observe students as they shift, tap a key, and then release both keys at the same time.
- Remind students to keep their other fingers on, or close to, the Home keys.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students alternate keying lowercase and uppercase using the right Shift key.

Language Acquisition

The Right Shift Key

Explain to students that the right Shift key is used to key capital letters.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students type the sentence, *Ed and Fran ran.*

- ◆ Award 5 points for completing the Extra Credit.

LESSON 3

The G and ? / Keys

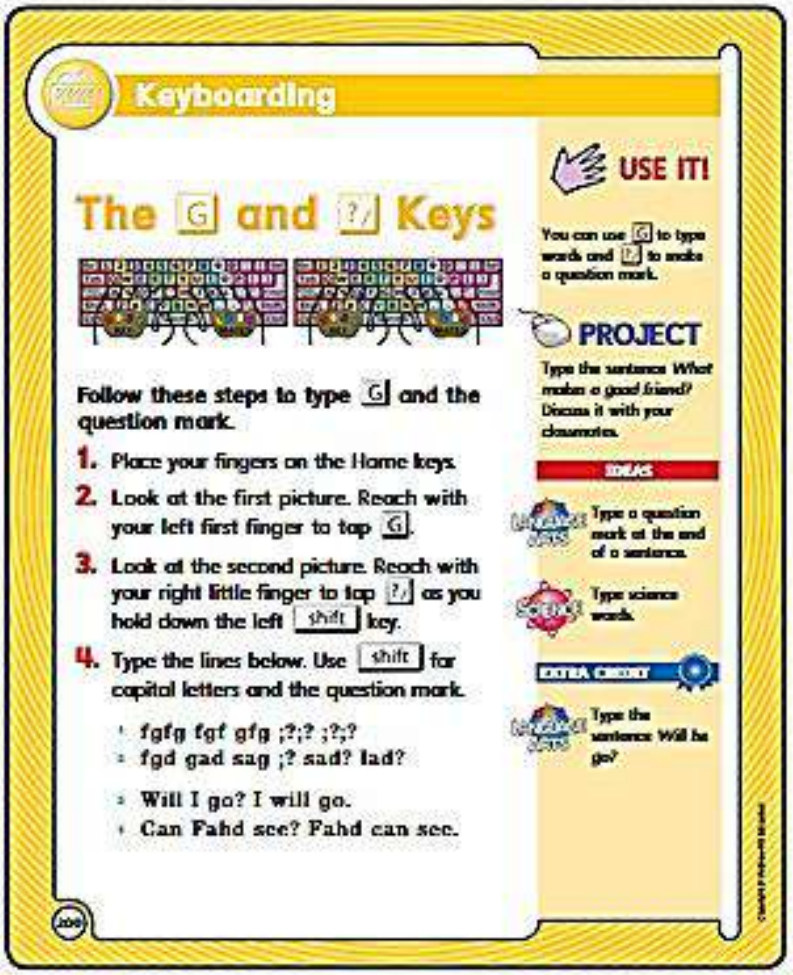
Objective Students learn the **G** and Question Mark keys and practice them with previously learned keys.

*"You will learn the **G** and Question Mark keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the left first finger to tap the **G** key and the right little finger to tap the Question Mark key. Remind students that they need to hold the left Shift key down when keying a question mark.
- Observe students as they practice reaching from F to G and then from the Semicolon key to the Question Mark key. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type a question mark at the end of sentences.

Language Acquisition

Question mark

Model the different inflection we use for interrogative sentences. Give examples of sentences that use question marks for the end punctuation.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students type the sentence, *Will he go?*.

◆ Award 5 points for completing the Extra Credit.

LESSON 3

The B and P Keys

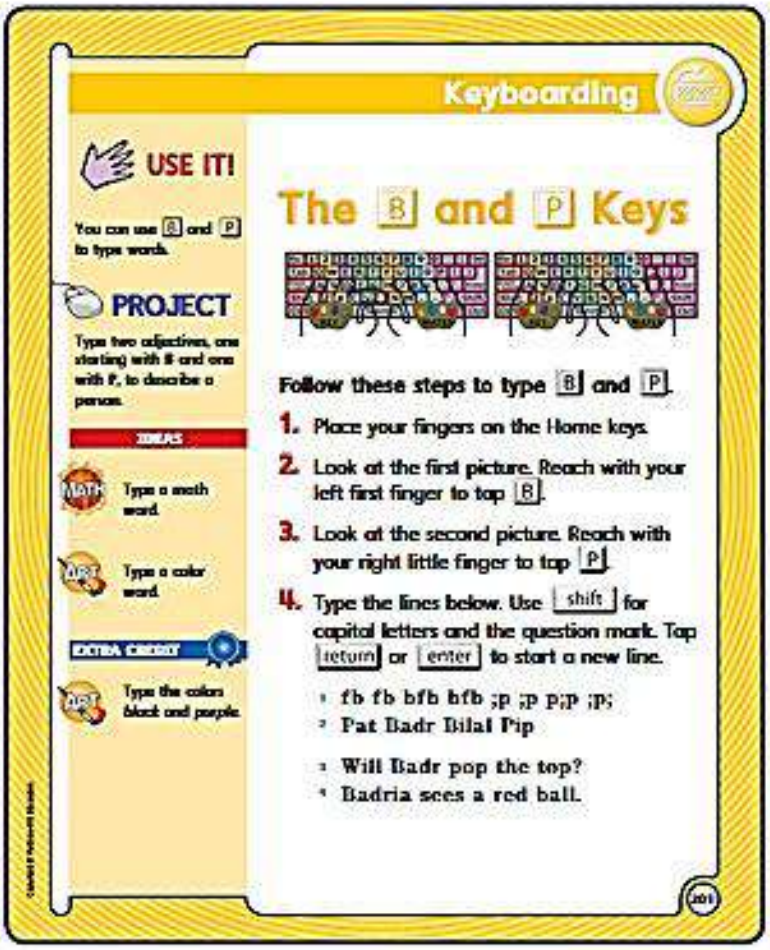
Objective Students learn the **B** and **P** keys and practice them with previously learned keys.

*"You will learn the **B** and **P** keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the left first finger to tap the **B** key and the right little finger to tap the **P** key.
- Observe students as they practice reaching from **F** to **B** and then from the Semicolon key to **P**. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **B** and **P** in lowercase and uppercase.

Language Acquisition

B **and** ***P***

Review the sounds associated with *B* and *P*. Give examples of words using these letters.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students type the colors *black* and *purple*.

◆ Award 5 points for completing the Extra Credit.

LESSON 3

The M and X Keys

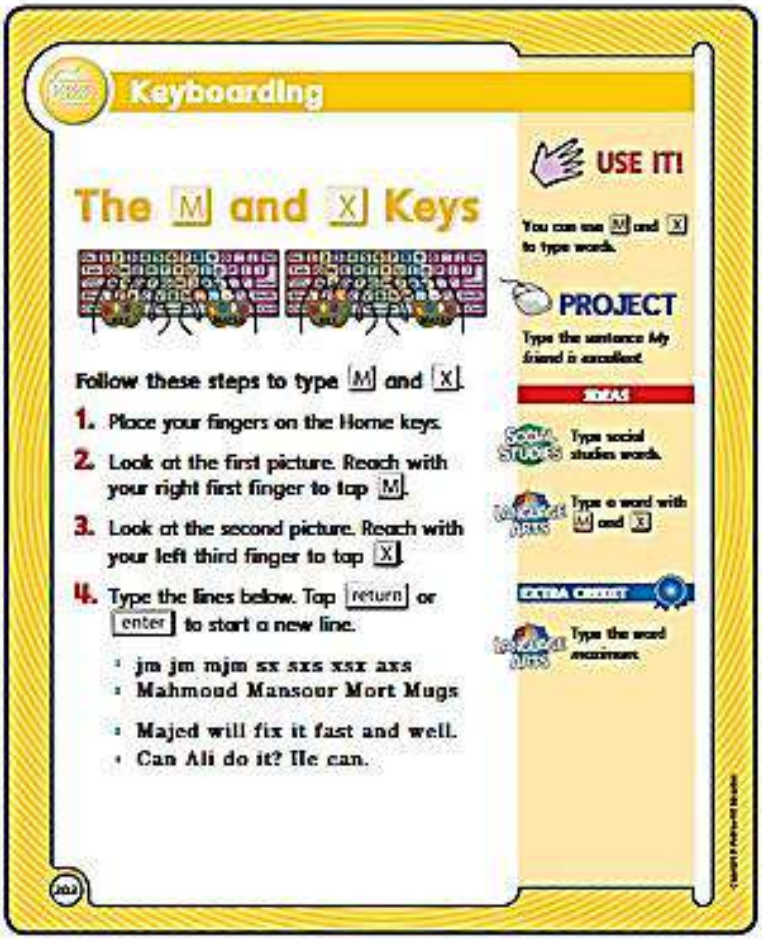
Objective Students learn the **M** and **X** keys and practice them with previously learned keys.

*"You will learn the **M** and **X** keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right first finger to tap the **M** key and the left third finger to tap the **X** key.
- Observe students as they practice reaching from **J** to **M** and then from **S** to **X**. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **M** and **X** in lowercase and uppercase.

Language Acquisition

M **and** ***X***

Review the sounds associated with *M* and *X*. Give examples of words using these letters.

Integration

EXTRA CREDIT

Have the students open a word processing document. Have students type the word *maximum*.

◆ Award 5 points for completing the Extra Credit.

LESSON 4

The Y and Z Keys

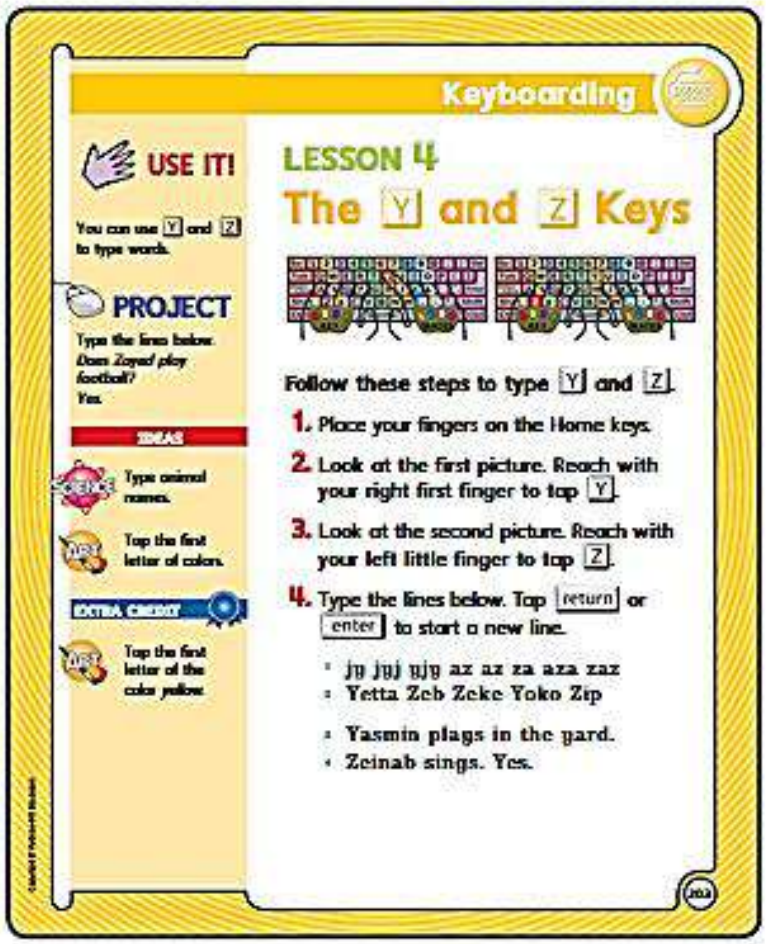
Objective Students learn the **Y** and **Z** keys and practice them with previously learned keys.

*"You will learn the **Y** and **Z** keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the right first finger to tap the **Y** key and the left little finger to tap the **Z** key.
- Observe students as they practice reaching from **J** to **Y** and then from **A** to **Z**. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **Y** and **Z** in lowercase and uppercase.

Language Acquisition

Y* and *Z

Review the sounds associated with **Y** and **Z**. Give examples of words using these letters.

Integration

EXTRA CREDIT

Have the students open a word processing document. Have students type the first letter of the color *yellow*.

◆ Award 5 points for completing the Extra Credit.

LESSON 4

The Q and , Keys

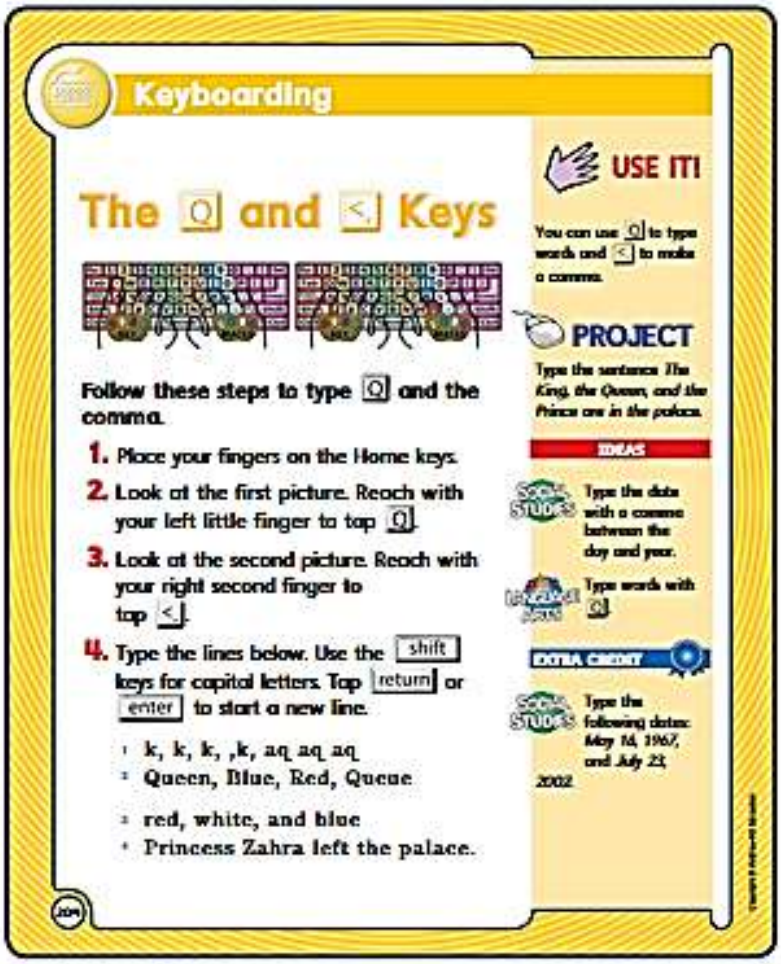
Objective Students learn the **Q** and Comma keys and practice them with previously learned keys.

*"You will learn the **Q** and Comma keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the left little finger to tap the **Q** key and the right second finger to tap the Comma key.
- Observe students as they practice reaching from **A** to **Q** and then from **K** to the Comma key. Have students continue practicing these reaches until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **Q** in lowercase and uppercase.

Language Acquisition

Q and ***Comma***

Review the sound associated with *Q*. Give examples of words starting with *Q*. Explain that a comma is used between the day and the year when typing the date.

Integration

EXTRA CREDIT

Have the students open a word processing document. Have students type the following dates: *May 16, 1967,* and *July 23, 2002.*

◆ Award 5 points for completing the Extra Credit.

LESSON 4

The V and : Keys

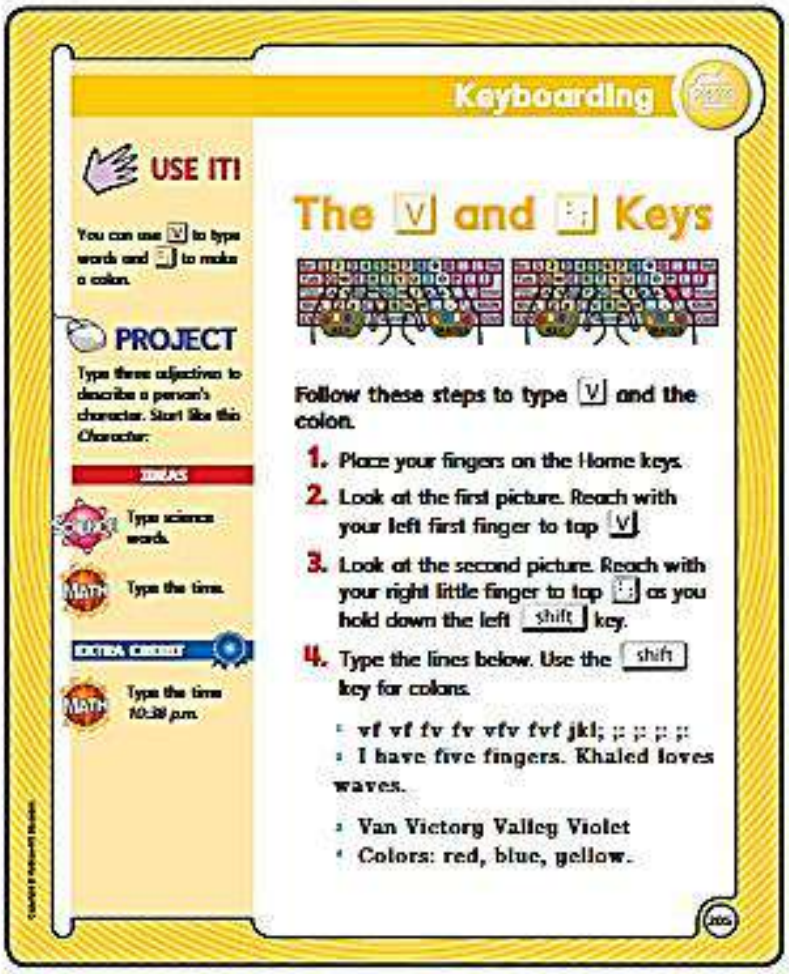
Objective Students learn the **V** and Colon keys and practice them with previously learned keys.

*"You will learn the **V** and Colon keys as you practice the other keys you have learned."*

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Have them reach with the left first finger to tap the **V** key and the right little finger to tap the Colon key. Remind students that they must also press and hold the left Shift key when typing a colon.
- Observe students as they practice reaching from **F** to **V** and typing a colon. Have students continue practicing these keystrokes until you direct them to stop.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Help students type **V** in lowercase and uppercase.

Language Acquisition

V **and** ***Colon***

Review the sound associated with *V*. Give examples of words starting with *V*. Explain that a colon is used before a list and between the hour and minutes when typing time.

Integration

EXTRA CREDIT

Have the students open a word processing document. Have students type *10:38 p.m.*

◆ Award 5 points for completing the Extra Credit.

LESSON 4

The Number Keys

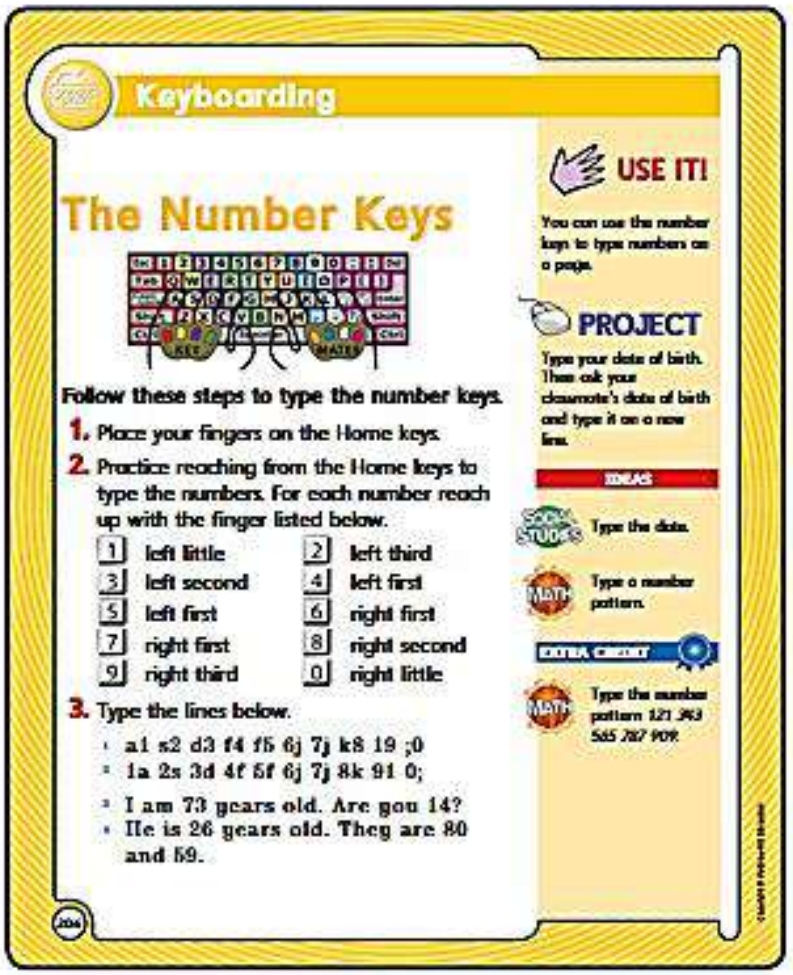
Objective Students key the numbers.

"You will learn the number keys and practice the other keys you have learned."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Demonstrate the reaches for students. These reaches can be difficult for students.
- Allow students plenty of time to practice the reaches before typing the lines.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Keyboarding

The Number Keys

Follow these steps to type the number keys.

1. Place your fingers on the Home keys.
2. Practice reaching from the Home keys to type the numbers. For each number reach up with the finger listed below.

1	left little	2	left third
3	left second	4	left first
5	left first	6	right first
7	right first	8	right second
9	right third	0	right little

3. Type the lines below.
   - a1 s2 d3 f4 f5 6j 7j k8 l9 ;0
   - 1a 2s 3d 4f 5f 6j 7j 8k 91 0;
   - I am 73 years old. Are you 14?
   - He is 26 years old. They are 80 and 59.

USE IT!

You can use the number keys to type numbers on a page.

PROJECT

Type your date of birth. Then ask your classmate's date of birth and type it on a new line.

IDEAS

Type the date.

Type a number pattern.

EXTRA CREDIT

Type the number pattern 121 343 565 787 909.

204

Technology Challenge

Help students type double-digit numbers.

Language Acquisition

Numbers

Reinforce the number keys by saying each number in Arabic and then in English.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students tap the following number pattern: *121 343 565 787 909*.

◆ Award 5 points for completing the Extra Credit.

LESSON 4

The Symbol Keys

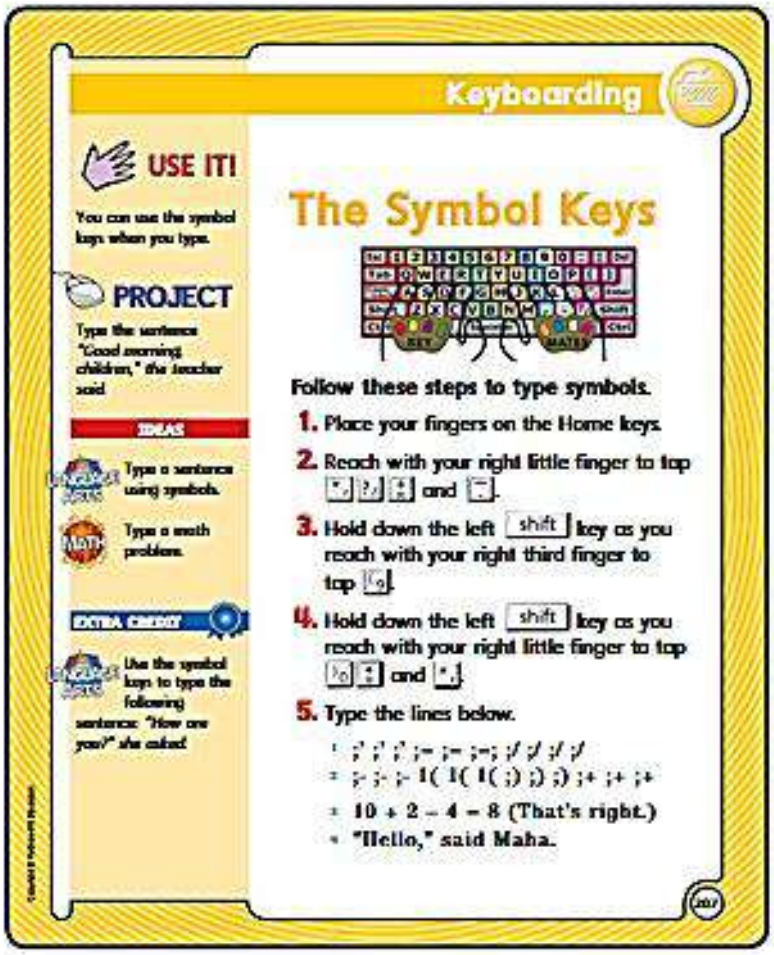
Objective Students key the symbols.

"You will learn the symbol keys and practice the other keys you have learned."

- Have students open a word processing document.
- Remind students to place their fingers on the Home keys and to use proper posture.
- Demonstrate the reaches for students. These reaches can be difficult for students.
- Allow students plenty of time to practice the reaches before typing the lines.
- Review the Shift keys with the students.
- ◆ Have students complete the lesson. Award 15 points upon completion.

Informal Assessment

Observe students' keying techniques and check their work for accuracy.



Technology Challenge

Have students alternate tapping a symbol key and a lowercase letter key.

Language Acquisition

Symbols

Reinforce the symbol keys by saying the name of each symbol in Arabic and then in English.

Integration

EXTRA CREDIT

Have students open a word processing document. Have students use the symbol keys to type the following sentence: *"How are you?" she asked.*

- ◆ Award 5 points for completing the Extra Credit.

Performance Assessment

Chapter 7 Test

Objective Students demonstrate understanding of the material presented in the Keyboarding chapter.

"You have learned basic keyboarding skills. Today you will show what you have learned."

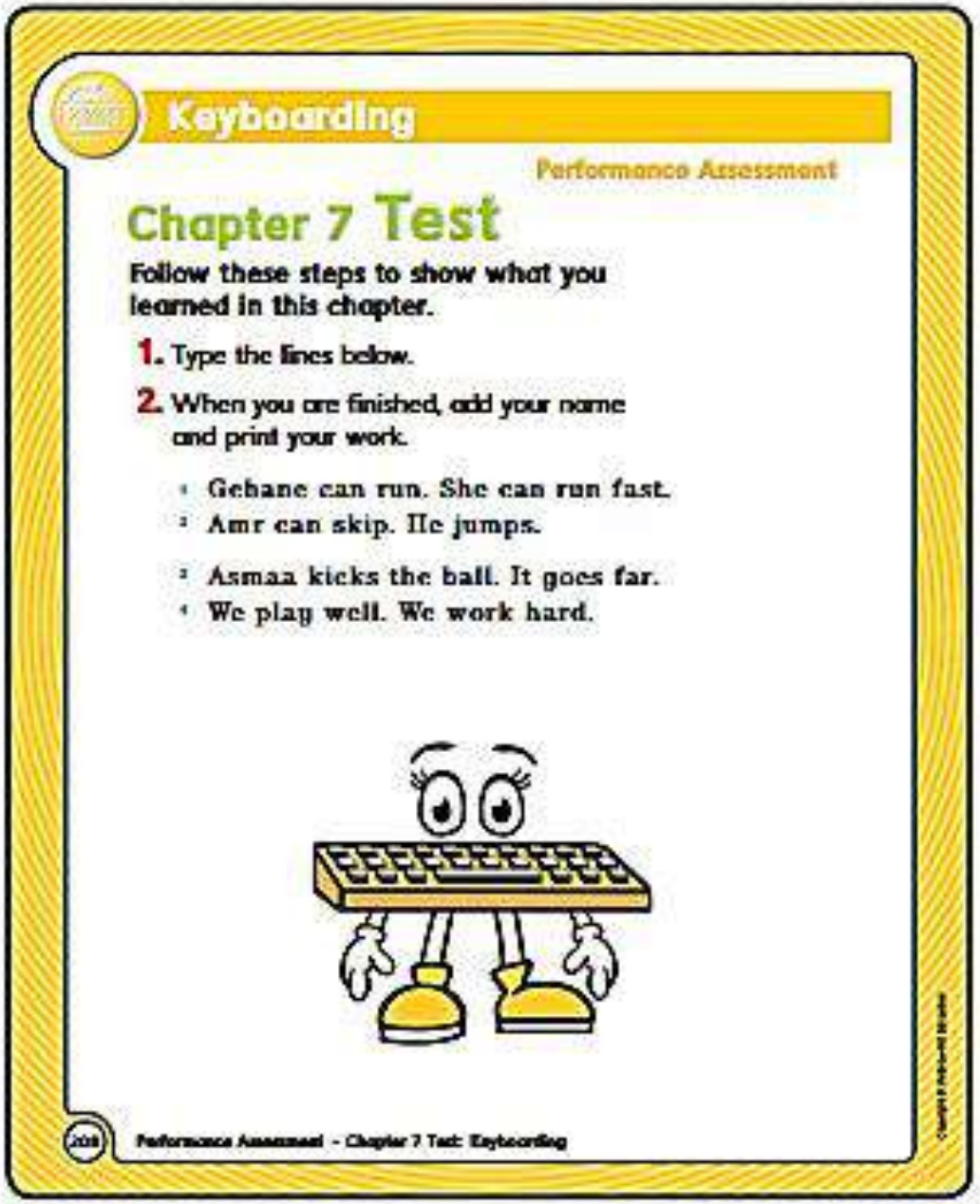
- Explain to students that they should type for both accuracy and speed.

Formal Assessment

Performance Assessment

Check students' work to see that they accurately performed all tasks. Apply the assessment rubric below.

Scoring Rubric		
Total	**Points**	
5	5	Successfully completed
	3	Completed three steps
	1	Completed one step
	0	Did not complete



Keyboarding

Performance Assessment

Chapter 7 Test

Follow these steps to show what you learned in this chapter.

1. Type the lines below.
2. When you are finished, add your name and print your work.

Gehane can run. She can run fast.
Amr can skip. He jumps.
Asmaa kicks the ball. It goes far.
We play well. We work hard.

Project

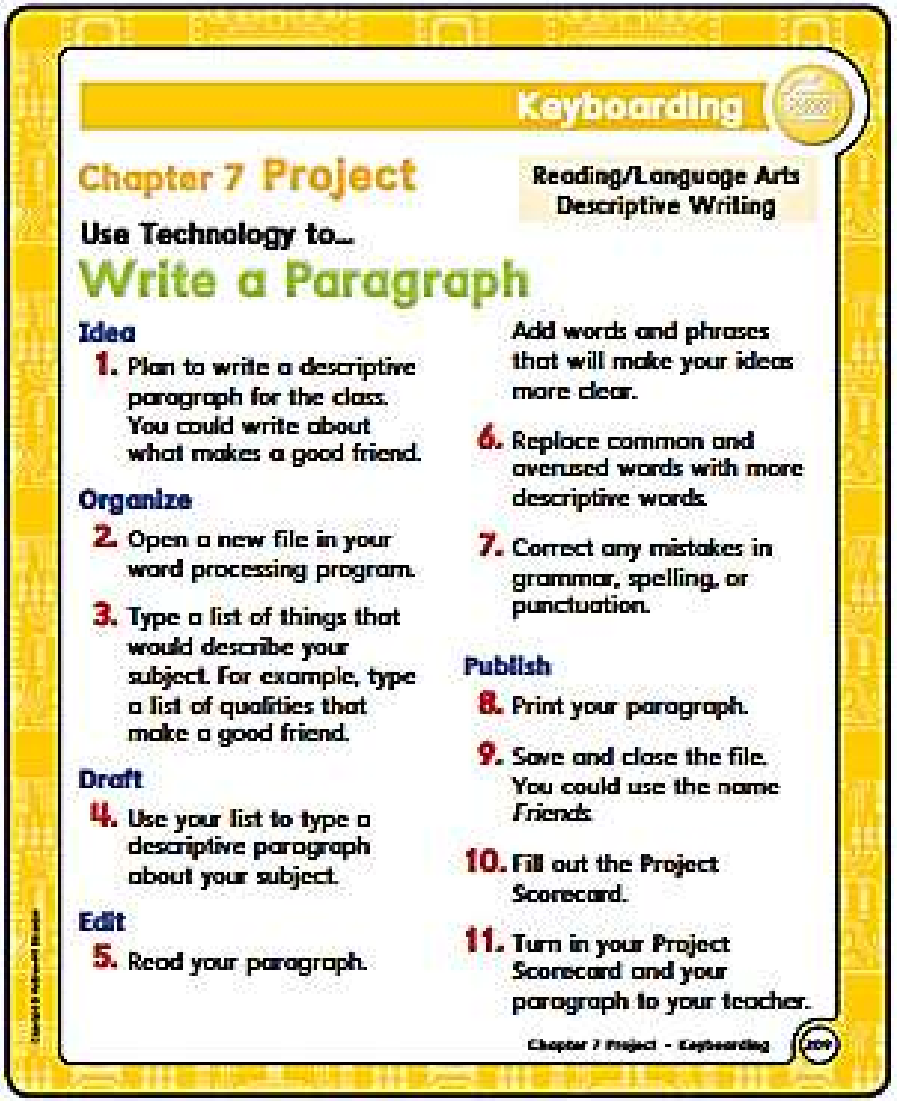
Use Technology to . . .

Write a Paragraph

Objective Students use a word processing program to prewrite, draft, and edit a paragraph describing a friend's qualities.

"You can use a word processing program to prewrite, draft, and edit a descriptive paragraph."

- Explain to students that in the Chapter Project they will apply the keyboarding skills they learned in this unit. They can use these skills every time they use the computer.
- Explain that the purpose of descriptive writing is to create clear images in the reader's mind. It is important to use vivid adjectives, adverbs, and verbs.
- Name common, overused words for students. Discuss how overused words do not create vivid images, and how descriptive words do.
- Allow students to write a descriptive paragraph about their current studies.
- Have students share their paragraphs with the class. Students should evaluate their own paragraphs to make sure they met their purpose in writing.
- Have students complete the Chapter 7 Project using a copy of the **Project Scorecard** as a checklist for the project's requirements.Approximate time needed to complete the project: 30 minutes.



Keyboarding

Chapter 7 Project

Reading/Language Arts
Descriptive Writing

Use Technology to...

Write a Paragraph

Idea

1. Plan to write a descriptive paragraph for the class. You could write about what makes a good friend.

Organize

2. Open a new file in your word processing program.
3. Type a list of things that would describe your subject. For example, type a list of qualities that make a good friend.

Draft

4. Use your list to type a descriptive paragraph about your subject.

Edit

5. Read your paragraph.
6. Add words and phrases that will make your ideas more clear.
6. Replace common and overused words with more descriptive words.
7. Correct any mistakes in grammar, spelling, or punctuation.

Publish

8. Print your paragraph.
9. Save and close the file. You could use the name *Friends*.
10. Fill out the Project Scorecard.
11. Turn in your Project Scorecard and your paragraph to your teacher.

Chapter 7 Project - Keyboarding

Project Assessment

Check students' work to make sure that they accurately performed all of the tasks required. Use the **Project Scorecard** as a rubric to assign a final score for each student.

Project Scorecard

Reading/Language Arts
Descriptive Writing

Use Technology to . . .

Write a Paragraph

Name: _____ Date: _____

Basic Computer Skills	Point Value	My Score	FINAL SCORE
☐ **Key a paragraph. (Steps 5, 6)** Lesson 2: The E and H Keys Lesson 2: The O and R Keys Lesson 2: The I and T Keys Lesson 2: The U and C Keys Lesson 3: The N and W Keys Lesson 3: The G and ⏎ Keys Lesson 3: The B and P Keys Lesson 3: The M and X Keys Lesson 4: The Y and Z Keys Lesson 4: The V and ⇧ Keys	5		
☐ **Use punctuation marks. (Step 7)** Lesson 2: The ⇧ Key Lesson 4: The Q and ⏎ Keys Lesson 4: The Symbol Keys	3		
☐ **Capitalize letters at the beginnings of sentences. (Step 7)** Lesson 2: The Left Shift Key Lesson 3: The Right Shift Key	2		
SUBTOTAL	10		

Language Arts Skills	Point Value	My Score	FINAL SCORE
☐ Prewrite a descriptive paragraph.	1		
☐ Draft a descriptive paragraph.	2		
☐ Edit a descriptive paragraph.	1		
☐ Use descriptive words.	1		
SUBTOTAL	5		

TOTAL SCORE _____

_____
Teacher Initials

Glossary/القاموس

A

Arctic an icy and cold place near the North Pole.
Plants in the Arctic grow close to the ground.

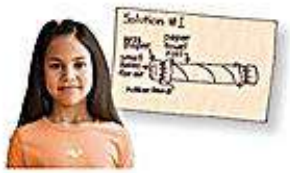
المنطقة القطبية الشمالية مكان جليدي وبارد قريب من القطبين الشمالي والجنوبي.
تنمو النباتات في المنطقة القطبية بالقرب من الأرض.

attract to pull toward something.
A magnet can attract some objects.

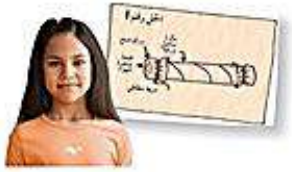
جذب هو الشد تجاه الشيء.
يمكن للمغناطيس جذب بعض الأجسام.

B

brainstorm to think of as many ideas as possible.
The children had to brainstorm solutions.

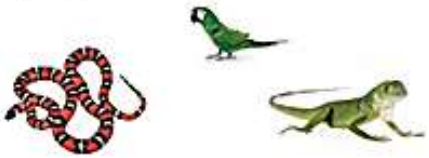


عصف ذهني التفكير في أكبر عدد ممكن من الأفكار.
يحتاج الأطفال لأجراء عصف ذهني بحثًا عن حلول.

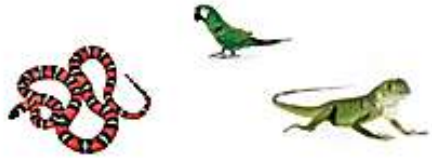


C

classify to group things by how they are alike.
You can classify animals by how many legs they have.



تصنيف تجميع الأشياء حسب أوجه الشبه بينها.
يمكنك تصنيف الحيوانات حسب عدد الأرجل التي لدى كل منها.



communicate to write, draw, or tell your ideas .
You can communicate the ways you can change a piece of clay.

تواصل هي كتابة أفكارك أو رسمها أو التعبير عنها أو مشاركتها مع الآخرين.
يمكنك مشاركة الطرق التي تمكّنك من تغيير قطعة صلصال.

compare to observe how things are alike or different
You can compare how a cat and a dog are alike and different.

مقارنة ملاحظة مدى التشابه أو الاختلاف بين الأشياء.
يمكنك مقارنة مدى التشابه والاختلاف بين القطط والكلاب.

continent a large piece of land on Earth.
There are seven continents on Earth.

قارة قطعة يابسة كبيرة من الأرض.
يوجد في الأرض سبع قارات.

D

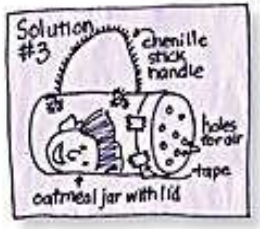
decompose when plant and animal parts rot or break down.
This log will decompose over time.

تحلل عملية طبيعية تحدث للكائنات الحية تؤدي إلى انفصال عناصرها وتحللها بعد موت الحي بفعل البكتيريا.
سوف يتحلل جذع الشجرة هذا مع مرور الوقت.

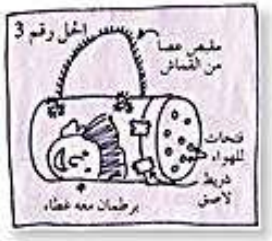
desert a dry place.
Cactus plants can live in the desert.

صحراء مكان جاف وحار. يتميز بندرة سقوط الأمطار.
بإمكان نباتات الصبار أن تعيش في الصحراء.

design to draw, plan, build, and test an idea.
This drawing was made during the design process for a hamster carrier.



تصميم رسم فكرة والتخطيط لها وتنفيذها واختبارها.
تم عمل هذه الرسمة أثناء عملية تصميم حقيبة لحمل حيوان الهامستر.



deposition the dropping off of weathered rock.
There is much deposition in rocky areas.

ترسيب تراكم فتات صخري على شكل طبقات بفعل الرياح و الماء.
يكثر الترسيب في المناطق الصخرية.

dissolve to mix evenly with a liquid and form a solution.
Sugar will dissolve when it is mixed with water.

ذوبان امتزاج المادة كليًا بالسائل لعمل محلول.
سوف يذوب السكر عند خلطه مع الماء.

draw conclusions to use what you observe to explain what happens
You can draw conclusions about why the stick will make a shadow.

استنتاج خلاصات استخدام النتائج لتفسير ما يحدث.
يمكنك استنتاج السبب الذي سوف يجعل العصا تصنع ظلاً.

E

erosion when rock and soil are moved by wind or water to a new place.
Erosion slowly changes the shape of land.

تعرية تحريك التربة والصخور بفعل الرياح أو المياه إلى مكان جديد.
تغيّر التعرية شكل الأرض ببطء.

extinct when a living thing dies out and no more of its kind live on Earth.
Dinosaurs are extinct.

انقراض عندما يموت كائن حي ولا يعيش أي فرد من نوعه على الأرض.
الديناصور حيوان منقرض.

F

flower a part of a plant that makes seeds.
Flowers come in many shapes and colors.

زهرة جزء من النبات ينتج البذور.
تتميز الزهور بأشكالها وألوانها المختلفة.

force a push or pull on an object.
When you kick a ball, you are using a kind of force.

قوة عملية دفع أو شد شارس على جسم ما.
عندما تركل الكرة فإنك تستخدم أحد أنواع القوّة.

fossil what is left of a living thing from the past.
This fish fossil was found in the desert.

أحفورة آثار أو بقايا مخلوقات حية عاشت في الماضي البعيد.
عُثر على أحفورة السمكة هذه في الصحراء.

friction a force that slows down moving things.
A skate makes friction when the stopper rubs against the ground.

احتكاك قوة تعمل على إبطاء الأشياء المتحركة.
يحدث الاحتكاك حينما يحتك المكبح المطاطي لحذاء التزلج بالأرض.

fruit the plant part that holds the seeds.
The peach fruit has a seed inside.

ثمرة جزء من النبات يحمل البذور.
تحتوي ثمرة الخوخ على بذرة بداخلها.

fulcrum the point that a lever moves against.
This piece of wood can act as a fulcrum.

نقطة ارتكاز هي النقطة التي تتحرك منها الرافعة.
يمكن أن تكون هذه القطعة الخشبية نقطة ارتكاز.

G

gravity a kind of force that pulls down on everything on Earth.
Gravity is the force that pulls a ball to the ground.

الجاذبية الأرضية هي نوع من القوة التي تجذب كل شيء على الأرض إلى أسفل.
الجاذبية هي القوة التي تجذب الكرة نحو الأرض.

H

human-made things are things made by people.
Glue and beach balls are examples of human-made things.

أشياء مصنّعة أشياء من صنع الإنسان.
من أمثلة الأشياء المصنّعة الغراء وكرات الشاطئ.

I

infer to use what you know to figure something out.
From these tracks, you can infer what animal was here.

استنتاج استخدام المعرفة السابقة للوصول إلى معرفة جديدة.
من هذه الآثار يمكنك استنتاج أي الحيوانات كان هنا.

investigate to make a plan and try it out.
You can investigate how long it takes the car to stop rolling.

تحقق وضع خطة وتجربتها.
يمكنك التحقق من طول المسافة.

living a thing that grows, changes, and needs food, air, and water to survive.
This man is a living thing.

كائن حي الكائن الذي ينمو ويتغير ويحتاج إلى الغذاء والهواء والماء ليحيا.
الإنسان كائن حي.

M

make a model to make something to show how something looks.
You can make a model of a mountain in the ocean.

عمل نموذج صنع شيء لتوضيح ما يبدو عليه شيء محدد.
يمكنك صنع نموذج لجبل في المحيط.

measure to find out how far something moves, or how long, how much, or how warm something is.
You can measure temperature with a thermometer.

قياس إجراء نقوم به لإيجاد مدى بعد شيء ما أو طوله أو كميته أو درجة حرارته.
يمكنك قياس درجة الحرارة باستخدام ميزان الحرارة.

L

leaves the plant parts that use sunlight and air to make food.
Leaves come in different shapes and sizes.

أوراق أجزاء النبات التي تستخدم ضوء الشمس والهواء لصنع الغذاء.
للأوراق أشكال وأحجام مختلفة.

lever a simple machine made of a bar that turns around a point.
A lever can help you move or lift objects.

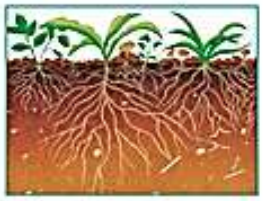
رافعة آلة بسيطة مصنوعة من قضيب يدور حول نقطة محددة.
بإمكان الرافعة أن تساعدك على رفع الأجسام.

life cycle how a living thing grows, lives, and dies.
The life cycle of a bean plant starts with a seed.

دورة الحياة مراحل نمو الكائن الحي ومعيشته وموته.
تبدأ دورة حياة نبات الفول بالبذرة.

minerals (nutrients) bits of rock and soil that help plants and animals grow.
Plants use minerals in the ground to grow.

معادن (العناصر الغذائية) أجزاء من مكونات الصخور والتربة تساعد النباتات والحيوانات على النمو.
تستخدم النباتات المعادن الموجودة في الأرض لتنمو.



model a sample of a product or idea used for testing.
You can make a model to show how an idea should look.

نموذج عينة لمنتج أو فكرة تُستخدم من أجل الاختبار.
يمكنك تصميم نموذج لتوضيح كيف تبدو الفكرة.

motion a change in the position of an object.
This horse is in motion.

حركة تغيّر في موضع أحد الأجسام (تغير مكان الجسم).
هذا الحصان في حالة حركة.

mountain land that is very high.
A mountain is the highest type of land.

جبل أرض مرتفعة للغاية.
الجبل هو المكان الأكثر ارتفاعًا على اليابسة.

N

natural resource a material from Earth that people use in daily life.
Rocks are a natural resource.

مصدر طبيعي مادة من الطبيعة يستخدمها الإنسان في حياته اليومية.
وتُعد الصخور مصدرًا طبيعيًا.

nonliving things a thing that does not grow and change, or need food, air, or water to exist.
Rocks and books are examples of nonliving things.

جماد شيء لا ينمو ولا يتغير ولا يحتاج إلى الغذاء أو الماء أو الهواء ليظل موجودًا.
من أمثلة الجماد الصخور والكتب.

nutrients things in the soil that help plants grow and stay healthy.
There are lots of nutrients in some soils.

عناصر غذائية مواد في التربة تساعد النباتات على النمو.
تحتوي بعض أنواع التربة على الكثير من العناصر الغذائية.

O

observe to see, hear, taste, touch, or smell
You can observe how the flower looks, smells, and feels.

ملاحظة استخدام الحواس الخمسة للمعرفة (الرؤية-السمع -التذوق-اللمس-الشم).
يمكنك ملاحظة شكل الزهور ورائحتها وملمسها.

oxygen a gas found in the air we breathe.
Living things need oxygen.

أكسجين غاز موجود في الهواء الذي نتنفسه.
تحتاج الكائنات الحية إلى الأكسجين.

P

plains flat land that spreads out a long way.
Plains are wide and flat.

سهول أرض منبسطة تمتد لمدى واسع.
السهول واسعة ومنبسطة.

poles the two ends of a magnet, or either end of Earth's axis.
Earth has two poles, a north pole and a south pole.

قطبان طرفا المغناطيس أو طرفي محور الأرض.
الأرض لها قطبان: القطب الشمالي والقطب الجنوبي.

pollen sticky powder inside the flower that helps make seeds.
Pollen sticks to bees when they land on flowers.

حبوب اللقاح حبيبات دقيقة داخل الزهرة يساعد في إنتاج البذور.
تلتصق حبوب اللقاح بالنحل عندما يقف على الزهور.

pollution anything that makes air, land, or water dirty.
Garbage is one kind of pollution.

تلوث أي شيء يجعل الهواء أو الأرض أو الماء غير نظيف.
النفايات أحد أشكال التلوث.

position the place where something is.
The position of the rabbit is above the cat.

مؤقع مكان وجود الشيء.
مؤقع الأرنب فوق المقعد وموقع القط تحته.

predict to use what you know to tell what you think will happen
You can predict what the weather will be like today.

توقع استخدام ما تعرفه من معلومات لتحديد ما تعتقد أنه سيحدث.
يمكنك توقع حالة الطقس اليوم.

put things in order to tell or show what happens first, next, or last
You can put things in order to show the life cycle of a plant.

ترتيب الأشياء هو تحديد أو بيان ما سيحدث أولاً، أو ثانيًا أو أخيرًا.
يمكنك ترتيب الأشياء للإشارة إلى دورة حياة أحد النباتات.

R

rain forest a hot, wet place.
A rain forest has many green plants.

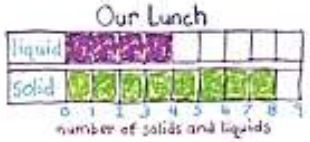
غابة مطيرة مكان حار ورطب تتساقط فيه الأمطار بشكل يومي تقريبًا.
تحتوي الغابة المطيرة على الكثير من النباتات.

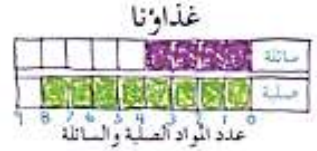
ramp A simple machine with a flat, slanted surface.
A ramp can be used to move an object from one level to another.

أداة التحميل آلة بسيطة لها سطح مسنو ومائل.
تصنع من الخشب أو المعدن.
يمكن استخدام أداة التحميل لتحريك جسم من مستوى إلى آخر.

record data to write down what you observe
You can record data about what your class had for lunch.

تسجيل البيانات تدوين الملاحظات والمشاهدات.
يمكنك تسجيل البيانات حول ما تناوله طلاب صفك على الغداء في جدول.





recycle To make new items out of old items.
You can recycle paper.

إعادة التدوير تصنيع أشياء جديدة باستخدام أشياء قديمة.
ويمكنك إعادة تدوير الورق.

reduce to cut back on how much you use something.
We should reduce the amount of water we use.

ترشيد تقليل الكمية التي تستخدمها من شيء ما.
ينبغي علينا ترشيد كمية المياه التي نستخدمها.

repel to push away or apart.
The two south poles of a magnet repel each other.

تنافر الدفع بعيدًا.
يتنافر القطبان الجنوبيان لمغناطيس مع بعضهما البعض.

reuse to use something again.
We can reuse items to cut down on waste.

إعادة الاستخدام استخدام الشيء مرة أخرى.
يمكننا إعادة استخدام العناصر لتقليل المخلفات.

river a body of fresh water that moves.
A river may flow into a lake.

نهر مياه عذبة تسير في مجرى واسع.
قد يتدفق النهر إلى إحدى البحيرات.

rock a hard, nonliving part of Earth.
A rock like this can be used as a tool.

صخرة جزء صلب وجامد.
تم استخدام هذه الصخرة كفأس قديمًا.

root a plant part that keeps the plant in the ground.
Roots hold a plant in the ground.

جذر جزء من النبات يعمل على تثبيته في الأرض.
الجذور تثبت النباتات في التربة.

S

seed a part of a plant that can grow into a new plant.
A seed inside a peach can grow into a peach tree.

ذرة جزء من النبات ينمو ويصبح نباتًا جديدًا.
يمكن أن تنمو البذرة الموجودة داخل ثمرة الخوخ تصبح شجرة خوخ.

seedling a young plant.
A young bean plant is a seedling.

بادرة نبتة صغيرة في بداية ظهورها.
رعم الفول هو البادرة.

simple machine a tool that can change the size or direction of a force.
This simple machine is called a ramp.

آلة بسيطة أداة يمكن أن تُغيّر من حجم القوة أو تجاهها.
عرف هذه الآلة البسيطة باسم أداة التحميل.

soil a mix of tiny rocks and bits of dead plants and animals.
Most plants need soil to grow.

تربة مزيج من الصخور الصغيرة وبقايا النباتات والحيوانات الميتة.
تحتاج معظم النباتات إلى التربة لكي تنمو.

solution a kind of mixture with parts that do not easily come apart.

محلول نوع من المخاليط يصعب فصل مكوّناته.

speed is how far something moves in a certain amount of time.
Cheetahs can run at very high speed.

سرعة هي مقدار حركة الجسم في فترة زمنية معينة.
تجري الفهود بسرعة كبيرة جدًا.

stem the part of a plant that holds up the plant.
The stem holds up the flower.

ساق جزء من النبات يحمله ويدعمه.
يدعم الساق الزهرة.

T

technology all the tools and ideas we use.
Technology helps make our lives easier.

تكنولوجيا جميع الأدوات والأفكار التي نستخدمها.
تساعد التكنولوجيا في تسهيل حياتنا.

tool an object or body part that helps do work.
Our hands and teeth are tools.

عضو جزء من الجسم يساعد على أداء العمل.
أيدينا وأسناننا عبارة عن أعضاء تساعدنا في أداء الأعمال.

trait the way a living thing looks or acts.
The color of a flower is a trait.

صفة وراثية الأسلوب الذي يظهر به الكائن الحي أو يتصرف وفقًا له.
يُعد لون الزهرة صفة وراثية.

V

valley the low land between mountains.
The valley is flat.

وادي أرض منخفضة بين جبلين.
يكون الوادي منبسطًا.

W

weathering when water changes the shape and size of rocks.
Weathering can make rocks crack.

تجوية تحدث عندما تغيّر المياه من شكل الصخور وحجمها.
يمكن أن تؤدي التجوية إلى تشقق الصخور.