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Science Readers: Content and Literacy in Science—Grade 2

This sample includes the following:

SCIENCE READERS

Content *and* Literacy *in* Science

Grade 2

Teacher's Guide

Teacher Created Materials PUBLISHING

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EARTH and SPACE SCIENCE

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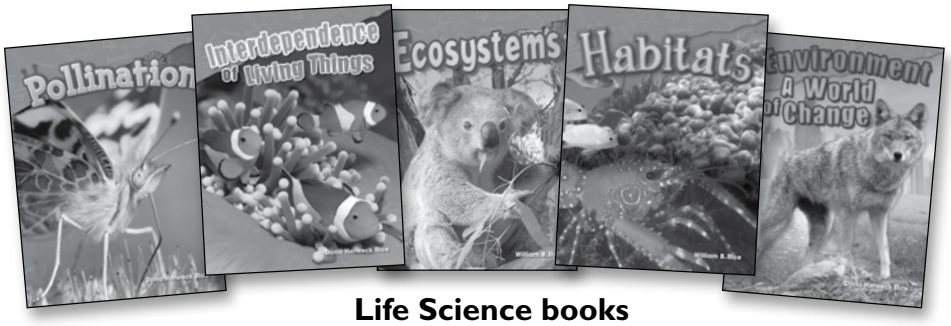
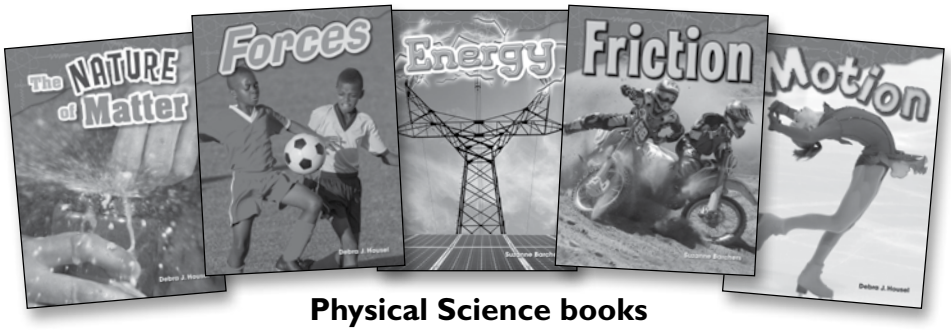
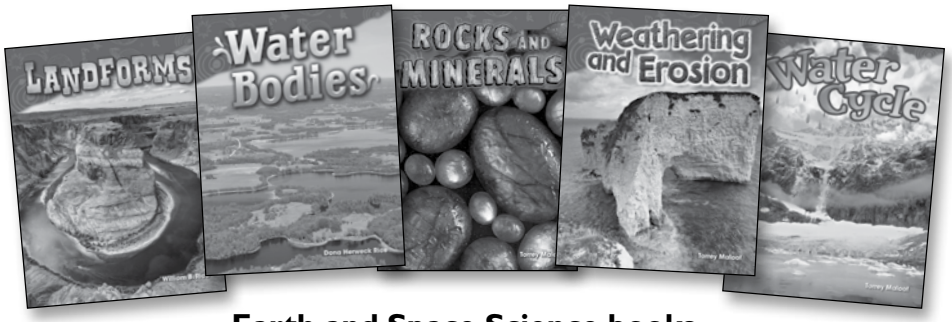


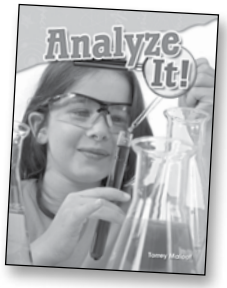
Life Science books



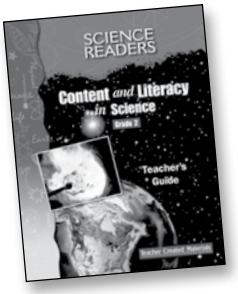
Physical Science books



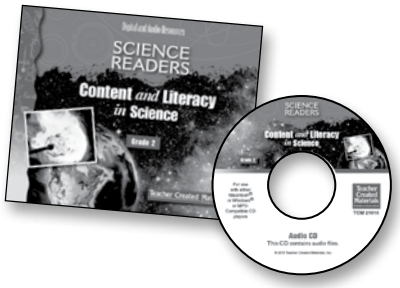
Earth and Space Science books



Scientific Practices book



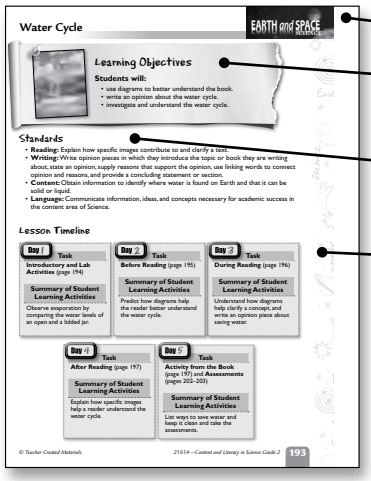
Teacher's Guide



Digital and Audio Resources

Unit Organization

Overview Page



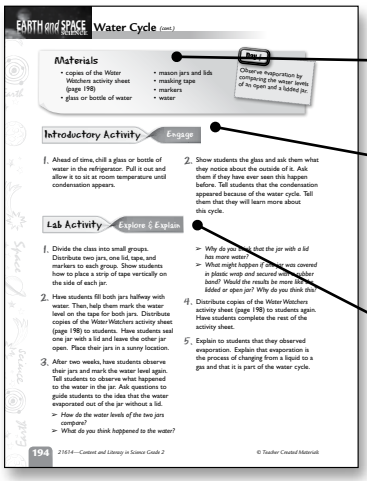
Science strand

Learning objectives

Standards

Suggested timeline for lesson

Introductory and Lab Activities

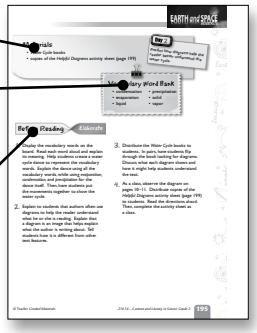


Materials

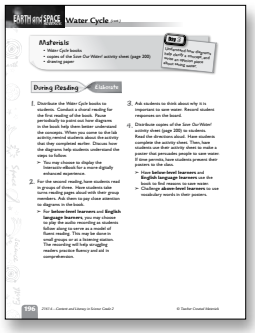
Engage students with the Introductory Activity

Explore and Explain the new concept with the Lab Activity

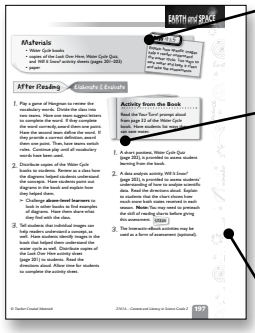
Before Reading



During Reading



After Reading



Materials list

Vocabulary Word Bank

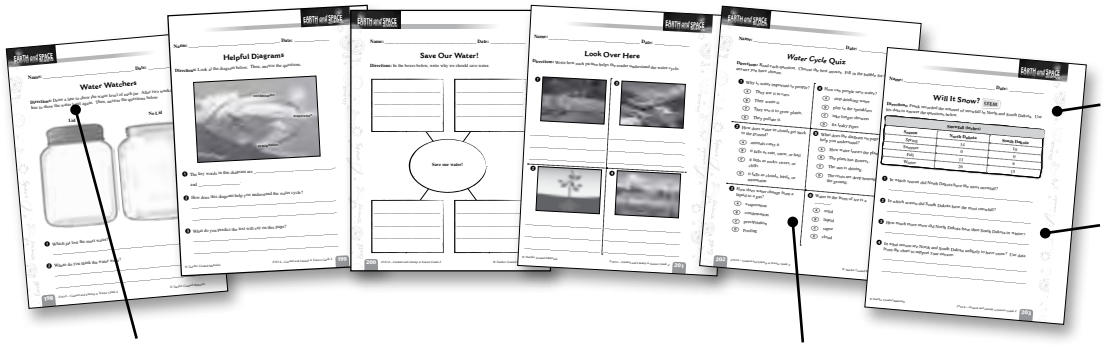
Elaborate on the concept with a vocabulary and a prereading activity

Materials list

Elaborate with an After Reading activity on Day 4

Evaluate with Assessments on Day 5

Student Reproducibles and Assessments



Clear directions

Multiple-choice quiz

Data Analysis

Wide write-on lines

How to Use This Product *(cont.)*

Pacing Plan

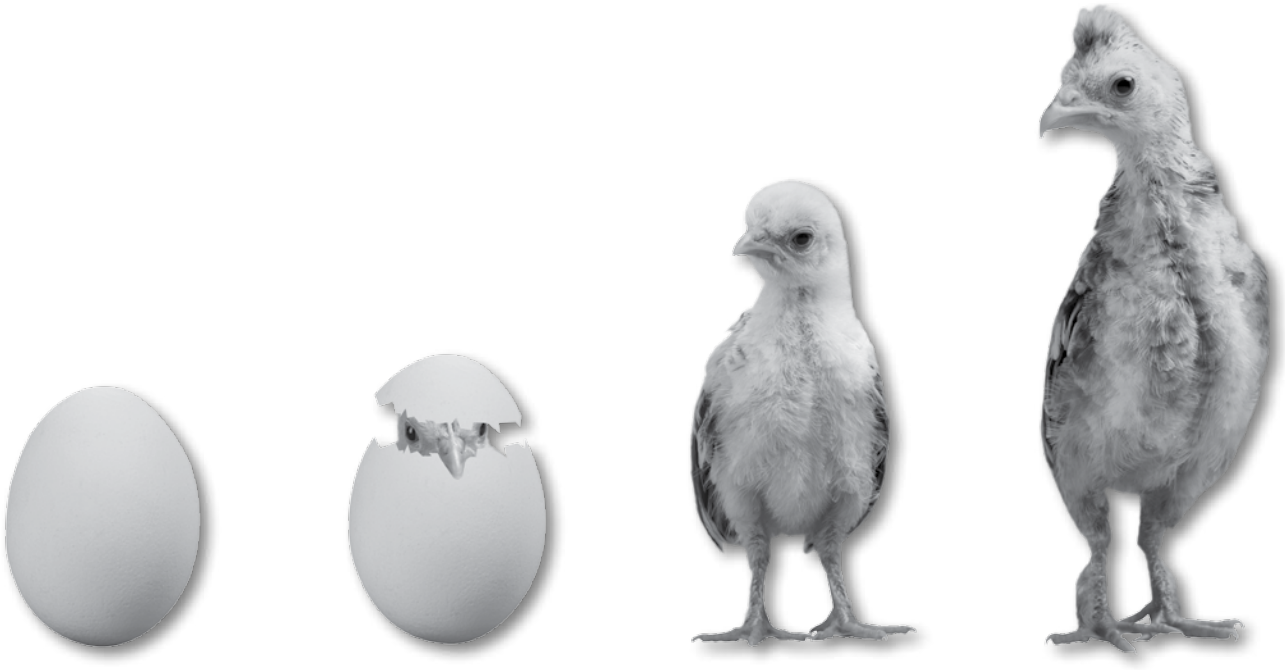
The following pacing plan shows an option for using this product. Teachers should customize this pacing plan according to their students' needs. One lesson has been included for each of the 16 books. Each day of the lesson requires 20 to 40 minutes of time and spans 5 instructional days, for a total of approximately 30–50 hours over the course of 80 days.

Instructional Time	Frequency	Setting
20–40 min/day	5 days/week	Whole-class, small-group or one-on-one instruction

Day 1	Day 2	Day 3	Day 4	Day 5
Introductory and Lab Activities	Before Reading	During Reading	After Reading	Activity from the Book and Assessments

Lab Safety

To ensure safety in the science classroom, a Science Safety Contract has been provided in the Digital Resources (safety.pdf). Distribute copies of this contract to students prior to beginning any science instruction. Discuss with students how to be respectful and responsible during science activities. Ask students and their parents/guardians to sign and return the contract for your records.



Science Strands

The books and lessons in this kit cover the three strands of science which encompass the Disciplinary Core Ideas. The icons in the lessons and on the back of the books denote each strand. One book in this kit is devoted completely to scientific practices. This book describes how to think like a scientist and study the natural world.

Differentiation

Students learn best when material is scaffolded appropriately. If a student is confronted with material that is too difficult, he or she may become frustrated and give up. However, if a student is not challenged enough, he or she may become bored and lose interest in the subject. Differentiation is not about making the work easy for students. Instead, it is about challenging all students appropriately.

The books in this kit are leveled to target and support different groups of learners. The chart on page 26 contains specific information on the reading levels of the books included in this kit. The lesson plans for these books have **differentiation strategies** to help **above-**, **on-**, and **below-level learners** comprehend the material. These strategies will ensure that students are actively engaged in learning while receiving the support or enrichment that they need.

English language learners have different instructional needs. Although these students may struggle with reading, that is not always the case. English language learners need different support depending on their level of English proficiency. The lesson plans in this kit offer suggestions to differentiate instruction for the unique needs of English language learners.

SCIENCE READERS

Differentiation Tools in This Kit

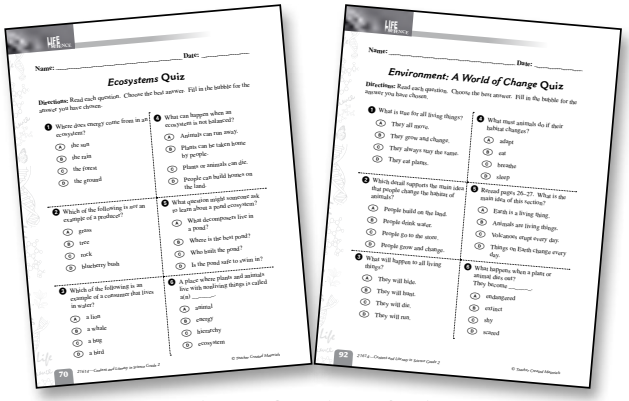
- Audio recordings of texts model fluency and support auditory learners.
- An Interactiv-eBook for each book supports students through video, audio, and other digital functions.
- Graphic organizers support visual learners and language learning.
- Hands-on lab activities engage tactile learners.
- Leveled books support above-, on-, and below-level learners.
- Differentiation strategies embedded in each lesson support a variety of learners.

How to Use This Product *(cont.)*

Assessment

Assessment is an important part of this unit of study. The *Science Readers* series offers multiple assessment opportunities. You can gain insight into students' learning through multiple-choice quizzes, small-group observations, analysis of written assignments, and a culminating activity. These formal and informal assessments provide you with the data needed to make informed decisions about what to teach and how to teach it. This is the best way for you to know who is struggling with various concepts and how to address the difficulties that students are experiencing with the curriculum.

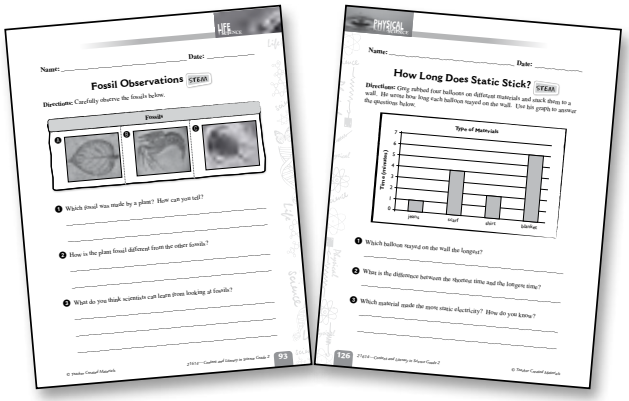
Multiple-Choice Quizzes—At the end of each book's lesson in this Teacher's Guide is a short quiz with multiple-choice questions. These short assessments may be used as open-book evaluations or as review quizzes in which students read and study the content prior to taking the quiz. Additionally, the quizzes may be used as a more formal assessment to provide evidence of learning.



Multiple-Choice Quizzes

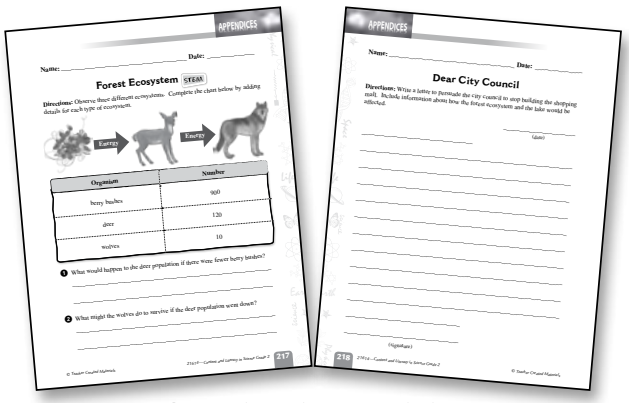
Data Analysis Activities—Each activity includes content-related data and text-dependent questions. These questions help students develop and strengthen critical thinking skills.

Culminating Activity—The culminating activity asks students to apply what they have learned throughout the units in an engaging and interactive way. Students use what they have learned to create new ideas in a real-life context.



Data Analysis Activity

Progress Monitoring—There are several points throughout each lesson where useful evaluations can be made. These evaluations can be made based on group, paired, and individual discussions and activities.



Culminating Activity

Pollination

Learning Objectives

Students will:

- use diagrams to better understand pollination.
- write a story to tell a sequence of events.
- develop a model to show the process of pollination.

Standards

- **Reading:** Explain how specific images contribute to and clarify a text.
- **Writing:** Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
- **Content:** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **Language:** Communicate information, ideas, and concepts necessary for academic success in the content area of Science.

Lesson Timeline

Day 1

Task

Introductory and **Lab Activities** (page 40)

Summary of Student Learning Activities

Model the process of pollination and dissect a flower.

Day 2

Task

Before Reading (page 41)

Summary of Student Learning Activities

Make predictions about pollinators.

Day 3

Task

During Reading (page 42)

Summary of Student Learning Activities

Use diagrams to better understand pollination and write a story to tell about pollination.

Day 4

Task

After Reading (page 43)

Summary of Student Learning Activities

Complete a diagram of pollination.

Day 5

Task

Activity from the Book (page 43) and **Assessments** (pages 48–49)

Summary of Student Learning Activities

Create a model of a pollinator and take the assessments.

Pollination *(cont.)*

Materials

- copies of the *A Closer Look* activity sheet (page 44)
- baby powder
- two pieces of felt
- flowers for dissection (for example: tulip or daffodil)
- plastic butter knives

Day 1

Model the process of pollination and dissect a flower.

Introductory Activity — Engage

1. Sprinkle baby powder on a piece of colored felt. Have a student hold the felt while facing the class. Ask another student to carefully bump into the felt with another piece of felt.
2. Ask the class what happened to the powder. Explain that this demonstrates how pollen moves from one plant to another in a process called *pollination.*

Lab Activity — Explore & Explain

1. Place students in small groups. Distribute copies of the *A Closer Look* activity sheet (page 44) to students. Tell students they will take turns dissecting, or taking apart, a flower for closer inspection.
2. Distribute flowers and plastic butter knives to groups. **Note:** You may wish to also distribute hand lenses.
3. Demonstrate how to cut off the petals with a knife. Then, have students cut the petals of their own flowers. Have students write their observations on their activity sheets.
4. Demonstrate how to locate and cut off the stamens. Then, have students cut the stamens of their own flowers. Have students record their observations. **Note:** You may wish to reference the diagram on page 13 of the *Pollination* book.
5. Demonstrate how to locate and cut off the pistil. Then, demonstrate how to cut the pistil open. Have students carefully cut the pistils of their own flowers and record their observations.
6. Ask students questions to guide them to the idea that parts of the flower have different functions, but they all work together.
   - ➢ *What do you notice about the stamen?*
   - ➢ *What do you think the pollen does?*
   - ➢ *What do you notice about the pistil? What do you see when you cut it open?*
   - ➢ *What do you think each part of the flower does? What makes you think that?*
7. At the bottom of the activity sheet, have students predict how the plant parts work together. Tell students they will learn more about each plant part.

Materials

- *Pollination* books
- copies of the *Animals That Pollinate* activity sheet (page 45)
- drawing paper

Day 2

Make predictions about pollinators.

Vocabulary Word Bank

- anther
- ovary
- pistil
- pollen
- pollinator
- stamens
- stigma
- style

Before Reading — Elaborate

1. Distribute drawing paper to students. Lead students in drawing and labeling a diagram of a flower as an introduction to the vocabulary words. Have students complete individual drawings while you narrate each part. **Note:** You may wish to reference the diagram on page 13 of the *Pollination* book.
   - ➢ *At the top of the stem is the pistil.* (Draw and label the pistil.)
   - ➢ *The pistil is made up of the style, ovary, and stigma.* (Draw and label the style, ovary, and stigma.)
   - ➢ *The stamens can be found around the pistil.* (Draw and label the stamens.)
   - ➢ *An anther is found at the top of each stamen.* (Draw and label the anthers.)
   - ➢ *Pollen covers each anther.* (Draw and label pollen.)
   - ➢ *The petals surround all of these parts in order to protect them.* (Draw and label the petals.)
2. Remind students of the baby powder pollination activity. Explain that some plants depend on animals to pollinate them. Add a bee to your diagram and label it *pollinator*. Discuss as a class other animals that may pollinate plants.
3. Distribute copies of the *Animals That Pollinate* activity sheet (page 45) to students. Read the directions and the list of animals aloud. Ask students to predict which of the animals listed might pollinate plants. Explain that they should mark an *X* beside each animal they think is a pollinator in the *Before Reading* column. Have students keep their activity sheets to use later in the lesson.

Pollination *(cont.)*

Materials

- *Pollination* books
- copies of the *Story of Pollination* activity sheet (page 46)
- students' copies of the *Animals That Pollinate* activity sheet (page 45)

Day 3

Use diagrams to better understand pollination and write a story to tell about pollination.

During Reading — Elaborate

1. Distribute the *Pollination* books to students. For the first reading, read the book aloud as students follow along. Pause periodically to point out diagrams in the book that help the reader better understand the text.
   - ➢ You may choose to display the Interactiv-eBook for a more digitally enhanced reading experience.
2. For the second reading, have students read in pairs. Instruct them to take turns reading pages with their partners. Have them discuss the information presented in the diagrams.
   - ➢ For **below-level learners** and **English language learners**, you may choose to play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station. The recording will help struggling readers practice fluency and aid in comprehension.
3. Have students refer back to the *Animals That Pollinate* activity sheet from the Before Reading activity. Have them mark an *X* next to animals that are pollinators. Ask students to compare the two columns of their charts. Then, have them answer the question at the bottom of the sheet.
4. Place students in small groups to review the steps that plants follow to make new plants. Then, ask students to think about how a pollinator might explain the process, if animals could talk. Brainstorm ideas as a class. Record student ideas on the board.
5. Distribute copies of the *Story of Pollination* activity sheet (page 46) to students. Read the directions aloud. Encourage students to use the steps in the pollination process and the ideas they brainstormed as a class to write a story from the perspective of a pollinator.
   - ➢ Have **below-level learners** and **English language learners** illustrate their stories on a graphic organizer first. Then, have them write sentences to tell about the pictures.
   - ➢ Encourage **above-level learners** to write from multiple perspectives, such as the pollinator and the flower.

Materials

- *Pollination* books
- copies of the *Diagram It!*, *Pollination Quiz*, and *In Bloom* activity sheets (pages 47–49)

Days 4&5

Complete a diagram of pollination. Create a model of a pollinator and take the assessments.

After Reading — Elaborate & Evaluate

1. Review the vocabulary words. Then, demonstrate how to use the words in sentences that show their meaning. For example, for the word *pollinator*, a sentence could be *Pollinators move pollen to other plants to help make new plants*. Have students create their own sentences with a partner.

2. Distribute the *Pollination* books to students. Discuss as a class how diagrams help a reader better understand a text. Have students identify diagrams in the book and explain how the diagrams helped them better understand the text. Ask what they learned from the diagram.

3. Distribute copies of the *Diagram It!* activity sheet (page 47) to students. Read the directions aloud. Explain to students that they should add explanations to go with the pictures in boxes 2 and 4, and they should draw what is described in boxes 1 and 3.

Activity from the Book

Read the Your Turn! prompt aloud from page 32 of the *Pollination* book. Have students draw a diagram to show what their pollinator might look like, and list the materials they might use to make a model of it. If possible, have students use these materials to create a model of a pollinator.

1. A short posttest, *Pollination Quiz* (page 48), is provided to assess student learning from the book.

2. A data analysis activity, *In Bloom* (page 49), is provided to assess students' understanding of how to analyze scientific data. Read the directions aloud. **Note:** You may wish to preteach the skill of reading bar graphs before giving this assessment. STEM

3. The Interactiv-eBook activities may be used as a form of assessment (optional).

Name: _____ **Date:** _____

A Closer Look

Directions: With an adult's help, cut apart a flower. Draw a picture and write a sentence to describe each part. Then, describe how the parts might work together.

petals	_____ _____ _____
stamens	_____ _____ _____
pistil	_____ _____ _____

How do you think these plant parts work together?

_____

_____

Name: _____ **Date:** _____

Animals That Pollinate

Directions: Before reading the book, mark an *X* next to animals you think might be pollinators. After reading the book, mark an *X* next to animals that are pollinators. Then, answer the question below.

Animals	Before Reading	After Reading
bats		
moths		
insects		
furry animals		
fish		
lizards		
bees		
butterflies		
birds		

Why do you think some animals are better pollinators than others?

_____

_____

_____

Name: _____ **Date:** _____

Story of Pollination

Directions: Pretend you are a pollinator. Write a story about the pollination process. Use the story outline below to help you.

My name is _____. I am a _____. I pollinate plants.

This means _____ .

This is a story to tell how this happens.

First, _____

_____

_____

Next, _____

_____

_____

Finally, _____

_____

_____

And that's the story of how I help plants make new plants.

Name: _____ **Date:** _____

Diagram It!

Directions: Complete the diagram below so that there is a drawing and an explanation in each box.

1. These anthers have pollen.

4.

_____

_____

2.

_____

_____

3. The bee visits another flower. It leaves pollen on the stigma.

Name: _____ **Date:** _____

Pollination Quiz

Directions: Read each question. Choose the best answer. Fill in the bubble for the answer you have chosen.

1 How do plants depend on animals?

- (A) Animals give plants water.
- (B) Animals give plants food.
- (C) Animals make plants smell nice.
- (D) Animals can help pollinate plants.

2 Which animal might help pollinate a plant?

- (A) a bee
- (B) a bat
- (C) a bird
- (D) all of above

3 What can the diagram on page 13 of the book help you understand?

- (A) where anthers are on a flower
- (B) what anthers do
- (C) the definition of *anther*
- (D) the number of flowers in the world

4 What do the pedals on a flower do?

- (A) Pedals keep the plant warm.
- (B) Pedals keep the plant safe.
- (C) Pedals collect sunlight.
- (D) Pedals block sunlight.

5 Besides animals, what else can help pollinate a plant?

- (A) wind
- (B) sunlight
- (C) trees
- (D) fire

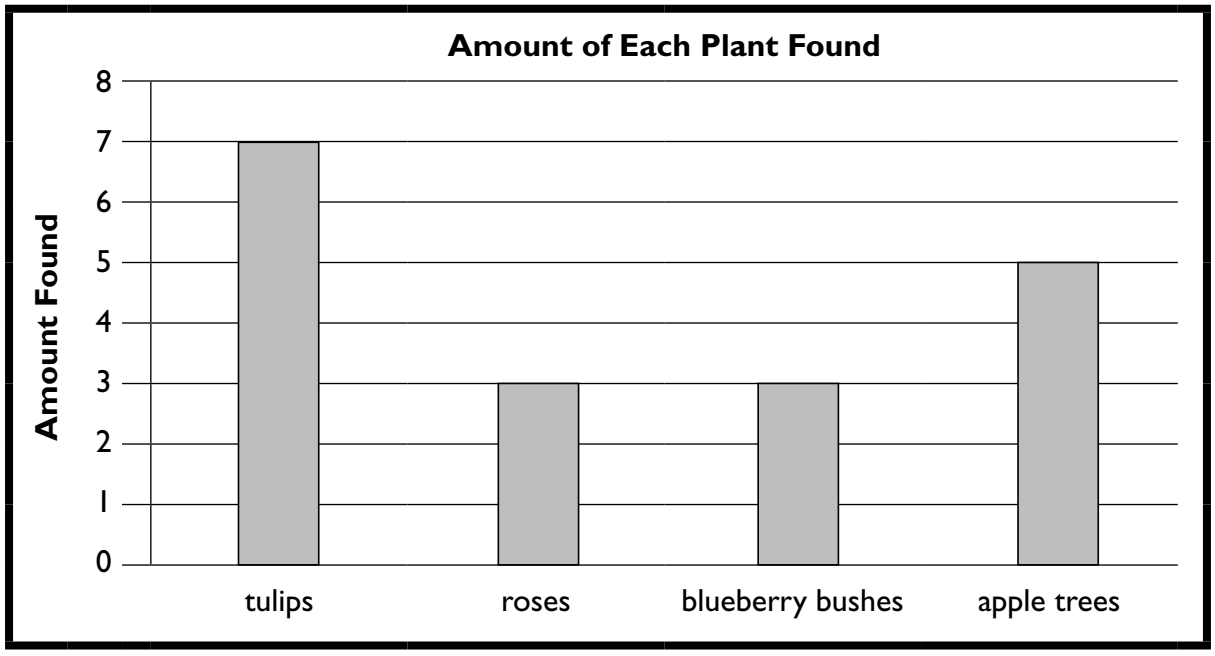
6 Two animals that pollinate plants more than others are _____ and _____.

- (A) dogs and bees
- (B) bees and butterflies
- (C) butterflies and cats
- (D) birds and moths

Name: _____ **Date:** _____

In Bloom STEM

Directions: Kenley went on a nature hike. She made a graph to show plants she saw. Use her graph below to answer the questions.



1. What plant did Kenley see the most?

_____

2. How many more apple trees did Kenley see than roses? How do you know?

_____

_____

3. How many plants did Kenley see altogether? How do you know?

_____

_____

Pollination

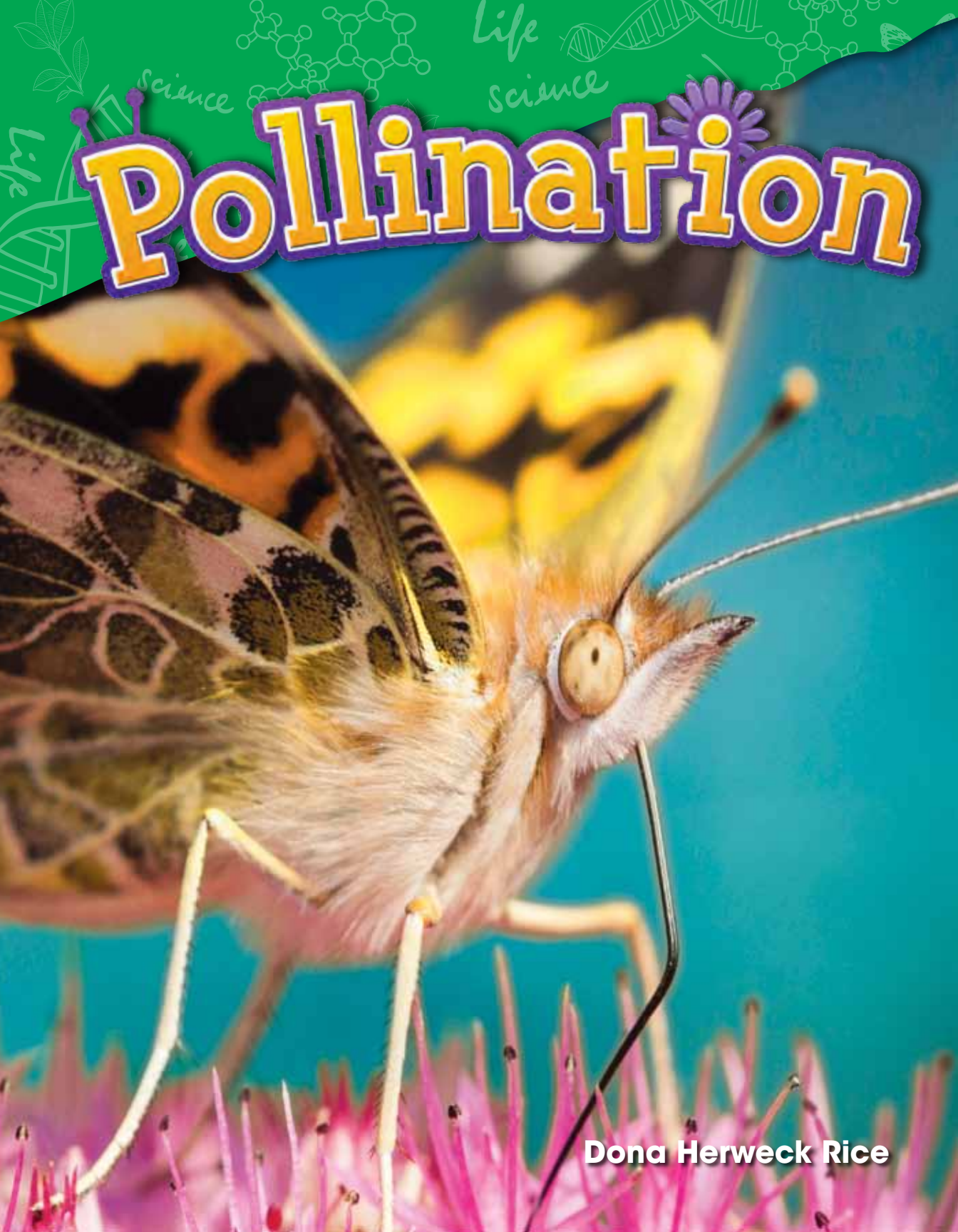


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Table of Contents

Teamwork

Muscle and bone. Fish and water. Milk and cookies. Some of the best things in life **depend** on each other.

Well, milk and cookies may not depend on each other. But most plants and a lot of insects do! They need each other to **survive**.

New plants don't just decide to grow one day. They need help to get things started. That is where insects come in. Wind and water help, too. They make it possible for most plants to grow new plants.

Insects seek pollen in flowers. Some, like the Venus flytrap, trick the bugs and eat them!

A Big Job!

More than 90 percent of all plants need a **pollinator**.

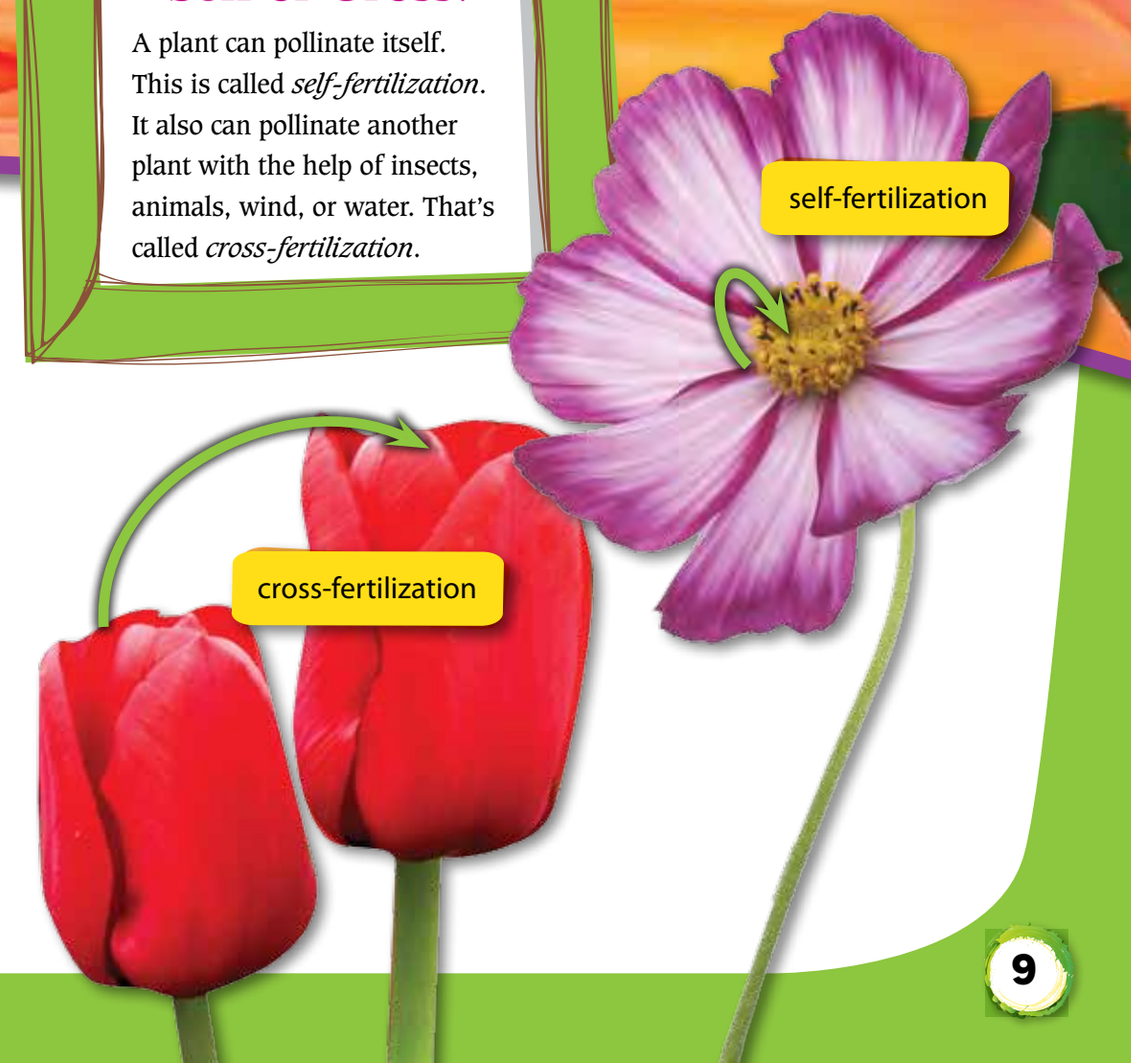
Pollination

Insects, wind, and water help plants. They do this through pollination. That is how they carry **pollen** from plant to plant. This starts the process that allows new plants to grow.

Each beehive has a queen bee. She is the mother of all the other bees.

Self or Cross?

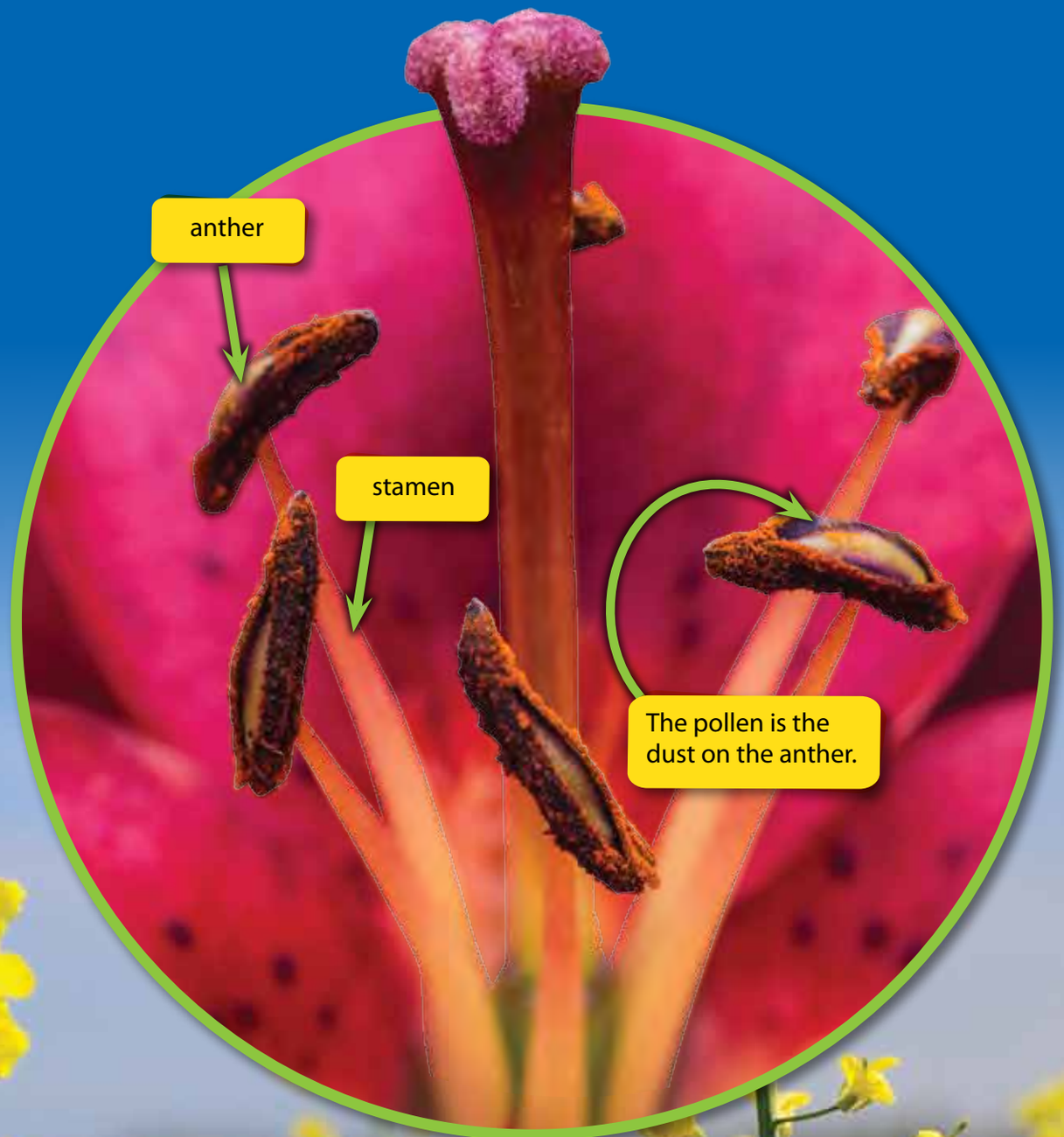
A plant can pollinate itself. This is called *self-fertilization*. It also can pollinate another plant with the help of insects, animals, wind, or water. That's called *cross-fertilization*.



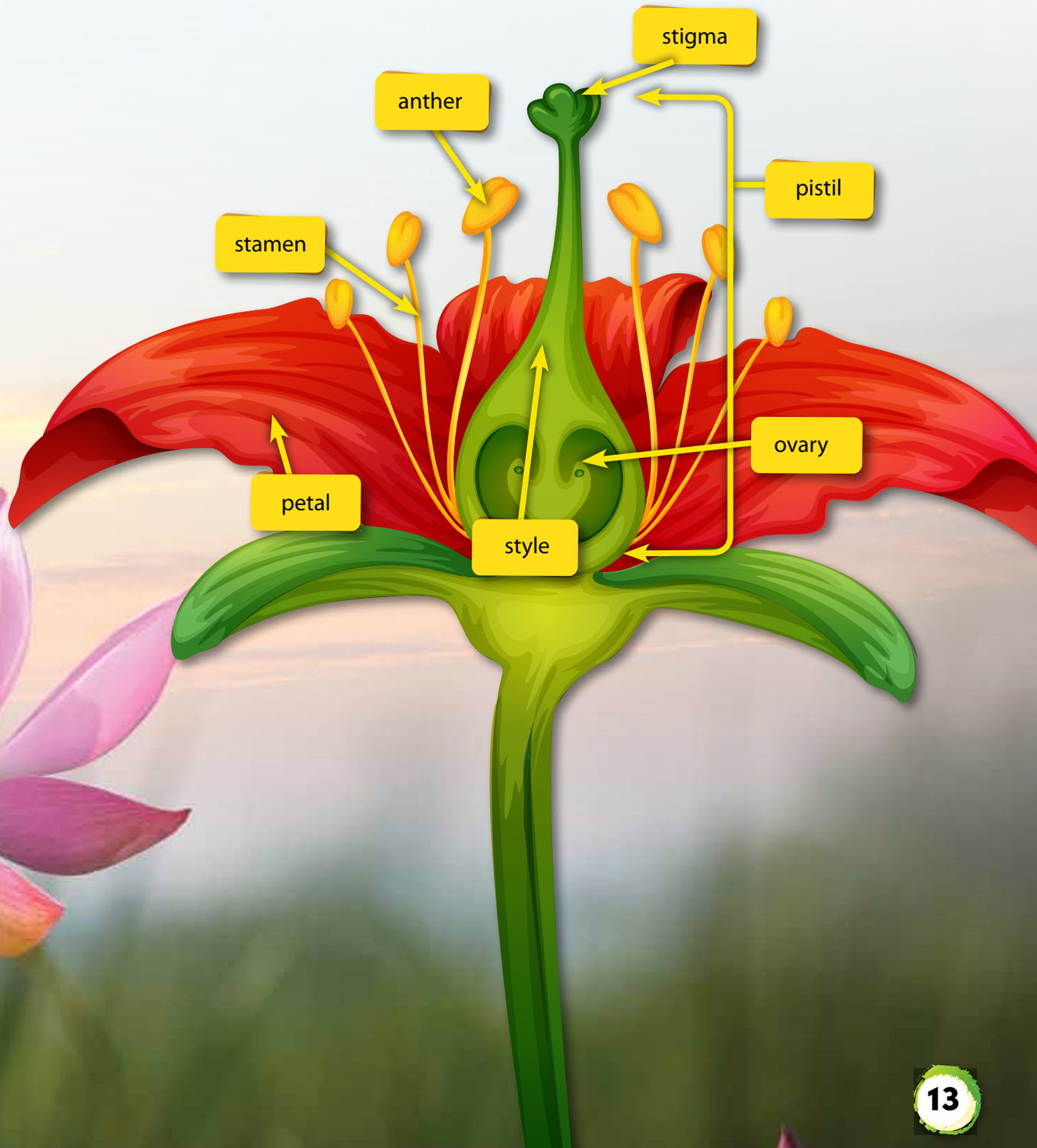
Pollen is a dust. It is found at the end of a flower's **stamens**. Stamens are long and thin. They make the pollen. On the end of each stamen is an **anther**. The anther holds the pollen.

Achoo!

Some people are allergic to pollen. When there is a lot of flower pollen, they may sneeze and sneeze and sneeze!



To make a new plant, the pollen must reach the **pistil**. The pistil is the female part of the plant. The **stigma** is at the top of the pistil. The tube below it is the **style**. The **ovary** is at the base of the pistil. This is where seeds are made.



In many flowers, petals protect the pistil. They surround it. They keep it safe.

The stigma is sticky. Pollen can easily stick to it. Then, it goes down the style. It reaches the ovary.

Pistils may look different, but they all have the same purpose.

Cotton has tiny hairs instead of flowers. These hairs make the fabric we use for clothing.

One Plant or Two?

Some plants, such as corn, have separate male and female parts on the same plant. Other plants, such as willow trees, have male and female parts on different plants.

stamen on a willow tree

Help Is on the Way

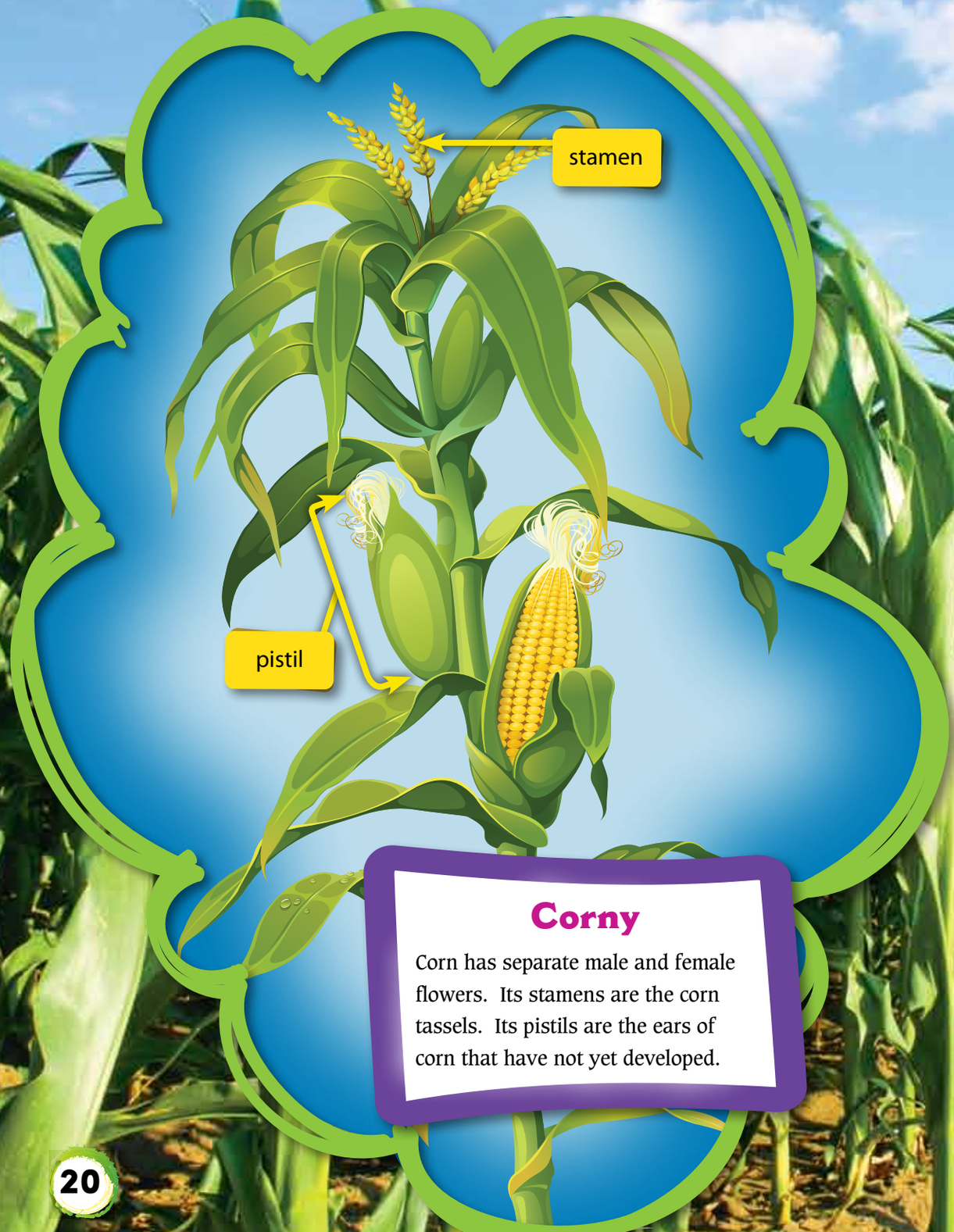
Plants do not get up and move on their own. They have no way to move their pollen to make new plants. They need help. Insects, wind, and water give them the help they need.

Pollen sticks to insects when they feed on flowers. They carry the pollen on them as they fly. Some of that pollen falls off. Or it can be caught by the wind or rain. Either way, the pollen's journey begins!

Pollen sticks to a bee's body.

Pollen Grains

If you look at pollen through a microscope, this is what you will see. You can tell by its spiky shape that a pollen grain can stick to things easily.



Corny

Corn has separate male and female flowers. Its stamens are the corn tassels. Its pistils are the ears of corn that have not yet developed.

Fertilize

In a plant, the male cell fertilizes the female cell. Pollen is the male cell. The female cell is the ovary. They make seeds together.

Pollinators

The helpers that carry the pollen are pollinators. Their job is important! Without them, there would be no new plants.

Bats, moths, and birds are also good pollinators.

Wind and water help a lot, too. But two types of living things are the biggest heroes. They are bees and butterflies.

Good for Them, Too!

By helping plants, bees and butterflies also help themselves. They feed from the flowers. They need new plants to keep growing!

Bees

Bees are some of the best pollinators! They have hairy bodies that trap pollen. They usually visit the same kind of flower. This keeps the pollen where it is needed. Their small size and short legs help bees get inside flowers, too.

Butterflies have taste buds on their feet. They also have a long tubelike tongue they use like a straw to suck up liquid.

Butterflies

Butterflies trap pollen on their bodies, too. They walk around on groups of flowers. This helps spread pollen.

Nature's Puzzle

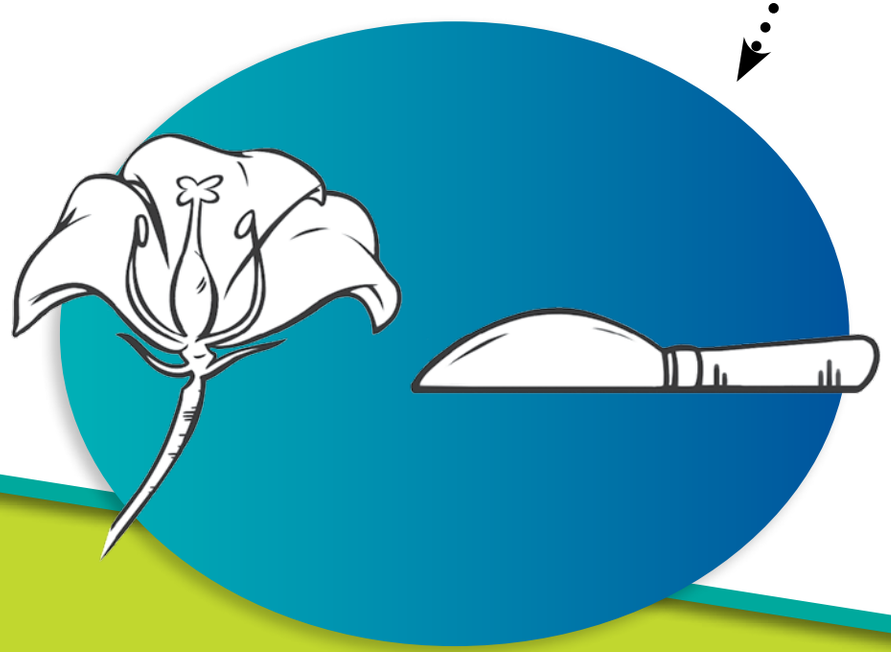
Nature is like a puzzle. Each part of nature connects to make an amazing whole. Pollination is like that. Plants, insects, wind, and water are parts of the puzzle. And nature needs every piece!

Let's Do Science!

What is inside a flower? See for yourself!

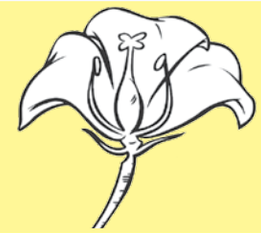
What to Get

- ❍ butter knife
- ❍ flower with stamens and pistil

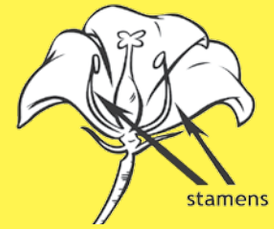


What to Do

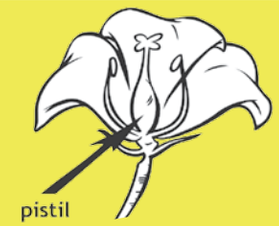
1. Look at the flower. See how it is shaped. See all its parts.



2. Have an adult help you find the stamens. Touch and study them. What do you notice?

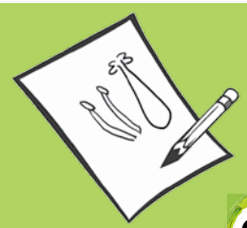


3. Have an adult help you find the pistil. Touch and study it. What do you notice?



4. Carefully remove the pistil. Cut it open with an adult. What do you see?

5. Draw pictures of the parts of the flower. What do you think each part does?



Glossary

anther—the part of a flower that holds the pollen

depend—to count on or need

ovary—the part of a plant where seeds are made

pistil—the female part of a flower

pollen—dust made by plants and carried to other plants, usually by wind or insects, so that plants can produce seeds

pollinator—something that carries pollen from plant to plant

stamens—parts of a flower that make pollen

stigma—the top part in the center of a flower that receives the pollen

style—the long, thin center part of the pistil

survive—to remain alive

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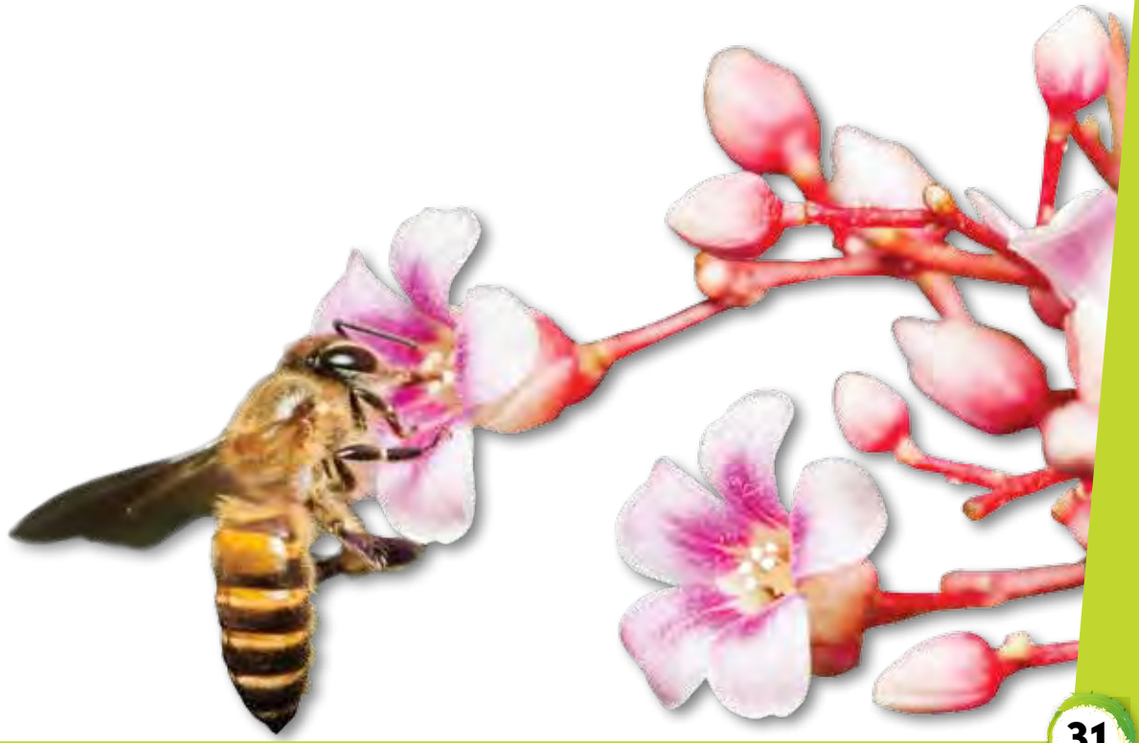

Your Turn!

Create a Pollinator

Take a look at the world around you to find signs of pollinators. Then, use craft items or things from nature to make a model of a pollinator. What does the pollinator do to carry pollen? How can you show that?