

# Organisms and Their Habitats



## Teacher Guide



habitats



seasonal habitat change



planned habitat





# Organisms and Their Habitats

Teacher Guide



Core Knowledge®

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## **Organisms and Their Habitats**

### **Teacher Guide**

Core Knowledge Science™ 2

# Introduction

### ABOUT THIS UNIT

#### The Big Idea

This unit focuses on the interdependent relationships between plants and animals in ecosystems.

Plants and animals depend on their surroundings to survive. The habitat plants and animals live in is primary when it comes to meeting their various needs. For example, butterflies (and other pollinators) need flowering plants, and flowering plants also need butterflies (as well as other pollinators and seed or fruit spreaders). All plants, including those that support butterflies, also need light and water too. By using prior knowledge, observations, and hands-on experiences, students will apply what they have learned to meet the needs of butterflies in a sustainable habitat and determine what it takes to make a natural butterfly habitat.

In this unit, students will plan a butterfly meadow that will come back and spread year after year. They will investigate the dependence of plants on air, water, minerals, and light for growth and on the dependence of animals to pollinate flowers and disperse seeds. Students will also observe the diversity of life in different habitats. They will further examine the interdependence of relationships in ecosystems in Grade 3 Unit 3 *Habitats and Change* and in Grade 4 Unit 2 *Energy and Matter in Ecosystems*.

Students explore concepts that include the following:

- Plants depend on air, water, nutrients, and light to grow.
- Plants depend on animals for pollination or to move their seeds around.
- There are many different kinds of living things in any area and they exist in different places on land and in water.
- Designs can be communicated through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

Engineers and engineering designers use knowledge of the properties of matter as they use materials in design solutions and make things that are useful to people. This series of lessons incorporates learning goals that support the principles and practices of engineering design, such as defining problems, testing materials, and evaluating possible solutions.



## Note to Teachers and Curriculum Planners

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This unit introduces Grade 2 students to the interdependence between plants and animals in ecosystems. Students will plan and conduct an investigation to determine if plants need air, sunlight, and water to grow. They will develop a model that mimics the function of an animal dispersing seeds or pollinating plants and make observations of plants and animals to compare diversity of life in different habitats. The following are preliminary considerations for planning and instruction relative to this unit:

- While Grade 2 students will be investigating two different variables of sunlight and water, they will only test one variable at a time. Students are also not expected to identify specific plant and animal names in specific habitats.

Students will investigate interdependence of relationships in ecosystems in Grade 5.

## Note to Core Knowledge Teachers

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Thanks to ongoing research in the field, our understanding of how children learn continues to evolve. In the subject area of science, students benefit from not just reading about concepts and ideas, but from hands-on experiences. Following the release of the Next Generation Science Standards (NGSS), the Core Knowledge Foundation used this opportunity to update and enhance the science portion of the *Core Knowledge Sequence*.

While there have been some shifts in the grade levels at which certain topics are recommended, the fundamental principles of pedagogy inherent to the Core Knowledge approach, such as the importance of building a sequential, coherent and cumulative knowledge base, have been retained.

### Online Resources



To learn more about the changes and to access resources for this unit, please use the links found in the Online Resources Guide.

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

This science unit embodies Core Knowledge's vision of best practices in science instruction and knowledge-based schooling, such as the following:

- building students' knowledge of core ideas in life, physical, and earth sciences, as well as engineering design
- developing scientific practices that give students firsthand experience in scientific inquiry, engineering, and technology
- connecting scientific learning to concepts across various disciplines, such as mathematics and literacy

## What are the relevant NGSS Performance Expectations for this unit?\*

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This unit, *Organisms and Their Habitats*, has been informed by the following Grade 2 Performance Expectations for the NGSS topic *Interdependent Relationships in Ecosystems*. Students who demonstrate understanding can do the following:

**2-LS2-1** Plan and conduct an investigation to determine if plants need sunlight and water to grow.

**2-LS2-2** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

**2-LS4-1** Make observations of plants and animals to compare the diversity of life in different habitats.

### Online Resources



For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit.

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

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### Sources:

NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.

National Research Council. 2012. *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Committee on a Conceptual Framework for New K–12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

### What Students Should Already Know

The concept of progressions, articulated in the National Research Council's *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*, is very much aligned to the Core Knowledge principle of building new knowledge on prior knowledge. According to the NRC, students build “progressively more sophisticated explanations of natural phenomena” over the course of many years of schooling. “Because learning progressions extend over multiple years, they can prompt educators to consider how topics are presented at each grade level so that they build on prior understanding and can support increasingly sophisticated learning.” In schools following NGSS recommendations, teachers can build on the “prior understandings” captured in the following summaries of NGSS Disciplinary Core Ideas:

#### ETS1.A: Defining and Delimiting Engineering Problems

- A situation that people want to change or create can be approached as a problem to be solved through engineering.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- Before beginning to design a solution, it is important to clearly understand the problem.

#### ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

#### ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

### What Students Need to Learn

For this unit, the Core Knowledge Science Sequence specifies the following content and skills. Specific learning objectives are provided in each lesson segment throughout the unit. NGSS References, including Performance Expectations, Disciplinary Core Ideas, and Crosscutting Concepts, are included at the start of each lesson segment as appropriate.



## Lesson 1. Plant Diversity and Varied Habitats

SEGMENTS 1–4

- Classify plants.
- Observe and record data about habitats and the plants that live in them.
- Describe different habitats.
- Describe plants that live in different habitats.
- Compare and contrast plants from a variety of habitats.

## Lesson 2. Plant Needs

SEGMENTS 1–5

- Identify how to plan an investigation about plants' needs.
- Describe how to test if plants need water and sunlight to grow.
- Observe, collect, and record data about plants' needs for sunlight and water.
- Gather information about plants' needs.
- Draw conclusions from evidence about plants' needs for sunlight and water.

## Lesson 3. Animal Diversity and Varied Habitats

SEGMENTS 1–4

- Classify animals.
- Observe and record data about habitats and the animals that live in them.
- Describe different habitats.
- Describe animals that live in different habitats.
- Compare and contrast animals from a variety of habitats.

## Lesson 4. Plant and Animal Relationships

SEGMENTS 1–3

- Describe ways that plants and animals depend on each other.
- Model ways that animals help propagate plants by spreading seeds and pollen.

## What Teachers Need to Know

Supportive information on the content standards and the science they address is provided throughout the lessons at points of relevance:

**Know the Standards:** These sections, found later in this Teacher Guide, explain what to teach and why, with reference to NGSS and Core Knowledge expectations, as well as connections to relevant math and reading language arts standards.

**Know the Science:** These sections provide supporting, adult-level, background information or explanations related to specific science concepts, examples, or Disciplinary Core Ideas.

## USING THE STUDENT BOOK

### Student Book



The *Organisms and Their Habitats* Student Book includes eight chapters, intended to be read aloud by the teacher as the students look at images on each page.

As you will note when you examine the Student Book, minimal text is included on each page. Instead, colorful photos and engaging illustrations dominate the Student Book pages. The design of the Student Book in this way is intentional because students in Kindergarten through Grade 2 are just learning to read. At these grade levels, students are learning how to decode written words, so the complexity and amount of text that these young students can actually read is quite limited.

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

The intent of the Grades K–2 CKSci lessons is to build students’ understanding and knowledge of science concepts, as well as of associated practices and skills. It is for this very reason that in Grades K–2 CKSci, the core content of each lesson is reinforced to students using a teacher Read Aloud, accompanied by example images and diagrams. Cognitive science research has clearly documented the fact that students’ listening comprehension far surpasses their reading comprehension well into the late elementary and early middle school grades. Said another way, students are able to understand and grasp far more complex ideas and text that they hear read aloud than they would ever be able to read or comprehend when they read to themselves. For a more thorough discussion of listening and reading comprehension and the underlying cognitive science research, teachers may want to refer to Appendix A of the Common Core State Standards for English Language Arts, noting in particular the Speaking and Listening section of the appendix.

Use this link to download the CKSci Online Resources for this unit, where the specific link to this appendix can be found:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## USING THE TEACHER GUIDE

### Pacing

To meet NGSS Performance Expectations we encourage teachers to complete all Grade 2 CKSci units during the school year. To be sure all NGSS standards and dimensions are addressed, each Core Lesson segment should be completed. Each lesson segment requires thirty to forty-five minutes of instruction time. The time it takes to complete a full lesson depends on class size and individual circumstances.

Within the Teacher Guide, each Core Lesson is composed of multiple numbered segments, generally four to six. Each segment concludes with a Check for Understanding, providing the teacher with an opportunity for formative assessment.

At the end of this unit Introduction, you will find a blank Pacing Guide on pages 15–16, which you may use to plan how you might pace the lessons. We strongly recommend that you preview the unit in full before beginning and create your pacing guide before teaching the first lesson segment. As a general rule, we recommend that you spend a minimum of nineteen days and a maximum of twenty-eight days teaching the *Organisms and Their Habitats* unit so that you have time to teach the other units in the Grade 2 CKSci series.

## The Core Lessons

- Lesson time: Most Core Lesson segments constitute one classroom session of thirty to forty-five minutes. However, some segments cover two or three days of instruction, and some single-day activities and performance tasks will require setting aside a longer block of time.
- Lesson order: The lesson segments are coherently sequenced to build from one to the next, linking student engagement across lessons and helping students build new learning on prior knowledge.

<b>Unit Opener:</b> <b>Introduction to the Unit Phenomenon and Problem</b>	<b>Unit Opener:</b> Organisms and Their Habitats	<b>Big Question:</b> What must be done to make a natural butterfly habitat?
<b>Lesson 1: Plant Diversity and Varied Habitats</b> (2-LS4-1)	<b>1.1</b> Types of Plants Around Me	<b>Lesson 1 Guiding Question:</b> How much variety is there among plants?
	<b>1.2</b> Plants in Different Places	<b>1.1</b> What plants can I see around where I live and go to school?
	<b>1.3</b> Plant Habitats	<b>1.2</b> How can I describe the habitat of plants that live in the area where I live?
	<b>1.4 Lesson 1 Roundup:</b> Plants and Butterflies	<b>1.3</b> What are some different types of plants and the places in which they live?
		<b>1.4</b> How much variety is there among plants?
<b>Lesson 2: Plant Needs</b> (2-LS2-1)	<b>2.1</b> Finding Out What Plants Need	<b>Lesson 2 Guiding Question:</b> Do plants need water and sunlight to grow?
		<b>2.1</b> How can we investigate what plants need?
	<b>2.2</b> Testing What Plants Need	<b>2.2</b> How can we test if plants need sunlight and water to grow?
	<b>2.3</b> Collecting Data About What Plants Need	<b>2.3</b> How do plants respond to different amounts of light and water?
	<b>2.4</b> What Plants Need	<b>2.4</b> What do plants need?
	<b>2.5 Lesson 2 Roundup:</b> Plants and Sunlight and Water	<b>2.5</b> Do plants need water and sunlight to grow?



<b>Lesson 3: Animal Diversity and Varied Habitats</b> (2-LS4-1)	<b>3.1</b> Types of Animals Around Me	<b>Lesson 3 Guiding Question:</b> How much variety is there among animals?
	<b>3.2</b> Animals in a Habitat	<b>3.1</b> What animals can I see around where I live and go to school?
	<b>3.3</b> Animal Habitats	<b>3.2</b> How can I describe the habitat of animals that live in the area where I live?
	<b>3.4 Lesson 3 Roundup:</b> Butterflies and Other Animals	<b>3.3</b> What are some different types of places where animals live?
<b>Lesson 4: Plant and Animal Relationships</b> (2-LS2-2)	<b>4.1</b> Plants Need Animals	<b>3.4</b> How much variety is there among animals?
		<b>Lesson 4 Guiding Question:</b> How can we model an animal spreading pollen or seeds?
	<b>4.2</b> Animals Need Plants	<b>4.1</b> How do animals help plants by spreading pollen and seeds?
	<b>4.3 Lesson 4 Roundup:</b> Plants and Animals Depend on Each Other	<b>4.2</b> How do animals depend on plants?
<b>Unit Capstone</b>	<b>Unit Capstone:</b> Plant and Animal Relationships	<b>4.3</b> How can we model an animal spreading pollen or seeds?
<b>Unit Supplement</b>	Science in Action (two class sessions)	<b>Big Question:</b> What does it take to make a natural butterfly habitat?
		Who are some people who work in this type of science, and what do they do?

## Activity Pages

### Activity Pages



AP UO.1  
AP 1.1.1  
AP 1.2.1  
AP 1.3.1  
AP 1.4.1

Black-line reproducible masters for Activity Pages, as well as an Answer Key, are included in Teacher Resources on pages 152–170. The icon shown to the left appears throughout the Teacher Guide wherever Activity Pages (AP) are referenced. The Activity Pages can be organized into a learning portfolio for each student to demonstrate their progress relative to NGSS expectations and as student work products.

Make sufficient copies for your students in advance of each lesson segment.

Unit Opener—What Do Butterflies Need to Live? (AP UO.1)

Lesson 1—Plants Around Me (AP 1.1.1)

Lesson 1—Plants in My Habitat (AP 1.2.1)

Lesson 1—Plant Changes (AP 1.3.1)

Lesson 1—Butterfly Habitat (AP 1.4.1)

## Activity Pages



AP 2.1.1

AP 2.1.2

AP 2.4.1

AP 3.1.1

AP 3.2.1

AP 3.3.1

AP 4.1.1

AP 4.2.1

AP 4.3.1

AP UC.1

Lesson 2—Testing What Plants Need (Light Test) (AP 2.1.1)

Lesson 2—Testing What Plants Need (Water Test) (AP 2.1.2)

Lesson 2—Plant Needs (AP 2.4.1)

Lesson 3—Animals Around Me (AP 3.1.1)

Lesson 3—Animals in My Habitat (AP 3.2.1)

Lesson 3—Animal Changes (AP 3.3.1)

Lesson 4—Seed Search (AP 4.1.1)

Lesson 4—Plants Pollinators Like (AP 4.2.1)

Lesson 4—Modeling Animals and Plants (AP 4.3.1)

Unit Capstone—Butterfly Habitat Checklist (AP UC.1)

## Online Resources for Science

### Online Resources



For each CKSci unit, the Teacher Guide includes references to online resources (including external websites and downloadable documents) to enhance classroom instruction. Look for the icon on the left.

Use this link to download the CKSci Online Resources for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

The Online Resources Guide also links to lists of additional recommended children's books that support the content of this unit.

## Teaching Strategies

### Start with the familiar.

Lead with an experience. Begin each lesson with a demonstration, activity, or question about a phenomenon to engage students and focus their attention on the topic. Start with the familiar. Every science topic introduced to students relates in some way to their known world and everyday experiences. The purpose of every lesson is to build a bridge between what is familiar to students and broader knowledge about the way the world works.

### Ask driving questions.

The unit is governed by a Big Question, related to the unifying phenomenon. Each multi-part lesson is built around a lesson Guiding Question. And then at the beginning of each Teacher Guide lesson segment, you will find a driving question and Core Lesson segment devoted to encouraging students to think about this question as they are introduced to new science content. Use this opportunity to engage students in conversation, to think about how their own real-world experiences relate to the topic, or to participate in a demonstration that relates to the driving question.

<b>Encourage scientific thinking.</b>	<p>Approach the lessons with students not as learning about science but as learning about the world with a scientific mind. Science learning models science practice.</p> <p>Throughout the lessons, encourage students to ask questions about what they observe, do, and read. Record relevant questions in a prominent place in the classroom. Guide students back to these questions as opportunities to answer them emerge from readings, demonstrations, and activities.</p>
<b>Use continuous Core Vocabulary instruction.</b>	<p>During instruction, emphasize Core Vocabulary terms and their meanings in context rather than relying on isolated drill for memorization of definitions. Through scaffolded questioning, encourage students to come up with definitions in their own words and to use the words in their own sentences.</p> <p>Core Vocabulary words for each lesson, as well as Language of Instruction, other key terms teachers are encouraged to use in discussing topics with students, are provided at the start of each lesson. You can find Core Vocabulary and Language of Instruction definitions in the Glossary on pages 171–172.</p>
<b>Emphasize observation and experience.</b>	<p>Lessons employ various ways for students to learn, including watching, listening, reading, doing, discussing, and writing. To meet the NGSS Performance Expectations, which are multidimensional standards, students must not only gain factual knowledge associated with Disciplinary Core Ideas, but also use the content knowledge they acquire.</p>
<b>Use science practices.</b>	<p>Give students opportunities to discover new content knowledge through investigation and to use their new knowledge both in problem-solving exercises and as evidence to support reasoning. Students learn what science and engineering practices are by engaging in those same practices as they learn.</p> <p>Give students opportunities to discover new content knowledge through investigation and to use their new knowledge both in problem-solving exercises and as evidence to support reasoning. Students learn what science and engineering practices are by engaging in those same practices as they learn.</p>
<b>Make frequent connections.</b>	<p>Use a combination of demonstrations and reading materials, rich with examples, to help students recognize how the science concepts they are learning apply in their everyday lives. Prompt students to relate lesson content to their own experiences, to relate the new and unfamiliar to the familiar, and to connect ideas and examples across disciplines. Refer to the Crosscutting Concepts cited in the lessons, often included in the NGSS References listed at the start of each lesson.</p>
<b>Monitor student progress.</b>	<p>Use verbal questioning, student work, and the Check for Understanding assessments at the end of each lesson to monitor progress during each lesson and to measure understanding at the conclusion of the unit. Many lessons provide tips to help you support students who need further explanations or clarifications.</p>



## Instructional Design

The unit is composed with several integrated features that support three-dimensional learning for all students and development for teachers. Within each lesson, notations appear in the column to the left to indicate certain features in the instructional support.

<b>Differentiation</b>	<p>Adjustments to instruction appear in the text, indicated by <b>SUPPORT</b>, <b>EXTEND</b>, and <b>CHALLENGE</b> notations.</p> <p><b>SUPPORT</b>—Reading, writing, listening, and/or speaking alternatives appear for students who are English language learners, have special needs, or read below the grade level. Extra support is suggested for students who struggle to meet targeted expectations.</p> <p><b>EXTEND</b>—Extensions are suggested for students with high interest or who have already met the performance expectations.</p> <p><b>CHALLENGE</b>—Additional, relevant, and interesting exercises are suggested for students to explore that exercise math, reading, or science skill/comprehension that pushes beyond the grade level.</p>
<b>Teacher Development</b>	Information in the instructional text, Know the Science boxes, and Know the Standards boxes is provided to support ongoing teacher development with regard to both content and the teaching process.
<b>Monitor Progress</b>	Opportunities for formative assessment appear throughout the instructional support. These instances are most consistently noted in a Check for Understanding that concludes each lesson segment.
<b>Math Connection</b>	Connections to math standards are highlighted in the instructional text and in Know the Standards boxes. Where alphanumeric identification codes are shown, they reference connections to the Common Core State Standards.
<b>Language Arts Connection</b>	Connections to reading and language arts standards are highlighted in the instructional text and in Know the Standards boxes. Where alphanumeric identification codes are shown, they reference connections to the Common Core State Standards.
<b>Building Progressions</b>	Prior expected student learning, and how the prior learning will be built upon, is explained throughout the instructional support and in Know the Standards boxes.



DCI  
SEP  
CCC  
PE

Opportunities for students to develop and use specific elements of NGSS Disciplinary Core Ideas (DCI), Science and Engineering Practices (SEP), and Crosscutting Concepts (CCC) are highlighted throughout the instructional support text.

For detailed information about the NGSS references, follow the links in the Online Resources Guide for this unit. Use the following link to download any of the CKSci Online Resources Guides:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

**Icon Key:**

**DCI LS2.A** Interdependent relationships in ecosystems

**DCI LS4.D** Biodiversity and humans

**DCI ETS1.B** Developing possible solutions

**SEP 1** Asking questions (for science) and defining problems (for engineering)

**SEP 2** Developing and using models

**SEP 3** Planning and carrying out investigations

**SEP 4** Analyzing and interpreting data

**SEP 5** Using mathematics and computational thinking

**SEP 6** Constructing explanations (for science) and designing solutions  
(for engineering)

**SEP 7** Engaging in argument from evidence

**SEP 8** Obtaining, evaluating, and communicating information

**CCC 1** Patterns

**CCC 2** Cause and effect

**CCC 3** Scale, proportion, and quantity

**CCC 4** Systems and system models

**CCC 5** Energy and matter: flows, cycles, and conservation

**CCC 6** Structure and function

**CCC 7** Stability and change

---

**3D Learning**

Student performance in a given task, related to making sense of a phenomenon or designing a solution, requires integrated elements of the SEPs, CCCs, and DCIs. At certain points of instruction, the Teacher Guide identifies when all three dimensions are integrated for student learning and as support for the teacher.

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## Effective and Safe Classroom Activities

**Online Resources**

Conducting safe classroom demonstrations and activities is essential to successful elementary science education. The following resources provide Core Knowledge's recommendations for developing effective science classroom activities.

These resources, included at the back of the Teacher Guide on pages 173–177, consist of the following:

- Classroom Safety for Activities and Demonstrations
- Strategies for Acquiring Materials

- Advance Preparation for Activities and Demonstrations
- What to Do When Activities Don't Give Expected Results

These resources may also be accessed within the CKSci Online Resources Guide for this unit, available at

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## MATERIALS AND EQUIPMENT

The unit, like all hands-on science, requires a large variety of materials to support various ways of learning (including doing, discussing, listening, watching, reading, and writing). Prepare in advance by collecting the materials and equipment needed for all the demonstrations and hands-on investigations.

- Roll paper, poster board, or a bulletin board should be dedicated at the beginning of the unit to serve as a question board to cumulatively document and return to student questions. The question board is referred to in the materials for lesson segments in which it is used, but not repeated in the materials listed here.
- Internet access and the means to project images/videos for whole-class viewing is also required in many lesson segments but not repeated below.

### Lesson 1 Plant Diversity and Varied Habitats

#### Lesson 1.1

- hand lenses (1 per student or pair)

#### Lesson 1.2

- scissors (1 pair per student)
- colored pencils, crayons, or markers (1 set per student)
- pins or adhesive for temporary placement on wall or bulletin board

#### Lesson 1.4

- colored pencils, crayons, or markers (1 set per student)
- world map

### Lesson 2 Plant Needs

#### Lesson 2.1

- hand lenses (1 per student or pair)
- measuring tapes or rulers (1 per student or pair)
- small sticky notes (4 per student or group)
- markers (1 per student or pair)

#### Lesson 2.1, continued

- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group)

#### Lesson 2.2

- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group)

#### Lesson 2.3

- water source or water container such as cups, watering can, or pitcher
- access to dark closet or ability to deprive plants of sunlight
- access to sunny location where plants can be placed
- measuring cups (1 per student or group)
- tape measures or rulers (1 per student or group)
- single-stalk flowering plants, such as a zinnia or marigold, or bush green beans, in individual pots (4 per student or group)

## Lesson 2.5

- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group)

## Lesson 3 Animal Diversity and Varied Habitats

### Lesson 3.1

- hand lenses (1 per student or pair)
- digital device to take pictures

### Lesson 3.2

- printer to print pictures
- scissors (1 pair per student)
- colored pencils, crayons, or markers (1 set per student)
- pins or adhesive for temporary placement on wall or bulletin board

### Lesson 3.3

- globe or world map

### Lesson 3.4

- colored pencils, crayons, or markers (1 set per student)

## Lesson 4 Plant and Animal Relationships

### Lesson 4.1

- hand lenses (1 per student or pair)

### Lesson 4.3

- materials to pollinate or move seeds (Seed materials can be cotton balls, confetti, glitter, packing peanuts, or similar. Moving materials can be hook-and-loop material, carpet pieces, felt, fake fur, tape, craft sticks, straws, or similar.)
- scissors (1 pair per student)

## Unit Supplement

- magnifying glass/hand lens (1 per group)
- clipboard (1 per group)
- drawing paper (1 sheet per student)
- pencil (1 per student)

## Advance Preparation

For Lesson 2.2, students will need single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group of students). These must be planted from seed at least two weeks before the experiment (or plant starts that are already started can be purchased from a supplier).



## ORGANISMS AND THEIR HABITATS PACING

\_\_\_\_\_’s Class

**Note to Teacher:** *Organisms and Their Habitats* is intended to be taught as the second unit of Grade 2 CKSci. As a general rule, we recommend that you spend a minimum of nineteen days and a maximum of twenty-eight days teaching the *Organisms and Their Habitats* unit so that you have time to teach the other units in the Grade 2 CKSci series.

### Week 1

Day 1	Day 2	Day 3	Day 4	Day 5

### Week 2

Day 6	Day 7	Day 8	Day 9	Day 10

### Week 3

Day 11	Day 12	Day 13	Day 14	Day 15

### Week 4

Day 16	Day 17	Day 18	Day 19	Day 20

### Week 5

**Day 21**

**Day 22**

**Day 23**

**Day 24**

**Day 25**

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### Week 6

**Day 26**

**Day 27**

**Day 28**

**Day 29**

**Day 30**

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### Week 7

**Day 31**

**Day 32**

**Day 33**

**Day 34**

**Day 35**

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### Week 8

**Day 36**

**Day 37**

**Day 38**

**Day 39**

**Day 40**

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## UNIT 2

# Organisms and Their Habitats

### OVERVIEW

**Big Question:** What must be done to make a natural butterfly habitat?

**Anchoring Phenomenon:** The nature area around a school, called the land lab, has no butterflies. The driving question we explore in this unit is “What must be done to make a natural butterfly habitat?” To answer this question in depth over the course of the unit, students will explore **different habitats**. In exploring the question, students investigate the diversity of life in several habitats. They recognize that butterflies (and other pollinators) need flowering plants and that flowering plants also need butterflies (as well as other pollinators and seed and fruit spreaders). Students learn that all plants, including those that support butterflies, need light and water to grow.

**Student Book storyline:** Corbin has an idea for Mrs. Carver for Teacher Appreciation Day. Her students know she loves butterflies, so Corbin brings his camera to school so he and his friends can take pictures of butterflies for Mrs. Carver while the class is outside in the school’s nature area. But there are no butterflies to be found! Corbin often sees butterflies at home in his yard. He wonders if he can gently catch a few and bring them to live in the school’s nature area. He enlists his dad’s help. After school, they release some butterflies in the school’s nature area. The next day, Corbin invites his friends to try again to get some pictures. But the butterflies are gone. They did not stay in the nature area. Why did they leave? Why do some living things stay in a certain area while others do not stay there? What could Mrs. Carver’s students do to make butterflies come to the nature area and make a home there?

**Long-term project:** Students will plan a butterfly meadow that will attract butterflies year after year.

### Introductory Class Session Where Are the Butterflies?

Students find out about different types of habitats and the diversity of organisms to design an optimal natural habitat for butterflies. Throughout the unit, they will use prior knowledge, observations, hands-on experiences and understanding to meet the needs of butterflies in a sustainable habitat.

### Unit Opener Objective

- ✓ Identify the needs of living things.

### NGSS References

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this unit, students will ask questions about biodiversity with the goal of making a thriving butterfly habitat. They will look for patterns in habitats that butterflies do and do not inhabit.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

### Language of Instruction

The Language of Instruction consists of terms not considered a part of Core Vocabulary that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

#### evidence

### Instructional Activities

- teacher Read Aloud
- class discussion
- question generation

### Materials and Equipment

- question board
- internet access and the means to project images/video for whole-class viewing

### Instructional Resources

Student Book



Ch. 1

**Student Book, Chapter 1**  
"Where Are the Butterflies?"

Activity Page



AP UO.1

**Activity Page**  
What Do Butterflies Need to Live? (AP UO.1)

## 1. Introduce the Anchoring Phenomenon.

NGSS Elements



SEP 1  
DCI LS4.D

Introduce the unit by writing the Big Question—**What must be done to make a natural butterfly habitat?**—on a large sheet of paper. This establishes a cumulative question board to which students will add and refer to throughout the unit. Then ask students to pantomime how a butterfly behaves for about ten seconds.

- **Ask students to describe their pantomimes.**
  - » Students may have swayed with the wind or moved their arms like butterfly wings.
- **Ask each student to explain what they know about butterflies to activate prior knowledge.**
  - » Students may say butterflies
    - are flying bugs or insects
    - have six legs
    - have many colors
    - are light and not heavy
- Discuss when and where students have seen butterflies.
  - » in the summer or spring; in a garden or a park with flowers
- Make a heading, “What Do Butterflies Need?” on the question board, and record student suggestions.
  - » water, food, warm weather
- Ask students what other questions they have to answer in order to make a natural butterfly habitat, and record these on the question board. (See **Know the Standards.**)
  - » Accept reasonable questions that relate to the concept.
- Tell students that in this unit, they will be exploring different habitats to decide how to make a habitat for butterflies.

## Know the Standards

## TEACHER DEVELOPMENT

**SEP 1 Asking Questions:** In Grade 2, asking questions builds on prior experience and knowledge and progresses to questions that can be tested. Encourage students to ask questions whether or not anyone knows the answer. Explain that the scientific process begins with asking questions and then developing methods to find the answers to learn more about phenomena. Using words such as *who*, *what*, *when*, *where*, *why*, and *how* helps build understanding and scientific practices.



## 2. Read together: “Where Are the Butterflies?”

Student Book



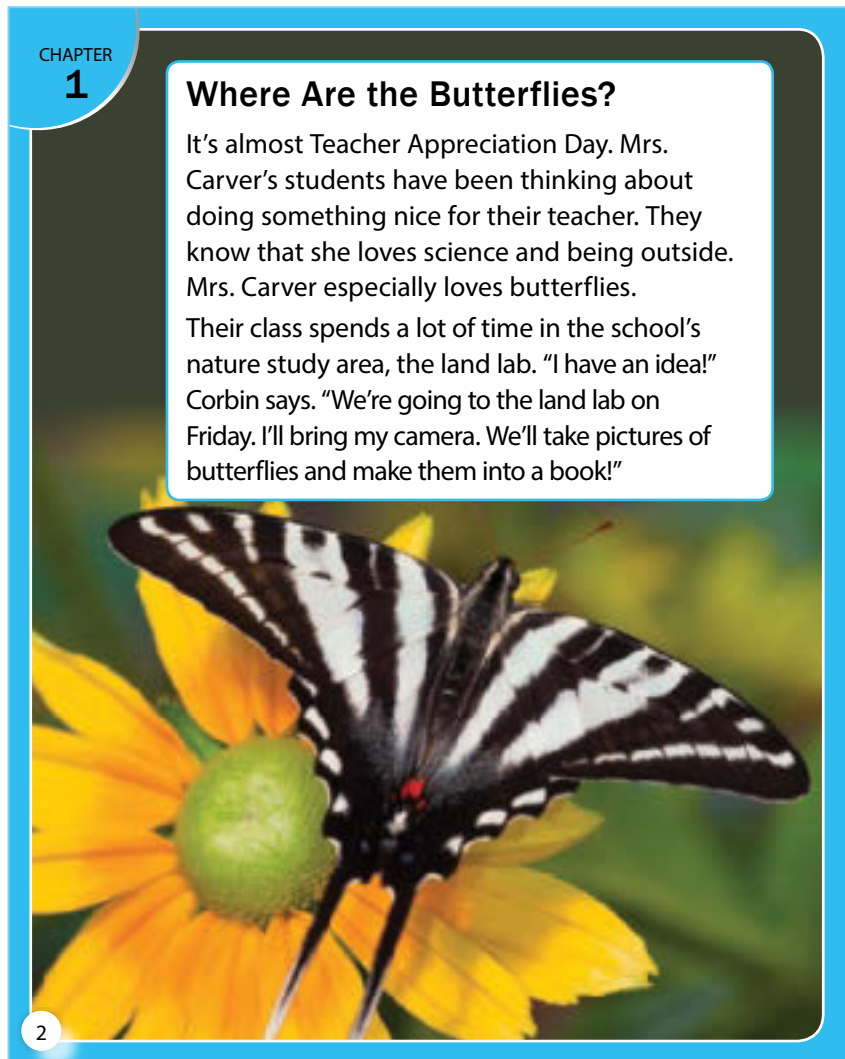
Ch. 1

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

### Read Aloud Support

Page 2

**Ask students to turn to page 2 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “Where Are the Butterflies?” and tell them to pay special attention to what butterflies may need to live.**



**Call attention to the picture.**

Explain that some schools have a Teacher Appreciation Day during which students and parents find ways to let their teachers know how much they are valued. Then ask these questions:

**INFERENTIAL**—Does more than one kind of butterfly live in a habitat? How do you know?

- » yes, because I have seen different types and colors of butterflies before outside

**INFERENTIAL**—Have any of you seen the type of butterfly in the picture? What kinds of butterflies have you seen?

- » Accept reasonable answers.

**EVALUATIVE**—Corbin's class has a land lab. What would you put in a land lab at our school?

- » Accept reasonable answers. Invite students to give reasons for their opinions.

**SUPPORT**—Show a video of an outdoor land lab to provide a common experience. See the Online Resources Guide for a link to a recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

Online Resources



Page 3

**Ask students to look at the pictures on page 3 as you read it aloud.**

On Friday, the class heads to the land lab. Corbin has his camera in his pocket. The students walk through the field and then along the path in the woods. They see birds, squirrels, and rabbits. But no matter where they look, they cannot find any butterflies.

Corbin is confused. The area around his home is full of butterflies! He wonders if he can bring some to the land lab. He'll ask his dad for help.



3

**LITERAL**—What animals did the class see in the land lab?

» birds, squirrels, rabbits

**INFERENTIAL**—Why don't they see any butterflies?

» Accept reasonable answers.

**INFERENTIAL**—Why would Corbin see butterflies at his home and not in the land lab?

» The land lab doesn't have the same things as Corbin has at his home.

## Pages 4–5

**Ask students to look at the pictures on pages 4 and 5 as you read aloud.**

Saturday morning, Corbin and his father gently catch some butterflies in a big net. They place them in a mesh container. Corbin puts some cotton balls soaked with sugar water inside. He knows butterflies like sweet liquids.

Corbin's dad drives them to the school, and they carry the butterfly containers to the land lab. Corbin lets the butterflies out into the field. He plans to bring some friends back on Sunday to take the pictures they need for Mrs. Carver's book.



4

When Corbin returns the next morning with his friends, they look everywhere. The butterflies are gone! Time is running out to make Mrs. Carver's gift. They have only two weeks left!

Corbin and his friends decide that they will go to the local library. They will read as much as they can about butterflies. Then maybe they can solve the mystery of the butterflies disappearing in time for Teacher Appreciation Day.



**LITERAL**—What did Corbin know butterflies like?

- » sweet liquids

**INFERENTIAL**—Why did Corbin put cotton balls soaked with sugar water in the containers?

- » to give the butterflies food and water.

**INFERENTIAL**—Where did the butterflies go?

- » Accept reasonable answers.

**INFERENTIAL**—Why didn't the butterflies make a new home in the land lab?

- » The land lab doesn't have what butterflies need to live.

### 3. Generate questions.

---

Activity Page



AP UO.1

- **Ask students what they need to live.**
  - » food, a place to live, water
- Distribute What Do Butterflies Need to Live? (AP UO.1), and have students complete it. Review their work as a class, and add student responses to the question board list of what butterflies need to survive.
- Ask each student to think of a question they have about what butterflies need. Add these questions to the question board.
  - » What do butterflies eat? Where do butterflies sleep? How much water do butterflies need? How do butterflies stay safe?

### 4. Check for understanding.

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Review the questions recorded so far on the question board. Ask students to summarize what they understand about the needs of butterflies.

#### **Formative Assessment**

Monitor Progress

Review student responses in the discussion and to What Do Butterflies Need to Live? (AP UO.1) to determine student understanding of the following concepts:

- Some habitats can support butterflies, and some cannot.
- Butterflies need water, food, and shelter to survive.

#### **Tie to the Anchoring Phenomenon**

In the next lessons in this unit, students will observe and explore the needs of plants and animals and how living things need each other. Just like Corbin and his friends, students will use this growing understanding to design a butterfly habitat in which butterflies can live and thrive.



# LESSON 1

## Plant Diversity and Varied Habitats

### OVERVIEW

**Guiding Question:** How much variety is there among plants?

Lesson 1 Segments	Segment Questions	Advance Preparation
<b>1.1 Types of Plants Around Me</b> Students observe and collect data about the plants in their environment.	What plants can I see around where I live and go to school?	Gather materials for the activity, and arrange for a natural environment to explore. See Materials and Equipment.
<b>1.2 Plants in Different Places</b> Students collect and sort data to describe what types of plants live in different habitats.	How can I describe the habitat of plants that live in the area where I live?	Gather materials for the activity. See Materials and Equipment.
<b>1.3 Plant Habitats</b> Students read to learn about plant life in different habitats around the world.	What are some different types of plants and the places in which they live?	Read Chapters 2 and 3 in the Student Book.
<b>1.4 Lesson 1 Roundup: Plants and Butterflies</b> Students learn about different types of butterflies, the habitats butterflies live in, and the plants butterflies need to survive.	How much variety is there among plants?	Gather materials for the activity. See Materials and Equipment.

### What's the Story?

**Summary:** In Lesson 1, students explore the diversity of plants around them and in different habitats on Earth.

**Learning Progression:** Lesson 1 builds on student understandings from Grade 1 in which students learned about plant and animal structures and how they survive. In Grade 2, students will explore the diversity of plants and animals and learn why certain organisms can survive in certain habitats and others cannot.

**Guiding Phenomenon:** Focusing on building a natural habitat for one type of organism inspires students to explore different habitats that can and cannot meet the need for survival from one generation to another.

## Learning Objectives

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**By the end of Lesson 1, students will do the following:**

- Classify plants.
- Observe and record data about habitats and the plants that live in them.
- Describe different habitats.
- Describe plants that live in different habitats.
- Compare and contrast plants from a variety of habitats.

## NGSS Standards and Dimensions

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**Performance Expectation:** 2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

<p><b>Science and Engineering Practice</b></p> <p><b>3 Planning and Carrying Out Investigations</b></p> <p>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"><li>• Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)</li></ul>	<p><b>Disciplinary Core Idea</b></p> <p><b>LS4.D Biodiversity and Humans</b></p> <p>There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)</p>
<p><b>Crosscutting Concept</b></p> <p><b>1 Patterns</b></p> <p>Patterns in the natural and human designed world can be observed.</p>	<p><b>Understandings about the Nature of Science</b></p> <p><b>Scientific Knowledge Is Based on Empirical Evidence</b></p> <p>Scientists look for patterns and order when making observations about the world. (2-LS4-1)</p>

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## LESSON 1.1

# Types of Plants Around Me

**Big Question:** What must be done to make a natural butterfly habitat?

**Lesson Guiding Question:** How much variety is there among plants?

**Today's Question:** What plants can I see around where I live and go to school?

**Tie to the Anchoring Phenomenon:** To create a butterfly habitat like Corbin and his friends in the Student Book story, in this lesson students explore the diversity of plants in their environment to begin to determine what types of plants would be appropriate in a natural habitat for butterflies.

## AT A GLANCE

### Learning Objective

- ✓ Classify organisms as plants.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson, students look for patterns of biodiversity in their environment. They ask questions about the types of organisms that can survive in the environment and distinguish between plants and nonplants.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

bush  
fruit  
tree

cactus  
grass  
vine

cone  
leaf

flower  
needle

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare    deciduous    diversity    habitat  
organism    record    varied    variety

### Instructional Resources

Activity Page



AP 1.1.1

#### Activity Page

Plants Around Me (AP 1.1.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- question board
- hand lenses (1 per student or pair)

### Advance Preparation

Identify a safe location outside that has a variety of plants that students can explore. It may be the schoolyard, a local park, or some other area.

## THE CORE LESSON 1.1

### 1. Introduce students to Lesson 1.

NGSS Elements



CCC 1  
SEP 1  
DCI LS4.D

Ask a volunteer to state the Big Question that you'll be answering in this unit, which is posted somewhere in the room—**What must be done to make a natural butterfly habitat?**

- Display the question board with the Big Question as the title.
- Record student responses as you ask these questions to activate and assess prior knowledge. Accept reasonable responses:
  - **How can you tell the difference between a plant and an animal?**
    - » Plants don't walk or move around. Plants are often green.

- **How can you tell the difference between a plant and a nonliving thing, such as a rock or water?**
  - » Plants grow and change. They have seeds or roots that make new plants. Nonliving things do not do these things.
- **How are plants different from each other?**
  - » Some plants are tall, and some are short. Some plants have flat leaves, and some have needles. Some plants have flowers.
- **What types of plants have you seen around school and at home?**
  - » grass, trees, flowers, vines, dandelions, bushes
- **How do we know what plants butterflies might need to live?**
  - » observe butterflies with different plants to see which plants they are attracted to; research to find out what butterflies eat

#### Activity Page



AP 1.1.1

- Distribute Plants Around Me (AP 1.1.1). Explain that students are going outside to look for plants and record what they notice. They should not touch the plants but should carefully observe six plants they notice and record them by drawing a picture of each plant. (See **Know the Standards.**)

Tell students that, to answer the unit's Big Question about making a natural butterfly habitat, they will explore plants and animals to find out which would provide a place where butterflies can live and thrive.

### Tie to the Anchoring Phenomenon

Students ask questions about the biodiversity of plants and animals to identify patterns of organisms that support butterfly life.

## 2. Hands-on interaction.

#### NGSS Elements



SEP 1  
DCI LS4.D

- Allow about fifteen minutes for students to explore the plants in an outdoor environment near or on school grounds. As they explore, they should draw a picture of at least six different plants they encounter.

## Know the Standards

## TEACHER DEVELOPMENT

**Performance Expectation 2-LS4-1:** The emphasis of this standard in Grade 2 is on the diversity of life in different habitats. It does not include specific animal and plant names. Students will begin by observing the diversity of life in their immediate environment and then explore and compare the diversity of life in different habitats on Earth.

**SUPPORT**—Discuss the properties of the plant, including thickness, texture, weight, and color. Model for students how to use a hand lens to examine a plant leaf, blade, or stem. Then demonstrate drawing a picture that captures the details.

### 3. Guide discussion.

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#### NGSS Elements



SEP 1  
DCI LS4.D

#### Activity Page



AP 1.1.1

#### Online Resources



- Discuss student findings by first making a master list on chart paper of all the plants students recorded. As you record the list, discuss whether each is or is not a plant.
- Then ask these questions:
  - **What makes a plant different from other living and nonliving things?**
    - » Plants don't move locations on their own. They don't have eyes and ears. Many plants are green.
  - **What plants from our list are the most common?**
    - » grass, trees
  - **Are the drawn plants you observed always the same? How do they change over time?**
    - » They grow, change color, make flowers or seeds, and die.
  - **How are the plants you observed the same and different?**
    - » Some are tall, some have leaves, some have wood, some are green, and some are different colors.
  - **Which of the plants on our list do you think butterflies would like?**
    - » flowering plants or colorful plants
- Show the first minute of this video about plants.  
See the Online Resources Guide for a link to the recommended video:  
[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)
- Ask student to identify which plants they saw in the video that they also found in their own environment and which plants are not found.

### 4. Check for understanding.

---

#### Monitor Progress

#### Formative Assessment

- Review student responses from Plants Around Me (AP 1.1.1) to determine student understanding of the following concepts:
  - Plants are different from animals and nonliving things.
  - There are many different types of plants, even in your community.





See the Activity Page Answer Key for correct answers and sample student responses.

- Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

### Tie to the Anchoring Phenomenon

In this activity, students explored plants in the immediate environment to begin to think about the types of plants that would support butterflies in a natural butterfly habitat like the one Corbin and his friends want to create.

## LESSON 1.2

# Plants in Different Places

**Big Question:** What must be done to make a natural butterfly habitat?

**Lesson Guiding Question:** How much variety is there among plants?

**Today's Question:** How can I describe the habitat of plants that live in the area where I live?

**Tie to the Anchoring Phenomenon:** In this lesson, students expand their awareness of the diversity of plants in their environment to determine what types of plants might thrive in a natural butterfly habitat so they can make appropriate choices as they create their own butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Observe and record data about plants in local habitats.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will look for patterns among plants as they explore biodiversity in their local environment.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

# Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

bush	cactus	cone	flower
fruit	grass	leaf	needle
tree	vine		

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare	deciduous	diversity	habitat
organism	record	varied	variety

## Instructional Resources

Activity Pages



AP 1.1.1  
AP 1.2.1

**Activity Pages**  
Plants Around Me (AP 1.1.1)  
Plants in My Habitat (AP 1.2.1)

## Materials and Equipment

- scissors (1 pair per student)
- colored pencils, crayons, or markers (1 set per student)
- pins or adhesive for temporary placement on wall or bulletin board
- question board

# THE CORE LESSON 1.2

## 1. Focus student attention on Today’s Question.

Activity Page



AP 1.1.1

**How can I describe the habitat of plants that live in the area where I live?**

Ask students to take out their completed Plants Around Me (AP 1.1.1) from the last segment. Discuss the types of plants from their immediate environment they chose to include.

- Review the master list of plants you compiled from student drawings, and discuss ways the plants can be sorted.
  - » shape, size, color, weight, texture
- **Ask students to describe the characteristics of the habitat the plants came from.**
  - » dry or wet, hot or cold, full sun or shady, rocky or sandy soil

- Ask students to describe the characteristics of another type of habitat or their own habitat in a different season and explain how the plants are different during that season.
  - » In a shady habitat, you find more fern and mossy type plants. In a dry habitat, you find thistles and cacti.
- Explain that today you are going to sort the plants students recorded yesterday into different categories. (See **Know the Science.**)

### Tie to the Anchoring Phenomenon

Students will categorize plants to determine which ones would support a natural butterfly habitat like the one Corbin in the story is working on.

## 2. Hands-on interaction.

NGSS Elements



SEP 1

Activity Page



AP 1.2.1

- Distribute Plants in My Habitat (AP 1.2.1). Ask students to recreate two of the plants they drew yesterday on the Activity Page. Have them cut each picture along the dotted lines. Ask students to write their names on the back of each drawing.
- When drawings are complete, have students participate in a class sorting activity. Using a bulletin board or large wall area, announce and write one of the following properties with its subproperties. Ask students to contribute their drawings by coming up to the board and attaching any of their plants that match the property/subproperty:
  - color: green, brown, red, blue, white
  - size: large, medium, small
  - shape: round, one point, more than one point
  - flower and nonflower

## Know the Science

## TEACHER DEVELOPMENT

**Plant Types:** Plants have different structures and appearances. Botanists group plants into two major categories: nonvascular plants (like mosses that don't have leaves, stems, or roots that help them transport water) and vascular plants, which have structures that move water from roots to leaves. Vascular plants are divided into three main groups:

- plants such as ferns that are seedless
- gymnosperms such as pine trees that often have needlelike leaves and cones and seeds but never produce flowers or fruits
- flowering plants that have seeds contained in fruits and include most of the plants we see around us, such as grasses, oaks, daisies, and beans

- Review each property sort with the class to make sure they agree that all plants have been sorted appropriately. Then compare the different plants that have been sorted.
  - **How are the plants the same?**
    - » For example, six are green, and three are brown.
  - **How are the plants different?**
    - » For example, some are whole plants, and some are leaves of plants.
- After each discussion, ask students to remove their drawings and write the property on the back of any plants that were on the board. Then, announce a new property and subproperties, and repeat the procedure.
- Discuss which plants students think would most likely be in a natural butterfly habitat.
 

**EXTEND**—For more accurate reproductions, you may want to collect or have students collect leaves or flowers from the plants they recorded. They can then trace the actual plant. They could also create rubbings of leaves to show texture. Remind them to only collect parts that have already fallen to the ground or are detached. They should not pull off pieces. Photos of the plants can also be used.

### 3. Check for understanding.

#### Formative Assessment

Review student responses in the sorting activity to determine student understanding of the following concepts:

- There is a wide diversity of plants, even in the immediate environment.
- Plants vary in color, shape, size, and structure.
- Different plants live in different habitats.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

Monitor Progress

Activity Page



AP 1.2.1

#### Tie to the Anchoring Phenomenon

In this activity, students recognized that even in their habitat, there are a wide variety of plants. In learning about plants, they will find that some may be more appropriate for a natural butterfly habitat than others. Ask the following questions to make further ties to the Anchoring Phenomenon:

- **Of the plants we looked at today, which ones do you think would be best for our butterfly habitat?**
  - » for example, ones that have flowers or will have flowers
- **Of the plants we looked at today, which ones do you think would not attract butterflies?**
  - » for example, ferns and plants that do not flower
- **What types of plants do you think Corbin would choose for his habitat?**
  - » for example, ones that flower



## LESSON 1.3

# Plant Habitats

**Big Question:** What must be done to make a natural butterfly habitat?

**Lesson Guiding Question:** How much variety is there among plants?

**Today's Question:** What are some different types of plants and the places in which they live?

**Tie to the Anchoring Phenomenon:** In this lesson, students expand their awareness of different habitats and the plants that live in each to determine the best habitat for butterflies that they will develop by the end of the unit.

## AT A GLANCE

### Learning Objectives

- ✓ Describe several types of habitats.
- ✓ Describe types of plants that live in various remote habitats.

### Instructional Activities

- teacher Read Aloud
- class discussion
- question generation
- vocabulary instruction

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will ask questions about patterns of plant life in different habitats.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

bush  
fruit  
tree

cactus  
grass  
vine

cone  
leaf

flower  
needle

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare  
organism

deciduous  
record

diversity  
varied

habitat  
variety

### Instructional Resources

Student Book



Ch. 2  
Ch. 3

**Student Book, Chapter 2**  
"What Are Some Plant Habitats?"

**Student Book, Chapter 3**  
"Plants Change with the Seasons"

Activity Page



AP 1.3.1

**Activity Page**  
Plant Changes (AP 1.3.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- question board

## THE CORE LESSON 1.3

### 1. Focus student attention on Today's Question.

NGSS Elements



DCI LS4.D

**What are some different types of plants and the places in which they live?**

Review the plant sorting activity. Then discuss these questions to activate prior knowledge:

- **How would you describe the habitat that we explored?**
  - » dry, wet, shady, open to the sun, hot, warm, cold

- **Describe a different habitat you have visited or read about.**
  - » a desert, a rain forest, a forest, a hot or cold place
- **How are the plants different in that habitat?**
  - » tall trees, ferns, cacti, fruit trees, flowers

Explain that today you are going to read about different habitats and the variety of plants that live in them. (See **Know the Science.**)

### Tie to the Anchoring Phenomenon

This lesson expands student awareness of the diversity of habitats and plant life on Earth to help them determine what a natural butterfly habitat would be.

## 2. Read together: “What Are Some Plant Habitats?”

Student Book



Ch. 2

Differentiation

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

## Know the Science

## TEACHER DEVELOPMENT

**Habitats:** A plant’s specific habitat is a natural environment where that plant thrives. Habitats are characterized by factors such as soil, moisture, range of temperature, and availability of sunlight. There are polar, temperate, subtropical, and tropical habitats. Depending on the amount of moisture and availability of sunlight, habitats on land include rain forests, woodlands, grasslands, or deserts. Freshwater habitats can be ponds, marshes, streams, rivers, or lakes. Saltwater habitats include salt marshes, bays, coasts, open sea, and deep water.

Pages 6–7

Ask students to turn to page 6 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “What Are Some Plant Habitats?” Tell them to think how a variety of plants are in different habitats.



Butterflies live in habitats all around the world. A habitat is the place where an organism lives. Habitats can be very different from place to place. The different habitats that butterflies live in have many different types of plants. Corbin wants to learn about different habitats.

A tropical forest is a warm, rainy habitat. The trees are very tall. Their leafy tops form a thick layer that shades the ground below. The plants near the ground often have large leaves so that they can get as much light as possible. Some plants in tropical forests don't even grow in soil. They grow on other plants!

Forest treetops shade the ground below.



These tropical forest plants grow on tree branches.

7

**Ask students to look at the pictures on pages 6 and 7 as you read aloud.**

**LITERAL**—What do butterflies need to survive?

- » plants that provide food and shelter

**LITERAL**—How can you describe a tropical forest habitat?

- » warm and wet with tall trees that shade the ground

**INFERENTIAL**—Could butterflies live in a tropical forest habitat?

- » yes, if they have food and shelter

**EVALUATIVE**—Young monarch caterpillars only eat milkweed. Do you think you would only like to eat one type of food?

- » Accept reasonable answers. Invite students to give reasons for their opinions.

Not all forest habitats are warm and wet year-round. Some forests have trees that lose their leaves in cooler weather. These trees grow new leaves again in the spring. There are many shapes of leaves. Nuts grow on some of the trees. They drop to the forest floor and make a tasty meal for animals.

The oak tree's leaves change color in the fall.



oak leaves



hickory trees



hickory nuts

8

**INFERENTIAL**—How is a tropical forest different from a forest that changes when the weather changes?

- » The trees in a tropical forest keep their leaves and don't change colors. In a forest that has weather changes, trees drop their leaves when the weather gets colder.

**LITERAL**—What did the leaves look like that we found in our local habitat?

- » For example, some leaves grew in groups, and others had one leaf per stem.

**INFERENTIAL**—Besides a tasty meal for animals, what purpose do you think nuts have?

- » They make new trees.

**CORE VOCABULARY**—Explain that a **tree** is a plant that usually has a single woody stem called a trunk and may grow to be very tall. People use wood from trees for building and heat. Many animals and plants depend on trees for food or shelter. Ask students to describe a tree and a **leaf** or **needle** from the tree.

Compare needles and leaves. Explain that pine needles are tree leaves in spite of their differences in size and shape.

## Page 9

**Turn to page 9, and read it aloud.**

Plants live in desert habitats, too. Deserts are dry places. These plants do not need much water to survive, but they need some. Some desert plants have long roots to find water deep underground. Others have short roots that spread out close to the surface of the sandy soil. These roots can quickly soak up water from a rare rainfall.



This cactus is a desert plant. It stores water in its stem. All cacti have flowers and fruit. The flowers attract insects, including butterflies.

The Joshua tree is another desert plant. Its flowers attract moths.



9

**LITERAL**—How can you describe a desert?

- » very dry without much rainfall

**INFERENTIAL**—How are desert plants different from tropical forest plants?

- » There are not as many plants in a desert as in tropical forests. They have deep roots or very short roots and can survive long periods without water. Tropical plants get plenty of water and can shade other plants.

**INFERENTIAL**—Are desert habitats always hot?

- » No, it depends on where they exist. Antarctica is a desert because it doesn't get much rainfall. Hot deserts can get cool at night. At night the sand in a hot desert loses its heat, so the area is cooler.

**INFERENTIAL**—Could butterflies live in a desert habitat?

- » yes, if they can find food and shelter



**CORE VOCABULARY**—Explain that a **cactus** is a plant that often has a thick stem to store water. Many cacti have protective spines instead of leaves. They do have **flowers**, which is how they reproduce.

**CHALLENGE**—Display a map, and have students research to identify major rain forests and deserts on Earth.

## Page 10

**Ask students to look at the pictures on page 10 as you read aloud.**

Another kind of plant habitat is a prairie. Prairies are flat areas with few trees. They are filled with grasses. Grass leaves are long and slim. Grass roots can take in a lot of water. Grasses can grow up to ten feet tall!

Prairies also have herbs, small plants that often have showy flowers. Their bright flowers attract butterflies and other insects. Milkweed is one type of prairie plant. It is the only plant where monarch butterflies lay their eggs.



10

**INFERENTIAL**—How is plant life on a prairie different from that in a desert?

- » Both have few trees, but a prairie gets more rain. So, it has a lot of plants, like grasses and milkweed.

**INFERENTIAL**—Would butterflies thrive in a prairie habitat?

- » yes, if they can find food and shelter

**CORE VOCABULARY**—Explain that **grass** is a flowering plant that has long narrow leaves. It grows wild in all kinds of habitats, including prairies, and is also common in lawns and landscapes. Grass **flowers** are very small and don't have decorative petals, but the flowers produce seeds that make new grass. Many animals depend on grass for food and / or shelter.

Think about the plants around your home. Are they tall or short? Are they skinny or thick? Do they have flowers or fruit? Plants can be very different. But all plants live where they do because they can get the air, water and sunlight they need there. They also provide food and shelter for butterflies and other living things in each type of habitat.

Corbin wonders if the plants that grow in the land lab are the right kind for butterflies.



11

**LITERAL**—Which plants did we observe in our local habitat that you saw in this chapter?

- » Answers will vary depending on the local environment, but students may say grasses, pine trees, and/or flowers.

**INFERENTIAL**—In which type of habitat would butterflies most likely thrive?

- » Different butterflies can thrive in different habitats. Monarch butterflies need milkweed that grows in prairies, in swamps, along roadsides, and in other places. Butterflies can also live in desert, forest, and tropical habitats as long as they can find food and shelter.

**EVALUATIVE**—Out of the different environments in this chapter, which would you like to live in?

- » Accept reasonable answers. Invite students to give reasons for their opinions.

Online Resources



- Show a video to explore more different kinds of plants that grow in different habitats.

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

- Discuss the water habitats shown in the video, and ask this question.
  - What types of plants live in freshwater habitats, such as ponds, lakes, and marshes?
    - » plants that have roots on the bottom under the water, fixed plants that have roots on the bottom and leaves at the surface of the water, floating plants, and plants that live on the edge

### 3. Read together: “Plants Change with the Seasons.”

Pages 12–13

**Ask students to turn to page 12 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “Plants Change with the Seasons.” Tell them to think how plants in the local habitat change with the seasons.**

CHAPTER  
**3**

## Plants Change with the Seasons

Plant habitats differ from place to place. But a single habitat can change, too. These changes happen over time in a pattern called seasons. Plants respond to the changes that different seasons bring.

In spring, the weather warms. There is more daylight. Leaf buds grow on the branches of trees. New plants sprout through the soil. A sticky material called sap begins to move from plant roots into the stems and leaves. Flowering trees bloom.



12

In summer, the days are long and warm. Plants soak up the sunlight and make food. Food gives plants the energy they need to grow. Many flowers bloom. Fruits and seeds develop. Trees fill with leaves.



Plants provide more food for animals in the summer.



This tomato plant is starting to grow fruit.

13

**LITERAL**—Describe spring and summer in our area.

- » Answers will vary depending on the local habitat, but in spring and summer, students should say that days become longer and nights shorter. In temperate zones, there are more dramatic seasonal changes in plants, like flowering and growing.

**INFERENTIAL**—Why do you think that insects and animals can find plenty of food in the summer?

- » The temperature is usually warmer in the summer. So, the plants have more fruits and flowers in the summer.

**CORE VOCABULARY**—Explain that a **fruit** is the part of a plant that contains seeds. We eat many fruits, including apples, oranges, avocados, and tomatoes, and eat or remove the seeds. Some fruits have one big seed. Others have lots of seeds. All flowering plants produce fruits that contain seeds.



The season after summer is called *autumn* or *fall*. In fall, days become shorter again. There is less daylight each day. The shorter days and cooler temperatures cause plants to make less food. The leaves on trees change color in the fall. Flowers stop blooming.

Fall is also when some fruits and seeds ripen. They soon fall to the ground. Apples ripen in fall.



In winter, the days are very short, and the temperatures are cooler. In places where winter is cold, plants stop growing. Their leaves, flowers, and fruit have fallen off. Plants no longer make food in the winter. Grasses turn brown in the winter because they aren't making food.



15

**LITERAL**—Describe fall and winter in your local habitat.

- » Answers will vary depending on the local habitat, but in fall and winter, students should say that days become shorter and nights longer. In temperate zones, there are more dramatic seasonal changes in plants, like flowers and leaves dying and dropping to the ground.

**INFERENTIAL**—How do plants survive a cold winter?

- » They survive on food stored in roots or stems. If the plant dies, the seeds may still be able to sprout in the spring.

**EXTEND**—Have students learn about and describe seasonal changes in tropical habitats. Most tropical areas experience a wet season and a dry season. In wet seasons, plants grow a lot and produce fruits and seeds late in the season.



## 4. Check for understanding.

### Monitor Progress

#### Activity Page



AP 1.3.1

### Formative Assessment

Distribute Plant Changes (AP 1.3.1), and have students label the season shown in each picture. Then discuss their reasonings for their labels.

» Students should be able to recognize the seasonal changes in the tree shown.

Discuss what type of habitat the tree might live in.

» most naturally in a forest or tropical habitat; not naturally in a prairie or desert

Review student responses in the reading questions and to Plant Changes (AP 1.3.1) to determine student understanding of the following concepts:

- Different habitats, such as prairie, desert, tropical, and forest, exist on Earth.
- A variety of plants live naturally in different habitats.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

### Tie to the Anchoring Phenomenon

In this activity, students expanded their understanding of the diversity of plants in different habitats. They recognized that different types of butterflies, like different types of plants, thrive in different habitats.

- Discuss the habitat in your area, and determine if it is more like a tropical forest, a temperate forest, a desert, or a prairie.
- Ask students to generate questions for the question board about the types of butterflies that would most likely survive in your local habitat and what types of plants would attract them.

## LESSON 1.4

# Lesson 1 Roundup: Plants and Butterflies

**Big Question:** What must be done to make a natural butterfly habitat?

**Lesson Guiding Question:** How much variety is there among plants?

**Today's Question:** How much variety is there among plants?

**Tie to the Anchoring Phenomenon:** In this lesson, students learn about different types of butterflies, their habitats, and the diversity of plants they need to live.

## AT A GLANCE

### Learning Objective

- ✓ Compare and contrast plants in a variety of habitats.

### Instructional Activities

- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will ask questions about patterns of plant life in different habitats.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

bush  
fruit  
tree

cactus  
grass  
vine

cone  
leaf

flower  
needle

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare    deciduous    diversity    habitat  
organism    record    varied    variety

### Instructional Resources

Activity Page



AP 1.4.1

#### Activity Page

Butterfly Habitat (AP 1.4.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- colored pencils, crayons, or markers (1 set per student)
- world map
- question board

## THE CORE LESSON 1.4

### 1. Focus student attention on Today's Question.

Online Resources



NGSS Elements



DCI LS4.D

#### How much variety is there among plants?

- Review the different habitats students learned about in the previous lesson segment: tropical, prairie, desert, and woodland, and water.
- Discuss the types of habitats butterflies live in.
- Show a two-minute video to introduce students to butterflies. Review information from the video by asking these questions:
  - **How many species of butterflies are there?**
    - » as many as 20,000 species
  - **Where do butterflies live?**
    - » on every continent except Antarctica
  - **What do adult butterflies eat?**
    - » nectar from flowers

- **What colors can butterflies see?**
  - » red, green, and yellow and some colors we can't see

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Tie to the Anchoring Phenomenon

Students will learn about what diverse types of plants butterflies need to live.

## 2. Research.

### Online Resources



### Differentiation

- Show a video to explore different kinds of butterflies and how they interact with plants. Tell students to look for how butterflies in the video use plants.

**CHALLENGE**—Display a world map. As the video plays, identify with students the locations of the world where each different butterfly lives. This will reinforce the idea that different butterflies live in different places, which means diverse habitats, and they rely on a diversity of plants around the world.

- **How do butterflies use plants?** (See **Know the Science**.)
  - » 1. They eat nectar from flowers. 2. They lay eggs on plant leaves and stems. The eggs develop on plants and grow. When they hatch, they eat the leaves of plants, which they need to grow. 3. Butterflies rest on plants and need trees and shrubs for protection.

- Show a video to explore different kinds of plants that attract butterflies.

- **What kinds of plants attract butterflies?**
  - » brightly colored flowering plants, such as lavender, echinacea, yarrow, wallflower, butterfly bush, ceanothus, avens, masterwort, gaillardia, and sea holly

### NGSS Elements



CCC 1  
DCI LS4.D

- **Why do you think you will need a variety of flowering plants in a butterfly garden?**
  - » so there are continuous flowers for a long time for the butterflies

See the Online Resources Guide for a link to the recommended videos:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Know the Science

## TEACHER DEVELOPMENT

**Butterfly Life Cycle:** Butterflies lay their eggs on host plants, also called larval plants. When caterpillars hatch from the eggs, they consume the leaves of the host plants as food. Milkweed provides the host plant and food source for young monarch butterflies throughout the United States.

### 3. Plan.

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NGSS Elements



SEP 1

Activity Page



AP 1.4.1

- Distribute Butterfly Habitat (AP 1.4.1). Ask students to use what they have learned about butterflies to start working on a butterfly habitat. Have them draw a plan for a habitat. In their plan, they should include at least five different types of plants.
- When drawings are complete, have students present their plans. Ask the following questions:
  - **What is the type of habitat you are planning?**
    - » tropical, woodland, desert, or prairie
  - **What types of plants have you included and why?**
    - » for example, tree and bush for shelter, three different colors of flowering plants that will flower at different times
  - **Did you include plants from our local habitat? Explain why.**
    - » for example, no, because I wanted to design a butterfly habitat for a different environment

### 4. Check for understanding.

---

#### Formative Assessment

Review student presentations and responses to questions about their plans for a butterfly habitat to determine student understanding of the following concepts:

- There is a wide diversity of plants throughout the world.
- Some plants are good for a butterfly garden in a specific habitat, and others are not.
- Different plants live in different habitats.

Monitor Progress

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students recognized that butterflies are found around the world. They interact with a diverse variety of plants as food sources and shelter.

- Discuss the elements of the local environment that can attract butterflies.
- As a class, compare student plans to identify those plants that will most likely attract butterflies. Ask students to provide evidence for their choices.

## LESSON 2

# Plant Needs

### OVERVIEW

**Guiding Question:** Do plants need water and sunlight to grow?

Lesson 2 Segments	Segment Questions	Advance Preparation
<b>2.1 Finding Out What Plants Need</b> Students observe and collect data about the plants in their environment.	How can we investigate what plants need?	Gather materials for the activity. See Materials and Equipment.
<b>2.2 Testing What Plants Need</b> Students collect and sort data to describe what types of plants live in different habitats.	How can we test if plants need sunlight and water to grow?	Gather materials for the activity. See Materials and Equipment.
<b>2.3 Collecting Data About What Plants Need</b> Students read to learn about plant life in different habitats around the world.	How do plants respond to different amounts of light and water?	Gather materials for the activity. See Materials and Equipment.
<b>2.4 What Plants Need</b> Students read to learn about plant life in different habitats around the world.	What do plants need?	Read Chapter 4 in the Student Book.
<b>2.5 Lesson 2 Roundup: Plants and Sunlight and Water</b>	Do plants need water and sunlight to grow?	Gather materials for the activity. See Materials and Equipment.

### What's the Story?

**Summary:** In Lesson 2, students explore the needs of plants to live, grow, and reproduce.

**Learning Progression:** Lesson 2 builds on student understandings from Lesson 1 in which students learned about the diversity of plants and plant habitats on Earth. In this lesson, they will explore the patterns of what all plants need to thrive in all habitats.

**Guiding Phenomenon:** Focusing on building a natural habitat for one type of organism inspires students to explore different habitats that can and cannot meet the need for survival from one generation to another.

## Learning Objectives

**By the end of Lesson 2, students will do the following:**

- Identify how to plan an investigation about plants' needs.
- Describe how to test if plants need water and sunlight to grow.
- Observe, collect, and record data about plants' needs for sunlight and water.
- Gather information about plants' needs.
- Draw conclusions from evidence about plants' needs for sunlight and water.

## NGSS Standards and Dimensions

**Performance Expectation:** 2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.

<b>Science and Engineering Practice</b>  <b>3 Planning and Carrying Out Investigations</b>  Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.  <ul style="list-style-type: none"><li>• Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)</li></ul>	<b>Disciplinary Core Idea</b>  <b>LS2.S: Interdependent Relationships in Ecosystems</b>  Plants depend on water and light to grow. (2-LS2-1)
<b>Crosscutting Concept</b>  <b>2 Cause and Effect</b>  Events have causes that generate observable patterns. (2-LS2-1)	<b>Understandings about the Nature of Science</b>  <b>Scientific Knowledge Is Based on Empirical Evidence</b>  Scientists look for patterns and order when making observations about the world. (2-LS4-1)

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

### Advance Preparation

For Lesson 2.1, students will need single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (four plants per student or group of students). These must be planted from seed at least two weeks before the experiment (or plant starts that are already started can purchased from a supplier).



## LESSON 2.1

# Finding Out What Plants Need

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** Do plants need water and sunlight to grow?

**Today's Question:** How can we investigate what plants need?

**Tie to the Anchoring Phenomenon:** In this lesson, students explore what the plants that support butterflies in a habitat need to live.

## AT A GLANCE

### Learning Objective

- ✓ Plan an investigation about plants' needs.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS2-1

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 3 Planning and Carrying Out Investigations

**Crosscutting Concept:** 2 Cause and Effect

In this lesson, students plan and conduct an investigation to test the causes and effects of different interactions among plants and sunlight and water.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

change	enough	leaf	less
light	more	plant	root
soil	stem	sun	water

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

conclude	control	data	evidence
fair test	investigate	nutrient	organism
record	respond/response		

## Instructional Resources

Activity Pages



AP 2.1.1  
AP 2.1.2

### Activity Pages

Testing What Plants Need  
(AP 2.1.1-Light Test and  
2.1.2 -Water Test)

## Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- question board
- hand lenses (1 per student or pair)
- measuring tapes or rulers (1 per student or pair)
- small sticky notes
- markers (1 per student or pair)
- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group of students)

## Advance Preparation

Plant from seed at least two weeks before the experiment, or purchase from a supplier.

## THE CORE LESSON 2.1

### 1. Introduce students to Lesson 2.

Ask a volunteer to state the **Big Question** that you'll be answering in this unit, which is posted somewhere in the room—**What must be done to make a natural butterfly habitat?**

#### NGSS Elements



SEP 3  
CCC 2  
DCI LS2.A

- Display the question board with the Big Question as the title.
- Record student responses as you ask these questions to activate and assess prior knowledge. Accept reasonable answers:
  - **What do butterflies need to live?**
    - » shelter and food
  - **What do butterflies use in a habitat to get what they need to live?**
    - » plants
  - **What do plants need to live?**
    - » water, sunlight, air, and nutrients from the soil

#### Online Resources



- Play a video song about what plants need to engage students. See the Online Resources Guide for a link to a recommended video:  
[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)
- Then ask this question:
  - **How do we know what plants need?**
    - » Accept reasonable answers. If a plant is dry, it might need water. If a plant is droopy, it may need sunlight.

Tell students that, to answer the unit's Big Question about making a natural butterfly habitat, they will explore plants and animals to find out which would provide a place where butterflies can live and thrive. If a butterfly habitat needs certain plants, then it also must have what those plants need to thrive.

Write the **Lesson 2 Guiding Question** where students can see it:

**Do plants need water and sunlight to grow?**

#### Tie to the Anchoring Phenomenon

To make sure butterflies have what they need in a habitat to survive, the habitat must also provide what both the plants and the butterflies that depend on them need to thrive.

## 2. Hands-on interaction.

### Activity Pages



AP 2.1.1  
AP 2.1.2

- Distribute Testing What Plants Need (AP 2.1.1 and AP 2.1.2), and explain that students will be using these forms to plan and conduct a fair test about what plants need. Notice that the only difference is that one form is a test for plants A and B and the other is for plants C and D. (See **Know the Standards**.)
- Distribute four nearly identical plants to each student or each student group along with a hand lens and ruler.
- Have students use sticky notes to label each plant with their initials and an identifier A, B, C, or D.
- Ask students to observe each plant and record those observations on the Activity Page:
  - Measure the height of each plant.
  - Count the number of leaves on each plant.
  - Record the color of each plant.
  - Record whether each plant is upright and looks healthy.

### NGSS Elements



SEP 3  
CCC 2  
DCI LS2.A  
Differentiation

**SUPPORT**—Model for students how to use a hand lens to examine a plant leaf, blade, or stem. Demonstrate how to use a ruler to take measurements and how to record the measurements.

## 3. Guide discussion.

- Discuss student observations of their plants. Confirm that the plants are about the same height and have the same number of leaves.
- Ask these questions about their plants:
  - **What do you need to take care of your plants?**
    - » water, sunlight, air, and nutrients
  - **How do you know you need those things?**
    - » because I've seen plants live and die with or without them

3D Learning

## Know the Standards

### TEACHER DEVELOPMENT

**Performance Expectation 2-LS2-1:** The emphasis of this standard in Grade 2 is on planning collaboratively to produce data to serve as the basis for evidence to answer a question. This is a foundation of scientific thinking and processes. Planning and carrying out investigations to answer questions or test solutions builds on prior knowledge and experiences and progresses to simple investigations based on fair tests. A fair test is a controlled investigation carried out to answer a scientific question. For a test to be fair, only one thing or variable is tested at a time.



AP 2.1.1

AP 2.1.2

- **How can we test that plants need sunlight?**
  - » Put one plant in the dark and another in the sunlight.
- **How can we test that plants need water?**
  - » Water one plant and don't water another.
- **How long do you think it would take before you would know what the effect of your test is?**
  - » a day, a week, a month
- **How will you know that your test has had an effect?**
  - » The plant without sun or water will be different from the plants with sun and water.
- **Explain that a hypothesis is a statement about what you think will happen. Write this sentence frame on the board.**  
**"If \_\_\_\_\_, then \_\_\_\_\_".**  
**Then discuss possible statements.**
  - » If I put one plant in the dark and another in sunlight, then the plant in the dark will not grow like the plant in the sunlight.
- Have students write a hypothesis about testing the effect of sunlight on plants on Activity Page 2.1.1. Then have students write a hypothesis for testing the effect of water on Activity Page 2.1.2.

## 4. Check for understanding.

### Monitor Progress

#### Activity Pages



AP 2.1.1

AP 2.1.2

### Formative Assessment

Review student responses in the discussion and their observations and hypotheses in Testing What Plants Need (AP 2.1.1 and 2.1.2) to determine student understanding of the following concepts:

- Plants have certain needs to live.
- A scientific test will give evidence to show what plants need.

See the Activity Page Answer Key for correct answers and sample student responses.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

## Tie to the Anchoring Phenomenon

In this activity, students observed plants and came up with a hypothesis about the plants' needs to make sure the habitat they design will meet the needs of butterflies and the needs of the plants that butterflies need to thrive. Discuss the following questions about the butterfly habitat students will be creating:

- **How will you know if the plants in your butterfly habitat need sunlight?**
  - » They will not look healthy and may not grow.
- **How will you know if the plants in your butterfly habitat need water?**
  - » They will not look healthy, may not grow, and may wilt.

## LESSON 2.2

# Testing What Plants Need

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** Do plants need water and sunlight to grow?

**Today's Question:** How can we test if plants need sunlight and water to grow?

**Tie to the Anchoring Phenomenon:** In this lesson, students design a test to find out what the plants that support butterflies in a habitat need to live.

## AT A GLANCE

### Learning Objectives

- ✓ Determine methods of controlling and varying light that plants receive.
- ✓ Determine methods of controlling and varying water that plants receive.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS2-1

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 3 Planning and Carrying Out Investigations

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students design an investigation to test the causes and effects of different interactions among plants with sunlight and water.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)



## Core Vocabulary

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

change	enough	leaf	less
light	more	plant	root
soil	stem	sun	water

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

conclude	control	data	evidence
fair test	investigate	organism	record
respond/response			

## Instructional Resources

Activity Pages



AP 2.1.1  
AP 2.1.2

### Activity Pages

Testing What Plants Need  
(AP 2.1.1 and 2.1.2)

## Materials and Equipment

- question board
- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group of students). These can be planted from seed at least two weeks before the experiment or purchased from a supplier.

## THE CORE LESSON 2.2

### 1. Focus student attention on Today's Question.

Activity Pages



AP 2.1.1  
AP 2.1.2

### How can we test if plants need sunlight and water to grow?

- Ask students to take out Testing What Plants Need (AP 2.1.1 and AP 2.1.2, which they started in the last segment. Review the observations they made about plants and the hypotheses they wrote. Let the students know that they will continue their work on the Activity Pages by designing a plan. Later in the lesson they will test their plans.
- Discuss the importance of testing for only one variable at a time.
  - **If you are testing two plants to see if they need sunlight, should you water them or not?**
    - » You should water both plants the same amount. The only difference should be one plant is in sunlight and one is in the dark without sunlight. Otherwise you won't know what causes the changes you might see.

NGSS Elements



SEP 3  
CCC 2  
DCI LS2.A

- **If you are testing two plants to see if they need water, should you leave one in the sunlight and the other in the dark?**
  - » You should put both in the sunlight. The only difference should be one plant is watered and one plant is not watered. Otherwise you don't know what causes the changes you might see.
- Explain that today, they are going to plan how they will test for the needs of plants. (See **Know the Science 1.**)

## Tie to the Anchoring Phenomenon

To make sure butterflies have what they need in a habitat to survive, the habitat must also provide what the plants that butterflies depend on need to thrive. Plant needs can be tested.

## 2. Hands-on interaction.

### NGSS Elements



SEP 3

### Activity Pages



AP 2.1.1

AP 2.1.2

- Have students explore the classroom to consider how they can conduct a fair test of plants' need for sunlight. Depending on whether your classroom has windows, students may have to improvise to place plants in sunlight or artificial light. Emphasize that one plant must be in complete darkness but that it must have the same amount of water as the plant that receives sunlight. Students may determine that they can cover one plant with a box or bowl to deprive it of sunlight. (See **Know the Science 2.**)
- Ask students to explore the classroom to consider how they can conduct a fair test of plants' need for water. Have them identify a water source and determine how much water they will provide one of the plants and how often they will water it. Emphasize that the other plant must not be given water but that it must have the same sunlight as the plant that receives water.
- Have students record their plans on Testing What Plants Need (AP 2.1.1 and 2.1.2).

## Know the Science

## TEACHER DEVELOPMENT

**1. Watering Plants:** Many plants, such as cacti, can survive without water for long periods of time. Other plants, such as water lilies or aquarium plants, will wilt and die quickly if taken out of water. For crop plants, such as beans or flowers, the water requirement varies. They begin to wilt once the water deficiency threshold is crossed. It might be a few days or a week, depending on how much moisture is in the air. Sunlight isn't necessary if plants have an artificial source of light.

**2. Fair Test:** To conduct a fair test on the need for light, some plants must be deprived of all light. In science, a fair test is a test that controls all but one variable when attempting to answer a scientific question. For example, if students withhold water and sunlight from one plant and give it to another, they will not know the effect of water or sunlight. Changing only one variable allows the person conducting the test to know that no other variable has affected the results of the test.

**CHALLENGE**—Challenge some students to design fair tests to determine other plant needs, such as space, air, temperature, and nutrients. You may also challenge students to determine the effects of factors that are not essential needs, such as talking or playing music to one plant and not the other.

### 3. Check for understanding.

---

#### Formative Assessment

Discuss student responses on Testing What Plants Need (AP 2.1.1 and 2.1.2) to determine student understanding of the following concepts:

- Only one variable can be tested at a time in a fair test.
- A scientific test will give evidence to show what plants need.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students designed a test to determine plants' needs for sunlight and water to make sure the habitat they design will meet the needs of butterflies and the needs of the plants butterflies need to thrive. Discuss these questions:

- **Where could Corbin get enough light for the plants in the butterfly habitat?**
  - » from the sun
- **Where could Corbin get enough water for the plants in the butterfly habitat?**
  - » from rain or from a sprinkler

Activity Pages



AP 2.1.1

AP 2.1.2

Monitor Progress

## LESSON 2.3

# Collecting Data About What Plants Need

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** Do plants need water and sunlight to grow?

**Today's Question:** How do plants respond to different amounts of light and water?

**Tie to the Anchoring Phenomenon:** In this lesson, students conduct a test to find out what the plants that support butterflies in a habitat need to live.

## AT A GLANCE

### Learning Objectives

- ✓ Collect evidence about plants' responses to adequate light but no water.
- ✓ Collect evidence about plants' responses to adequate water but no light.
- ✓ Collect evidence about plants' responses to adequate light and water.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS2-1

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 3 Planning and Carrying Out Investigations

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students use their investigation designs to test the causes and effects of different interactions among plants with sunlight and water.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

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change	enough	leaf	less
light	more	plant	root
soil	stem	sun	water

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conclude	control	data	evidence
fair test	investigate	organism	record
respond/response			

## Instructional Resources

Activity Pages



AP 2.1.1  
AP 2.1.2

### Activity Pages

Testing What Plants Need  
(AP 2.1.1 and 2.1.2)

## Materials and Equipment

- question board
- water source and water container such as cups, watering can, or pitcher
- access to dark closet or ability to deprive plants of sunlight
- access to a sunny location where plants can be placed
- measuring cups (1 per student or group)
- tape measures or rulers (1 per student or group)
- single-stalk flowering plants after sprouting, such as a zinnia or marigold, or bush green beans, in individual pots (4 per student or group)

## Advance Preparation

Plants must be planted from seed at least two weeks before the experiment, or started plants may be purchased from a supplier.

## THE CORE LESSON 2.3

### 1. Focus student attention on Today's Question.

3D Learning

#### How do plants respond to different amounts of light and water?

Activity Pages



AP 2.1.1

AP 2.1.2

- Ask students to take out Testing What Plants Need (AP 2.1.1 and AP 2.1.2), which they started in Lesson 2.1. Review the plans for the tests that they designed in Lesson 2.2.
- Discuss the importance of testing for only one variable at a time, a fair test.
- Explain that today, they are going to begin to conduct their tests. (See **Know the Standards**.)

#### Tie to the Anchoring Phenomenon

To make sure butterflies have what they need in a habitat to survive, the habitat must also provide what the plants that butterflies depend on need to thrive. Plant needs can be tested.

### 2. Hands-on interaction.

Activity Pages



AP 2.1.1

AP 2.1.2

- Ask students to read through Testing What Plants Need (AP 2.1.1 and 2.1.2), which. Emphasize the scientific process of recording observations very carefully. Discuss the advantages of recording observations.
    - » You don't have to remember what happened; you can look at your data. The data provide clues (evidence) you can use to help draw conclusions.
  - Have students set up their tests based on their plans they have designed previously. Emphasize the precise watering and other factors to control variables. Make sure they record their first observations.
  - Schedule the same time every day or in the time period students determined for the next two weeks to have students observe their plants and record their observations. Add to the form if the students will be recording daily. If students detect no change in an observation, they should record that, as well.
- SUPPORT**—Monitor students who need support to make sure they record their observations carefully. They may need assistance in measuring water or plant height.

NGSS Elements



SEP 3

Differentiation

## Know the Standards

## TEACHER DEVELOPMENT

**Performance Expectation 2-LS2-1:** Methodically recording observations provides the evidence for claims about what a plant needs for growth. Observation notes are the data students will use as evidence to answer the question.

### 3. Check for understanding.

#### Formative Assessment

Activity Pages



AP 2.1.1

AP 2.1.2

- Discuss student observations they wrote from the tests they conducted on Testing What Plants Need (AP 2.1.1 and 2.1.2) to determine student understanding of the following concepts:
  - Only one variable can be tested at a time in a fair test.
  - A scientific test will give evidence to show what plants need.
  - Methodical observations are critical to collecting data and evidence in a fair test.
- Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

Monitor Progress

In this activity, students conducted a test to determine plants' needs for sunlight and water to make sure the habitat they design will meet the needs of butterflies and the needs of the plants butterflies need to thrive. Discuss the following questions:

- **Why would Corbin need plants that get enough sun and water in the butterfly habitat?**
  - » If the plants don't get enough sun and water, they will not grow and will not attract butterflies.
- **How can you make sure the plants in your butterfly habitat get enough light and water?**
  - » Place them in a sunny location. Water them with a hose every day it doesn't rain.



## LESSON 2.4

# What Plants Need

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** Do plants need water and sunlight to grow?

**Today's Question:** What do plants need?

**Tie to the Anchoring Phenomenon:** In this lesson, students further explore what the plants that support butterflies in a habitat need to live.

## AT A GLANCE

### Learning Objective

- ✓ Gather information about plants' needs.

### Instructional Activities

- teacher Read Aloud
- class discussion
- question generation
- vocabulary instruction

### NGSS References

**Performance Expectation:** 2-LS2-1

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 3 Planning and Carrying Out Investigations

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students will learn about the causes and effects of different factors among the relationships in an ecosystem.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

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change	enough	leaf	less
light	more	plant	root
soil	stem	sun	water

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

conclude	control	record	data
evidence	fair test	investigate	nutrient
organism	respond/response		

### Instructional Resources

Student Book



Ch. 4

#### **Student Book, Chapter 4**

"What Do Plants Need to Grow?"

Activity Page



AP 2.4.1

#### **Activity Page**

Plant Needs (AP 2.4.1)

### Materials and Equipment

- question board
- internet access and the means to project images/video for whole-class viewing

## THE CORE LESSON 2.4

### 1. Focus student attention on Today's Question.

NGSS Elements



CCC 2  
DCI LS2.A

#### **What do plants need?**

Review what testing students have started in the previous lesson segments:

- **What are we testing to find out about plant needs?**
  - » to see if plants need sunlight and water
- **What else do you think plants need to grow?**
  - » space, the right temperature, nutrients, air

- Explain that today you are going to read about plant needs. (See **Know the Science**.)

### Tie to the Anchoring Phenomenon

To make sure butterflies have what they need in a habitat to survive, the habitat must also provide what the plants that butterflies depend on need to thrive.

## 2. Read together: “What Do Plants Need to Grow?”

Student Book



Ch. 4

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

## Know the Science

## TEACHER DEVELOPMENT

**Plant Needs:** There are many different types of plants growing in habitats all over the world. All plants need the resources necessary to perform photosynthesis, the process of turning light into food. Part of photosynthesis is taking in carbon dioxide from the air, so plants need air as well. Plants also need room to grow. For gardeners, seed packets define the amount of space to leave between seeds or plants so the plants can grow and thrive. Different plants thrive in different temperature zones, as well. Plants also need nutrients. They need water to move the nutrients from the roots throughout the plant.

**Ask students to turn to page 16 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “What Do Plants Need to Grow?” Tell them to think about how different habitats provide what plants living in the habitat need.**

**Pages 16–17**

**Ask students to look at the pictures on pages 16 and 17 as you read aloud.**

### CHAPTER 4

## What Do Plants Need to Grow?

Plants live in many different places. Plants come in all shapes and sizes, too. Some have flowers. Some make fruit. Some have tough, brown stems. Others have stems that are soft and green.

All plants need five things to survive, though. They need air, water, sunlight, nutrients, and room to grow. Plants live where they can get the amount of air, water, sunlight, nutrients, and space that they need. If these needs are not met, plants cannot grow.



16

Some plants need a lot of water. They live in wet places. Some plants don't need much water at all. They can live in dry places, like deserts. Different types of the plants live in the places where they can get just the right amount of water. Different plants also need different amounts of sunlight. Some must live in shady environments. Some need bright, direct sunlight. Different types of plants live where they can get just the right amount of sunlight.

Plants of the tropical forest floor grow in the shade of the taller trees.



Plants in a desert habitat need little water. They can survive in hot, bright sunlight.

17

**LITERAL**—What are the four things plants need to survive?

» water, sunlight, air, room to grow

**INFERENTIAL**—How does our local habitat provide what the plants that live in it need?

» It rains to provide water, there is plenty of sunlight, air is all around, and plants are not crowded.

**CORE VOCABULARY**—Use an example of one of the plants being tested to demonstrate the parts of a plant. Explain that a **plant** has different parts. The **stem** is the part that holds the plant up. A tree trunk is its stem. The **roots** absorb water and nutrients from **soil**. The stems move the water and nutrients from the roots to the rest of the plant, including each **leaf**. Most trees have a single stem or trunk.

Farmer Max grows sunflowers outside the town where Corbin lives. She farms sunflowers for their fruits. She plants rows of seeds once the weather is warm enough in the spring. The seeds will start to grow into plants if they get enough air, sunlight, nutrients, and water.



All spring and summer, the sunflowers use water, air, and sunlight to grow bigger and bigger.

Farmer Max told Corbin about the monarch butterflies that travel to their area. She said that the butterflies fly through their area on their way to the northeast in the spring.



Sometimes the butterflies stop and get nectar from the sunflowers. This gives the butterflies energy to fly farther north.

These monarch butterflies are just stopping for a quick meal.



In fall, the days get shorter and colder. Many outdoor plants will die off without enough sunlight and heat. Farmer Max watches her sunflowers. When the heads of the flowers tilt down and start to turn brown, it is time to harvest the fruits.



The kernels in these sunflowers could end up as a tasty snack for you.

19

**LITERAL**—In what type of weather did the farmer plant the sunflower seeds?

» warm weather

**INFERENTIAL**—What do you think would happen to the sunflowers if the seeds were planted in cold weather?

» They might not grow because they need warm weather.

**LITERAL**—How do you know when to harvest sunflower seeds?

» When the weather gets colder, the heads of the flowers tilt down and turn brown.

**CORE VOCABULARY**—Explain that **less** and **more** are opposites, or antonyms. Some plants, like those in the desert, need less **water** than plants in the rain forest. Desert plants need more **light** from the **sun** than those in a forest. Plants that thrive in a particular habitat do so because they get **enough** sun and water.





- Show a short video to explore more about what plants need to live.

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

**EXTEND**—Ask students to make a poster of a sunflower and label each part of the plant. Suggest that students research a recipe that uses sunflower seeds.

### 3. Check for understanding.

#### Activity Page



AP 2.4.1

#### Formative Assessment

Distribute Plant Needs (AP 2.4.1), and have students label each need shown in the picture. Then discuss their answers.

- » Students should be able to correctly identify the four elements from the reading.

Review student responses in the reading questions and on the Activity Page to determine student understanding of the following concepts:

- Plants have need for water, sunlight, air, and space.
- Different habitats provide different amounts of water, sunlight, air, and space. The plants that thrive in each habitat get enough of what they need.

#### Monitor Progress

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students expanded their understanding of plants' needs that must be met in Corbin's and their natural butterfly habitats. Discuss these questions:

- **What are your sources of water for the plants in your butterfly habitat?**
  - » rain, a sprinkler connected to a spigot, a watering can
- **How can you make sure there is enough light for the plants in your butterfly habitat?**
  - » Plant in a sunny location that is not shaded by trees or buildings.

## LESSON 2.5

# Lesson 2 Roundup: Plants and Sunlight and Water

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** Do plants need water and sunlight to grow?

**Today's Question:** Do plants need water and sunlight to grow?

**Tie to the Anchoring Phenomenon:** In this lesson, students conduct a test to find out what the plants that support butterflies in a habitat need to live.

## AT A GLANCE

### Learning Objective

- ✓ Draw conclusions from evidence about plants' needs for light and water.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS2-1

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 3 Planning and Carrying Out Investigations

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students draw conclusions following an investigation to test the causes and effects of different interactions among plants and sunlight and water.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

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change	enough	leaf	less
light	more	plant	root
soil	stem	sun	water

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

<b>conclude</b>	<b>control</b>	<b>data</b>	<b>evidence</b>
<b>fair test</b>	<b>investigate</b>	<b>organism</b>	<b>record</b>
<b>respond/response</b>			

## Instructional Resources

Activity Pages



AP 2.1.1  
AP 2.1.2

**Activity Page**  
Testing What Plants Need (AP 2.1.1 and 2.1.2)

## Materials and Equipment

- question board
- single-stalk flowering plants after sprouting such as a zinnia or marigold, or bush green beans, in individual pots (4 plants per student or group).

# THE CORE LESSON 2.5

## 1. Focus student attention on Today’s Question.

NGSS Elements



SEP 3

**Do plants need water and sunlight to grow?**

- Ask students to take out Testing What Plants Need (AP 2.1.1 and AP 2.1.2), which they have been working on throughout this lesson.
- Discuss the process students have taken to conduct their tests. Ask students to describe what went wrong and what went right.
- Explain that today, they are going to draw conclusions from the evidence they have collected. (See **Know the Standards.**)

## Know the Standards

### TEACHER DEVELOPMENT

**Performance Expectation 2-LS2-1:** Drawing conclusions from collected data involves higher-order thinking skills. In many cases, data are very clear, and obvious conclusions can be drawn. In other cases, results are not as clear, and results of tests can be inconclusive. Further testing or retesting may be necessary. Drawing conclusions means to process the data and explain what happened whether the hypothesis was correct or not. In some cases, mistakes have been made in the test, which corrupts the data and can lead to incorrect conclusions.

## Tie to the Anchoring Phenomenon

To make sure butterflies have what they need in a habitat to survive, the habitat must also provide what the plants that butterflies depend on need to thrive. Plant needs can be tested.

## 2. Hands-on interaction.

### Activity Pages



AP 2.1.1  
AP 2.1.2

- Have students observe their plants one more time before they write their conclusions in the space on Testing What Plants Need (AP 2.1.1 and AP 2.1.2).  
**Ask students,** Why might scientists record their observations?
  - » You don't have to remember what happened; you can look at your data. The data provides clues (evidence) that can help you draw conclusions.

- Discuss the results of the observations by asking these questions:
  - **Sunlight Test: What were the differences you observed between the plants that were given and not given sunlight?**
    - » Plants that were given sunlight were taller and greener than those that were not.

### NGSS Elements



SEP 3  
CCC 2

- **Water Test: What were the differences you observed between the plants that were given and not given water?**
  - » Plants that were given water were taller and greener than those that were not.
- **Sunlight and Water: What did you notice about the height of the two plants that got both water and sunlight?**
  - » They had very similar heights because they received water and sunlight.
- **Different Results: Why do you think it is possible for people to get different results?**
  - » If a plant were mistakenly watered or put in the sunlight, the results would have been different.

### Differentiation

**SUPPORT**—Some students may have difficulty drawing conclusions. Their plants may not have responded as they expected, especially if the test was compromised by accidentally watering a plant or exposing it to sunlight. Stress that conclusions can still be drawn from these data. The conclusion may be that the test has to be repeated to make sure it is not compromised. Emphasize that there is no need to try to draw conclusions about data that make no sense. When data don't make sense in scientific experiments, the experiments are repeated to make sure the data are correct.

### 3. Check for understanding.

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#### Activity Pages



AP 2.1.1

AP 2.1.2

#### Monitor Progress

#### Formative Assessment

Discuss student conclusions on Testing What Plants Need (AP 2.1.1 and 2.1.2) to determine student understanding of the following concepts:

- Only one variable can be tested at a time in a fair test.
- A scientific test will give evidence to show what plants need.
- Methodical observations are critical to collecting data and evidence in a fair test.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students drew conclusions from a test they conducted to determine plant needs for sunlight and water to make sure the habitat they design will meet the needs of butterflies and the needs of the plants butterflies need to thrive.

- **Ask students to use evidence from their fair tests to explain why they will need to make sure the plants in their butterfly habitats have enough light and water.**
  - » Plants need sun and water. They will wilt, not grow, or turn yellow if they don't get enough. If plants don't get what they need, they will not attract butterflies.

## LESSON 3

# Animal Diversity and Varied Habitats

### OVERVIEW

**Guiding Question:** How much variety is there among animals?

Lesson 3 Segments	Segment Questions	Advance Preparation
<b>3.1 Types of Animals Around Me</b> Students observe and collect data about the animals in their environment.	What animals can I see around where I live and go to school?	Gather materials for the activity, and arrange for a natural environment to explore. See Materials and Equipment.
<b>3.2 Animals in a Habitat</b> Students collect and sort data to describe what types of animals live in different habitats.	How can I describe the habitat of animals that live in the area where I live?	Gather materials for the activity. See Materials and Equipment.
<b>3.3 Animal Habitats</b> Students read to learn about animal life in different habitats around the world.	What are some different types of places where animals live?	Read Chapters 5 and 6 in the Student Book.
<b>3.4 Lesson 3 Roundup: Butterflies and Other Animals</b> Students adapt the butterfly habitat design from Lesson 1 to include animals.	How much variety is there among animals?	Gather materials for the activity. See Materials and Equipment.

### What's the Story?

**Summary:** In Lesson 3, students explore the diversity of animals around them and in different habitats on Earth.

**Learning Progression:** Lesson 3 builds on student understandings from previous lessons in which students learned about plant diversity and the needs of plants. In this lesson, students will explore the diversity of animals and learn why certain organisms can survive in certain habitats and others cannot.

**Guiding Phenomenon:** Focusing on building a natural habitat for one type of organism inspires students to explore different habitats that can and cannot meet the need for survival from one generation to another.

# Learning Objectives

By the end of Lesson 3, students will do the following:

- Classify animals.
- Observe and record data about habitats and the animals that live in them.
- Describe different habitats.
- Describe animals that live in different habitats.
- Compare and contrast animals from a variety of habitats.

# NGSS Standards and Dimensions

**Performance Expectation:** 2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

<p><b>Science and Engineering Practice</b></p> <p><b>3 Planning and Carrying Out Investigations</b></p> <p>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"><li>• Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)</li></ul>	<p><b>Disciplinary Core Idea</b></p> <p><b>LS4.D Biodiversity and Humans</b></p> <p>There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)</p>
<p><b>Crosscutting Concept</b></p> <p><b>1 Patterns</b></p> <p>Patterns in the natural and human designed world can be observed.</p>	<p><b>Understandings About the Nature of Science</b></p> <p><b>Scientific Knowledge Is Based on Empirical Evidence</b></p> <p>Scientists look for patterns and order when making observations about the world. (2-LS4-1)</p>

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)



## LESSON 3.1

# Types of Animals Around Me

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How much variety is there among animals?

**Today's Question:** What animals can I see around where I live and go to school?

**Tie to the Anchoring Phenomenon:** In this lesson, students explore the diversity of animals in their environment to begin to determine what types of animals would be appropriate in a natural habitat for butterflies.

## AT A GLANCE

### Learning Objective

- ✓ Classify organisms as animals.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson, students look for patterns of biodiversity in their environment. They ask questions about the types of organisms that can survive in the environment and distinguish between animals and other organisms and nonliving things.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

backbone	bird	desert	fall
fish	forest	fur	grassland
insect	lake	leg	ocean
pond	river	snail	spring
summer	whale	wing	winter

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare	contrast	coral	cycle
deciduous	diverse	habitat	meadow
observe	organism	plankton	prairie
record	season	stream	tropical
tundra			

### Instructional Resources

Activity Page



AP 3.1.1

#### Activity Page

Animals Around Me (AP 3.1.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- question board
- hand lenses (1 per student or pair)
- digital device to take pictures

## THE CORE LESSON 3.1

### 1. Introduce students to Lesson 3.

NGSS Elements



DCI LS4.D

Ask a volunteer to state the **Big Question** that you'll be answering in this unit, which is posted somewhere in the room—**What must be done to make a natural butterfly habitat?**

- Display the question board with the Big Question as the title.
- Record student responses as you ask these questions to activate and assess prior knowledge. Accept reasonable answers:

- **How can you tell the difference between a plant and an animal?**
  - » For example, animals move and have body parts, such as eyes and ears. Plants usually stay in one place.
- **How can you tell the difference between an animal and a nonliving thing, such as a rock or water?**
  - » Animals grow and change. They can make new animals. Nonliving things do not do these things.
- **How are animals different from each other?**
  - » Some are large like elephants. Some have fur, like a dog. Others have feathers, like a pelican. Some animals swim, some walk, some fly, and some crawl.
- **What types of animals have you seen around school and at home?**
  - » dogs, racoons, mice, birds, butterflies, snakes, cats, ants
- **How do we know what animals might be helpful or harmful to butterflies?**
  - » We can observe butterflies with different animals to see which ones coexist with them. We can also find out what animals eat butterflies and not put those in the butterfly habitat.

#### Activity Page



AP 3.1.1

- Distribute Animals Around Me (AP 3.1.1). Explain that students are going outside to look for animals and record what they find. They should not touch the animals, but they should carefully observe at least three animals they find and record each one by drawing a picture of it. (See **Know the Science**.)

Tell students that to answer the unit's Big Question about making a natural butterfly habitat, they will explore plants and animals to find out which would provide a place where butterflies can live and thrive.

Write the **Lesson 3 Guiding Question** where students can see it: **How much variety is there among animals?**

## Know the Science

## TEACHER DEVELOPMENT

**What Is an Animal?** Many people are confused about whether certain organisms are considered animals. An animal is a living organism that is multicellular, is a consumer, has sense organs, and has some type of nervous system that can respond to stimuli. All invertebrates, birds, fish, reptiles, amphibians, and mammals are animals. Unlike plants, animals consume living things. Animals can be invertebrates that don't have backbones, like snails and earthworms, or vertebrates, like deer, goldfish, and eagles.

## Tie to the Anchoring Phenomenon

Students ask questions about the biodiversity of plants and animals to identify patterns of organisms that support butterfly life.

## 2. Hands-on interaction.

NGSS Elements



SEP 1

- Give each student a hand lens. Allow around fifteen minutes for students to explore the animals in an outdoor environment near or on school grounds. As they explore, they should draw a picture of at least three different animals they encounter.
- Allow students to use digital devices to take pictures of animals in the local habitat. Alternatively, you could take pictures of animals to bring back to the classroom discussion.

Differentiation

**SUPPORT**—Model for students how to use a hand lens to examine an insect, worm, or larva. Discuss the properties of the animal, including color, number of legs, skin covering or shell, and type of movement. Then demonstrate drawing a picture that captures the details.

## 3. Guide discussion.

NGSS Elements



DCI LS4.D

- Discuss student findings by first making a list on chart paper of all the animals students recorded. As you record the list, discuss whether each is or is not an animal.
- Then ask these questions:
  - **What makes an animal different from other living and nonliving things?**
    - » Animals eat, move around, and have senses.
  - **What animals are the most common?**
    - » insects, birds, worms
  - **How will the animals you drew change over time?**
    - » They will grow and age.
  - **How are the animals you drew the same and different?**
    - » Same: They move, they eat, and they have senses to find food and get away from danger. Different: They are different sizes and shapes, eat different things, and have different colors and skin covering.
  - **Which of the animals you observed do you think butterflies would get along with?**
    - » other insects and animals that do not eat butterflies



- Show this video, stopping at 2:10, which gives an overview of the world of animals. Do not be concerned about naming the types of animals; emphasize the diversity of animals.

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

- Ask students to identify which animals they saw in the video that they also found in their own environment and which animals were not found.
  - » found: squirrels, birds, mosquitoes; not found: fish, bears, cows, lions

## 4. Check for understanding.

### Formative Assessment

Activity Page



AP 3.1.1

Monitor Progress

- Review students' responses from the discussion about their findings from Animals Around Me (AP 3.1.1) to determine student understanding of the following concepts:
  - Animals are different from plants and nonliving things.
  - There are lots of different types of animals, even in your environment.

See the Activity Page Answer Key for correct answers and sample student responses.

- Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

### Tie to the Anchoring Phenomenon

In this activity, students explored animals in the environment to begin to think about the types of animals that would support butterflies in a natural butterfly habitat. Corbin will have to figure out what types of animals eat butterflies so that those animals will not be attracted to the habitat. Then he will have to figure out the animals that coexist with butterflies. Discuss the following questions:

- **What kinds of animals would not eat butterflies?**
  - » worms, beetles, ladybugs, bees
- **What animals would eat butterflies?**
  - » birds, snakes, toads, frogs, spiders
- **What animals would compete with butterflies for food?**
  - » bees

## LESSON 3.2

# Animals in a Habitat

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How much variety is there among animals?

**Today's Question:** How can I describe the habitat of animals that live in the area where I live?

**Tie to the Anchoring Phenomenon:** In this lesson students expand their awareness of the diversity of animals in their local environment to determine what types of animals might appear in a natural butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Observe and record data about animals in local habitats.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will look for patterns among animals as they explore biodiversity in their immediate environment.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

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insect	lake	leg	ocean
pond	river	snail	spring
summer	whale	wing	winter

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compare	contrast	coral	cycle
deciduous	diverse	habitat	meadow
observe	organism	plankton	prairie
record	season	stream	tropical
tundra			

## Instructional Resources

### Activity Pages



AP 3.1.1  
AP 3.2.1

### Activity Pages

Animals Around Me (AP 3.1.1)

Animals in My Habitat  
(AP 3.2.1)

## Materials and Equipment

- printer to print pictures
- scissors (1 pair per student)
- colored pencils, crayons, or markers (1 set per student)
- pins or adhesive for temporary placement on wall or bulletin board
- question board

## THE CORE LESSON 3.2

### 1. Focus student attention on Today's Question.

#### Activity Page



AP 3.1.1

#### How can I describe the habitat of animals that live in the area where I live?

Ask students to take out their completed Animals Around Me (AP 3.1.1) from the last segment. Discuss the types of animals from their immediate environment they chose to draw.





- Review the master list of animals you compiled from student drawings, and discuss ways the animals can be sorted.
  - » shape, size, the way it moves, what it eats, covering
- **Ask students to describe the characteristics of the habitat the animals came from.**
  - » dry or wet, hot or cold, in full sun or shady, rocky or sandy
- **Ask students to describe the characteristics of another type of habitat or their own habitat in a different season.** Then have them explain how the animals are different in the other habitat or another season.
  - » For example: In a forest habitat, you find animals like deer, and you find animals like squirrels and birds that live in trees. In a marshy habitat, you find more insects, fish, and birds that eat fish.
- Explain that today you are going to sort the animals that students recorded yesterday into different categories. (See **Know the Science**.)

### Tie to the Anchoring Phenomenon

Students will categorize animals to determine which ones would support a natural butterfly habitat.

## 2. Hands-on interaction.

### Activity Pages

AP 3.1.1  
AP 3.2.1

- Distribute Animals in My Habitat (AP 3.2.1). Ask students to redraw two of the animals they recorded during the last segment on the Animals Around Me (AP 3.1.1). They can print out pictures of animals they captured with a digital device or draw the animal.
- Once the pictures of animals have been placed on Activity Page 3.2.1, have the students cut each picture along the dotted lines. Ask students to write their names or initials on the back of each picture.
- Then have students participate in a class sort. Using a bulletin board or large wall area, announce and label one of the following properties. Ask students to contribute one of their drawings to each sort by coming up to the board and attaching one of their animal pictures under the most appropriate label:
  - land animal, air animal, water animal
  - backbone, no backbone

## Know the Science

## TEACHER DEVELOPMENT

**Classifying Animals:** In addition to color, size, and shape, animals can be sorted in different scientific ways. Types of animals include mammals, fish, reptiles, birds, amphibians, and all invertebrates. They can be sorted by what they eat (other animals, just plants, other animals and plants).

- eats plants, eats meat, eats both plants and meat
- swims, flies, walks, crawls or slithers
- At the end of each sort, review the sort to make sure the class agrees that all animals have been sorted appropriately. Some animals may fit into two different categories. For example, frogs are both land and water animals. Then compare the different animals that have been sorted.
  - **How are the animals the same?**
    - » They all move, they all grow, and they all eat something.
  - **How are the animals different?**
    - » Some fly, some swim, some eat only plants, some eat other animals, some are big, and some are very small.
- After each discussion, ask students to remove their drawings and label. Then announce a new sort, and repeat the procedure.

Differentiation

**CHALLENGE**—Challenge students to find out the diet of five different animals. Then have them find out what types of animals eat butterflies.

### 3. Check for understanding.

#### Formative Assessment

Monitor Progress

Review students' responses in the sorting activity to determine student understanding of the following concepts:

- There is a wide diversity of animals even in the local environment.
- Animals vary in color, shape, size, and what they eat.
- Different animals live in different habitats.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students recognized that even in their immediate habitat, there are a wide variety of animals. Some may be more appropriate for a natural butterfly habitat than others. Corbin will have to figure out what types of animals eat butterflies so that those animals will not be attracted in great numbers to the habitat. Then he must figure out the animals that coexist with butterflies.

- **Discuss which animals students think would most likely be in a natural butterfly habitat in the local environment.**
  - » other insects such as ladybugs, ants, and beetles; frogs; squirrels; birds
- **Discuss how they can discourage animals that eat butterflies.**
  - » Don't put a bird feeder in the habitat so there won't be too many birds.

## LESSON 3.3

# Animal Habitats

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How much variety is there among animals?

**Today's Question:** What are some different types of places where animals live?

**Tie to the Anchoring Phenomenon:** In this lesson, students expand their awareness of different habitats and the animals that live in each to determine the best habitat for butterflies.

## AT A GLANCE

### Learning Objectives

- ✓ Recall several types of habitats.
- ✓ Describe types of animals that live in various habitats.

### Instructional Activities

- teacher Read Aloud
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will ask questions about patterns of animal life in different habitats.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

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pond	river	snail	spring
summer	whale	wing	winter

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compare	contrast	coral	cycle
deciduous	diverse	habitat	meadow
observe	organism	plankton	prairie
record	season	stream	tropical
tundra			

## Instructional Resources

Student Book



Ch. 5  
Ch. 6

**Student Book, Chapter 5**  
“What Are Some Animal Habitats?”

**Student Book, Chapter 6**  
“Animals Change with the Seasons”

Activity Page



AP 3.3.1

**Activity Page**  
Animal Changes (AP 3.3.1)

## Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- globe or world map

## THE CORE LESSON 3.3

### 1. Focus student attention on Today's Question.

NGSS Elements



DCI LS4.D

**What are some different types of places where animals live?**

Review the animal sorting activity. Then discuss these questions to activate prior knowledge:

**Recall how you described the habitat that we explored.**

» dry, wet, shady, open to the sun, hot, warm, cold

**Describe a different habitat near where you live.**

» a city center, a neighborhood with lots of trees, an open area with lots of fields

**How are the animals different in that habitat?**

» more insects, birds, squirrels, mice, deer

Explain that today you are going to read about different habitats and the different kinds of animals that live in them. (See **Know the Science.**)

#### Tie to the Anchoring Phenomenon

This lesson expands student awareness of the diversity of habitats and animal life on Earth to help students determine the components of a natural butterfly habitat.

### 2. Read together: "What Are Some Animal Habitats?"

Student Book



Ch. 5

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

## Know the Science

## TEACHER DEVELOPMENT

**Animal Habitats:** An animal habitat is a natural environment in which that particular animal thrives. Animal habitats can be described in part by soil, moisture, range of temperature, and availability of sunlight. Some habitats seem to have little to offer but can support animal life. Pigeons find what they need in city habitats with very little vegetation. Termites live in a habitat in a wood-framed house. In addition to domesticated pets, mice and roaches also thrive in human dwellings.

Pages 20–21

**Ask students to turn to page 20 of the Student Book as you read aloud. Remind them that the title of this chapter is “What Are Some Animal Habitats?” Tell them to think how different animals are in different habitats.**

**Ask students to look at the pictures on pages 20 and 21 as you read aloud.**



Some animals live in forests where trees lose their leaves in the fall. Birds and squirrels make nests in the trees. They find food on the forest floor. Deer eat leaves from the plants. They blend with the habitat when danger is near. Rabbits, raccoons, and insects live in these forests, too. Many types of birds nest in forest trees.



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**LITERAL**—What do animals need to survive?

» air, food, water, and protection or shelter

**INFERENTIAL**—Are the plant habitats we learned about, like forests, deserts, prairies, and mountains, the same as the animal habitats?

» Yes, plants and animals live together in habitats.

**INFERENTIAL**—Deer eat plants from the forest floor. How else do you think they survive in the forest?

» They find shelter under trees and get water from ponds and streams.

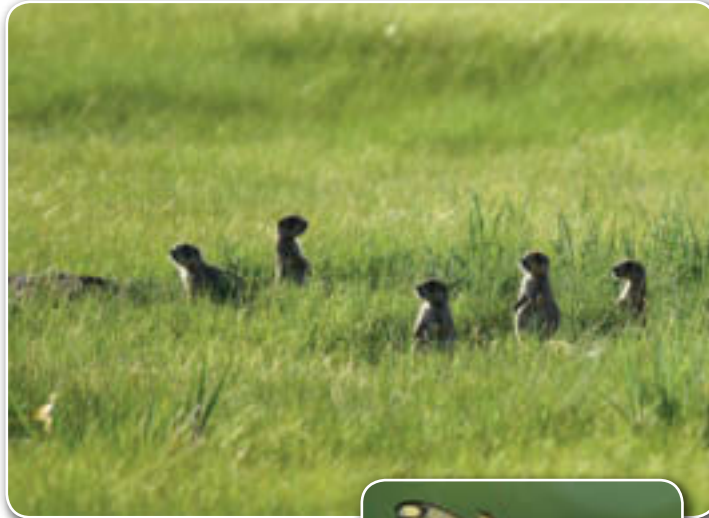


Many animals live in tropical forests. Tropical forests are warm and wet. Worms live in the wet soil in these forests. They get food from the dead leaves. Moles dig burrows under the wet ground. They eat insects that live under the ground.

The key near this giant blue earthworm lets you notice how big the worm is.



Can you guess where a prairie dog lives? If you said in a prairie, then you're right! Prairie dogs live in tunnels under the ground. Their burrows provide homes for other prairie animals, like toads and jackrabbits.



Butterflies live in lots of different habitats. Many live in prairies. They get food from wildflowers. They lay their eggs on the plants. When the caterpillars hatch, they eat the plants, too.



23

**LITERAL**—What is one type of habitat butterflies live in?

» a prairie

Deserts and tundras are very dry habitats. Deserts can be very hot. Tundras can stay very cold. These habitats have few trees. Lizards and scorpions are two kinds of desert animals. Lizards have scales on their feet. The scales protect them from the hot sand. Scorpions hunt at night when it is cooler.



The arctic hare also lives in a dry, cold place, the tundra. The hare has thick fur to keep it warm. Its fur is white in winter and brown in summer. It can hide from danger more easily.



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**EVALUATIVE**—Deserts and tundras both are dry habitats without a lot of rain. Which habitat would you rather live in and why?

» Accept reasonable answers. Invite students to give reasons for their opinions.

**CORE VOCABULARY**—Explain that a **desert** is an area on Earth that gets very little rain. Animals that live in the desert must be able to do so without a lot of water. A **forest** habitat is filled with trees. Many animals in forest habitats get both food and shelter from trees. A **grassland** is a type of habitat found in prairies, where there are few trees. Grasslands provide food for **insects**, such as butterflies and a lot of animals that eat plants. Insects are the largest group of animals on Earth. They are often smaller than vertebrates, but there are more of them. Insects all have six **legs**, and most have **wings**. They do not have **backbones**, like mammals, **fish**, and **birds**. Few live in the **oceans** or very cold places. Many animals, such as moles and many birds, eat insects for food.

Not all animals live on land. Many live in water. Some animals live in fresh water. Fresh water is water that is not salty. Lakes, rivers, and streams are freshwater habitats.

Many kinds of fish live in fresh water. They have body parts that help them move in the water. They get oxygen that is in the water, too. A flowing stream is the habitat for this trout.



Mussels are freshwater animals, too. They have shells that form in many shapes and colors. Special body parts help them remove tiny bits of food from the water. Freshwater mussels live in lake, river, and stream habitats.



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**INFERENTIAL**—What other kinds of animals live in freshwater habitats?

» insects, frogs, some turtles, alligators

**INFERENTIAL**—What are some freshwater habitats near us?

» local rivers, lakes, creeks, streams, ponds, or reservoirs

**CORE VOCABULARY**—Explain that freshwater habitats include **lakes**, **ponds**, and **rivers**. A **river** is a large natural stream of water flowing to the sea, a lake, or another river. A **pond** is a small body of still water. A **lake** is a large body of standing water.

**CHALLENGE**—Display a map, and have students research to identify major rivers and lakes on Earth. If your area has lakes or rivers, have students identify some that are nearby.

**Ask students to look at the pictures on pages 26 and 27 as you read them aloud.**

Oceans are saltwater habitats. Plankton are tiny living organisms that drift with the water. Plankton are too small to be seen without a microscope. Some make their own food. Some eat other plankton. They are also food for other ocean animals, including whales.



Animals in oceans can be very small or very large. Whales are some of the largest ocean animals. The blue whale is giant. It can be as big as two or three school buses!



Sea stars live in the ocean, too. They have body parts that help them move across the ocean floor. Another body part sucks up food in one swoop! There are many shapes, sizes, and colors of sea stars.



This chapter describes only a few animals that live in Earth's many habitats. Did you know that there are over eight million different kinds of animals on Earth? How can scientists group them?

You can group animals by their body covering. You can group them by what they eat. You can also group animals by whether they have a backbone. Mammals, fish, amphibians, and reptiles are some animals that have backbones. Animals that don't have backbones include insects, snails, and coral.



Which of these animals have backbones? Which animals do not? Do you have a backbone?

27

**LITERAL**—What is the difference between an ocean and a lake?

- » An ocean is much bigger than a lake. Oceans are saltwater and lakes are most usually freshwater.

**INFERENTIAL**—Why do you think a blue whale would not survive in a pond?

- » The blue whale is a saltwater animal. It needs salt water from an ocean. It is also very large, so a pond would likely not be large enough for it.

**CORE VOCABULARY**—Explain that an **ocean** is a very large body of salt water. Oceans cover over half of Earth's surface. Saltwater **fish** and animals like **whales** and sharks live in the oceans. Some types of **snails**, which have shells but no **backbone**, live in salt water. Other types live in fresh water.

**CHALLENGE**—Display a map, and have students research to identify the oceans on Earth.





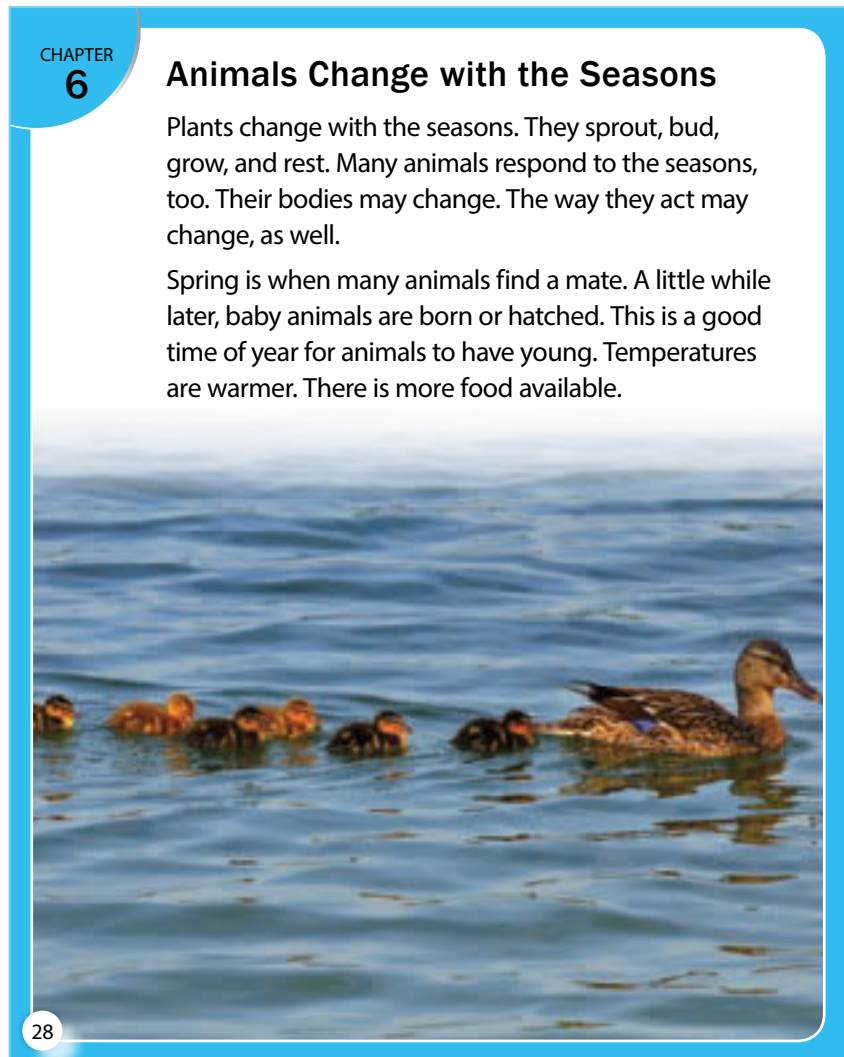
- Show a video to explore different kinds of animals that grow in different habitats. See the Online Resources Guide for a link to the recommended video:  
[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

### 3. Read together: “Animals Change with the Seasons.”

**Pages 28–29**

**Ask students to turn to page 28 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “Animals Change with the Seasons.” Tell them to think how animals in the local habitat change with the seasons.**

**Ask students to look at the pictures on page 28 and 29 as you read aloud.**



During the summer, the days are long and warm. Young animals grow and learn how to survive. Animals that live underground come out of their dens to find food. Leaves, fruits, and seeds are plentiful. There is food for meat-eating animals to catch and eat. Some animals shed their thick coats in summer. Summer is when baby animals grow the most.



A baby deer grows quickly over the summer.



A red fox sheds its heavy winter coat.



Garter snakes come out from underground to find food.

29

**INFERENTIAL**—What changes do you see in the animal life in our local habitat in spring and summer?

- » Answers will vary depending on the local habitat, but students may say that they hear frogs and crickets. They may see different kinds of birds. They may see bats, skunks, opossums, or raccoons.

**INFERENTIAL**—Why do you think some animals shed their fur during the summer?

- » In summer, the temperatures are usually much warmer. The fur coat would make them too hot.

**CORE VOCABULARY**—Explain that in **spring** and **summer**, the days become longer and the nights shorter. Temperatures get warmer as the days get longer. In **fall** and **winter**, the days get shorter, the nights get longer, and temperatures drop. Use a globe or world map to explain that while spring and summer occur in March through September in the Northern Hemisphere, spring and summer occur in October through February in the Southern Hemisphere.



Animals can sense the changes in fall. They can tell that the days are getting shorter. They can feel the temperatures getting cooler. Some animals begin to prepare their winter homes. They gather and store food. Squirrels stay in the same habitat year-round. They bury nuts to eat over the winter.



Other animals move to a warmer place. Monarch butterflies cannot survive a cold winter. Instead, they travel south where the weather is warmer. This journey can be thousands of miles. The butterflies gather on trees to rest along the way. Monarch butterflies gather together in large groups as they travel when the seasons change.



Winter is cold in many places. Animals that don't move to another place must find a way to stay warm. Some animals spend the winter in dens and burrows under the ground. They spend most days resting and sleeping. Their bodies do not use much energy. This means that they also do not need much food. Many bears rest in dens during the winter.



31

**INFERENTIAL**—Describe differences you see in animal life in fall and winter in our local habitat.

- » Answers will vary depending on the local habitat, but in fall and winter, students might say that there are fewer insects and different types of birds.

**LITERAL**—Where do monarch butterflies go when it starts to get cold in winter?

- » They fly south.

**INFERENTIAL**—How do animals survive over a cold winter?

- » Some animals, like squirrels and mice, survive on food they stored during the other seasons. Others sleep through the winter.

**EXTEND**—Have students investigate about where birds sleep at night. Many, like blue jays and cardinals, hide in the foliage of trees and bushes. Some, like woodpeckers, sleep in tree cavities or openings. Students might also research how some fish sleep.

## 4. Check for understanding.

Activity Page



AP 3.3.1

### Formative Assessment

Distribute Animal Changes (AP 3.3.1), and have students match the animal to the habitat it lives in. Then discuss their answers.

Review student responses in the reading questions and to Animal Changes (AP 3.3.1) to determine student understanding of the following concepts:

- Different habitats, such as prairie, desert, tropical, or forest habitats, exist on Earth.
- Different animals live naturally in different habitats.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

### Tie to the Anchoring Phenomenon

Monitor Progress

In this activity, students expanded their understanding of the diversity of animals and the different habitats. They recognized that different kinds of butterflies thrive in different habitats. Corbin will have to identify what type of butterfly will be able to thrive in the habitat they design and how they can get the butterflies to return year after year.

- **Discuss what type of habitat students are planning to build a butterfly habitat in.**
  - » dry, wet, shady, open to the sun, hot, warm, cold
- **Discuss how the seasons change in the habitat and how that will affect the butterflies.**
  - » Butterflies will leave a habitat that experiences cold winters. They will live year-round in a tropical habitat.

## LESSON 3.4

# Lesson 3 Roundup: Butterflies and Other Animals

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How much variety is there among animals?

**Today's Question:** How much variety is there among animals?

**Tie to the Anchoring Phenomenon:** In this lesson, students learn about different butterflies, their different habitats, and the diversity of other animals they need to live with to survive.

## AT A GLANCE

### Learning Objective

- ✓ Compare and contrast animals in a variety of habitats.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS4-1

**Disciplinary Core Idea:** LS4.D Biodiversity and Humans

**Science and Engineering Practice:** 1 Asking Questions

**Crosscutting Concept:** 1 Patterns

In this lesson segment, students will look for patterns among animals and plants as they explore biodiversity in their immediate environment.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

backbone	bird	desert	fall
fish	forest	fur	grassland
insect	lake	leg	ocean
pond	river	snail	spring
summer	whale	wing	winter

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

compare	contrast	coral	cycle
deciduous	diverse	habitat	meadow
observe	organism	plankton	prairie
record	season	stream	tropical
tundra			

## Instructional Resources

Activity Page



AP 1.4.1

### Activity Page

Butterfly Habitat (AP 1.4.1)

## Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- colored pencils, crayons, or markers (1 set per student)
- question board

## THE CORE LESSON 3.4

### 1. Focus student attention on Today's Question.

NGSS Elements



DCI LS4.D

#### How much variety is there among animals?

- Review the different habitats students learned about in the previous lesson segments: tropical, prairie, desert, woodlands, and water.
- Discuss the types of butterflies students have seen in their local habitat.
- Show a two-minute video of a monarch butterfly eating from milkweed flowers.
  - Review information from the video by asking this question:
    - **How do butterflies eat?**
      - » Their feet “taste,” and they use a long tube to suck up nectar from flowers.

Online Resources



See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Tie to the Anchoring Phenomenon

Students will learn about other animals that live in the same habitat as butterflies.

## 2. Research.

### Online Resources



- Show a video of the monarch butterfly life cycle. Tell students to look for how butterflies in the video use plants.

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

- **Review from Lesson 1 how butterflies use plants.**
  - » 1. They eat nectar from flowers. 2. They lay eggs on plant leaves and stems. The eggs develop on plants and grow. When caterpillars hatch, they eat the leaves of plants, which they need to grow. 3. Butterflies rest on plants and use trees and shrubs for protection.
- **What other animals live in the same habitat as butterflies in our local environment?**
  - » insects, worms, birds, squirrels, chipmunks
- **How do other animals interact with the plants in a habitat?**
  - » Some insects, like bees, also eat nectar. Some animals may eat the plant leaves and stems. Some animals leave waste that provides nutrients for plants to grow.
- **How do other animals interact with butterflies in a habitat?**
  - » Some animals, like birds and other insects, eat butterflies or caterpillars that would have become butterflies. Other animals, like ladybugs, ants, and chipmunks, just live alongside and do not help or harm butterflies.

### NGSS Elements



DCI LS4.D

Differentiation

**CHALLENGE**—Challenge some students to find out what animals eat butterflies. These will include birds and other insects. Have students make a poster to let others know to not let those animals in the butterfly habitat they design.

### 3. Plan.

#### Activity Page



AP 1.4.1

- Have students take out Butterfly Habitat (AP 1.4.1) from when they designed a butterfly habitat with plants in Lesson 1.4. If students no longer have it or need more space to add animals, provide a new copy. Review the type of habitat they designed and what plants they included.
- Now ask students to consider other animals, besides butterflies, that they can include in addition to the plants they drew on Activity Page 1.4.1. Ask these questions for students to consider. (See **Know the Science.**)
  - **Is there anything that can be done to protect butterflies from animals that will eat them?**
    - » Not really. The best thing to do is to make sure there is a variety of plants so animals are not trying to all eat the same food and get the same shelter.
  - **Is there anything that can be done to make sure the butterflies return to the habitat year after year?**
    - » Plant a variety of flowering plants that butterflies like.
- Ask students to make any changes to their natural butterfly habitat design to accommodate other animals that will come to live there.

#### NGSS Elements



SEP 1

CCC 1

DCI LS4.D

### 4. Check for understanding.

#### Formative Assessment

Ask students to present their revised habitat design, explaining any changes they made to accommodate other animals.

Review student presentations and responses to questions about their plans for a butterfly habitat to determine student understanding of the following concepts:

- There is a wide diversity of plants and animals throughout Earth.
- Other animals will live in a butterfly habitat. Some may be harmful to butterflies, and some may be supportive of the habitat.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

Monitor Progress

## Know the Science

## TEACHER DEVELOPMENT

**Butterfly Ecosystems:** Butterflies are a part of many ecosystems. In the larval stage, they eat leaves and other plant matter. In the adult butterfly stage, they drink nectar. They rely on plants that have needs for water, sun, nutrients, air, and space to grow. The decay of other plants and waste of animals provide nutrients for the plants that support butterflies. Other animals may eat butterflies or compete with them for food. In designing a butterfly habitat, plant needs, butterfly needs, and the needs of other animals must be considered.

## Tie to the Anchoring Phenomenon

In this activity, students recognized that animals share habitats with other animals that can compete for food, eat the butterflies, or support the habitat. As Corbin builds the butterfly habitat, he will have to consider other animals that will live there, too.

- **Categorize and then list the animals students expect will visit their butterfly habitat.**
  - » insects: bees, ants, wasps, crickets; mammals: mice, raccoons, opossums; birds: cardinals, blue jays



## LESSON 4

# Plant and Animal Relationships

### OVERVIEW

**Guiding Question:** How can we model an animal spreading pollen or seeds?

Lesson 4 Segments	Segment Questions	Advance Preparation
<b>4.1 Plants Need Animals</b> Students describe ways plants depend on animals to spread seeds and pollen.	How do animals help plants by spreading pollen and seeds?	Gather materials for the activity, and arrange for a natural environment to explore. See Materials and Equipment.
<b>4.2 Animals Need Plants</b> Students explain how animals depend on plants.	How do animals depend on plants?	Read Chapter 7 in the Student Book.
<b>4.3 Lesson 4 Roundup: Plants and Animals Depend on Each Other</b> Students model how animals disperse seeds and pollinate plants.	How can we model an animal spreading pollen or seeds?	Gather materials for the activity. See Materials and Equipment.

### What's the Story?

**Summary:** In Lesson 4, students explore the relationship of plants and animals within a habitat.

**Learning Progression:** Lesson 4 builds on student understandings from previous lessons in which students learned about plant and animal diversity and the needs of both plants and animals. In this lesson, students will explore relationships plants and animals have within an environment in which they both live.

**Guiding Phenomenon:** Focusing on building a natural habitat for one type of organism inspires students to explore different habitats that can and cannot meet the need for survival from one generation to another.

### Learning Objectives

**By the end of Lesson 4, students will do the following:**

- Describe ways that plants and animals depend on each other.
- Model ways that animals help propagate plants by spreading seeds and pollen.

# NGSS Standards and Dimensions

**Performance Expectation:** 2-LS2-2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

<p><b>Science and Engineering Practice</b></p> <p><b>2 Developing and Using Models</b></p> <p>Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"><li>• Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)</li></ul>	<p><b>Disciplinary Core Idea</b></p> <p><b>LS2.A Interdependent Relationships in Ecosystems</b></p> <p>Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)</p>	<p><b>Crosscutting Concept</b></p> <p><b>2 Cause and Effect</b></p> <p>Events have causes that generate observable patterns. (2-LS2-1)</p>
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For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## LESSON 4.1

# Plants Need Animals

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How can we model an animal spreading pollen or seeds?

**Today's Question:** How do animals help plants by spreading pollen and seeds?

**Tie to the Anchoring Phenomenon:** In this lesson, students learn how plants and animals interact in their habitat and then consider how animals will help pollinate and spread seeds in a butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Describe ways in which plants depend on animals to disperse seeds and pollen.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practice:** 1 Asking Questions

**Science and Engineering Practice:** 2 Developing and Using Models

**Crosscutting Concept:** 2 Cause and Effect

In this lesson, students ask questions about cause-and-effect relationships between animals and plants in a habitat.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

**need**      **pollen**      **seed**      **spread**

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

**depend**      **ecosystem**      **model**      **organism**  
**pollinate/pollination**      **related/relationship**

### Instructional Resources

Activity Page



AP 4.1.1

**Activity Page**  
Seed Search (AP 4.1.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing
- question board
- hand lenses (1 per student or pair)

## THE CORE LESSON 4.1

### 1. Introduce students to Lesson 4.

NGSS Elements



CCC 2  
DCI LS2.A

Ask a volunteer to state the **Big Question** that you'll be answering in this unit, which is posted somewhere in the room—**What must be done to make a natural butterfly habitat?**

- Display the question board with the Big Question as the title.
- Record student responses as you ask these questions to activate and assess prior knowledge. Accept reasonable answers:
  - **Can both plants and animals live in one habitat?**
    - » Yes, plants and animals can live together in habitats.
  - **How do butterflies interact with plants?**
    - » They drink nectar. They rest on leaves. As caterpillars, they eat leaves.
  - **Do butterflies help plants?**
    - » Accept any answers with the understanding that they will be learning about how animals and plants interact in this lesson.

#### Online Resources



- Show a video for students to see how seeds develop from flowers. Explain that plants produce fruit, which is the packaging for their seeds. The seeds will make new plants. Some seeds are small, and some are large. Make a class list of fruits with seeds students have found or know about.
  - » acorns, maple seeds, dandelion, watermelon seeds, tomato seeds, apple seeds, cherry pits, burdock burrs, sunflower seeds
- Distribute Seed Search (AP 4.1.1). Explain that students are going outside to look for fruits with seeds and record what they find. (See **Know the Science 1**.)

#### Activity Page



AP 4.1.1

Tell students that, to answer the unit's Big Question about making a natural butterfly habitat, they will explore plants and animals to find out which would help provide a place where butterflies can live and thrive.

Write the **Lesson 1 Guiding Question** where students can see it: **How can we model an animal spreading pollen or seeds?**

### Tie to the Anchoring Phenomenon

Students learn about the interaction of plants and animals in a habitat, to plan for how animals and plants will interact in a butterfly habitat.

## 2. Hands-on interaction.

#### NGSS Elements



SEP 1

CCC 2

DCI LS2.A

Differentiation

- Give each student a hand lens. Allow about fifteen minutes for students to look for seeds at an outdoor environment near or on school grounds. As they explore, they should draw a picture of at least four different seeds they see.
- It is unnecessary but optional to allow students to collect seeds. Carefully monitor materials that students collect.
- Have students wash their hands upon conclusion of handling materials outdoors.

**SUPPORT**—Model for students how to use a hand lens to examine a seed. Discuss the properties of the seed, turning it over to see its texture, size, shape, and color.

## Know the Science

## TEACHER DEVELOPMENT

**1. Fruit and Seeds:** Fruit is the packaging structure for the seeds of flowering plants. The role of fruit is to protect and distribute plant seeds. Plant fruits like cucumbers, tomatoes, oranges, apples, and kiwi have many seeds. Other fruits like peaches, avocados, and acorns have one seed. Humans eat some fruits with seeds in them, like tomatoes, but spit out the seeds from other fruits, like watermelon.

### 3. Guide discussion.

#### NGSS Elements



SEP 1  
CCC 2  
DCI LS2.A

- Discuss student findings by first making a list on chart paper of all the seeds students recorded. As you make the list, discuss what types of seeds students found.
- Then ask this question:
  - **How did each seed get to the place you found it?**
    - » It fell from a tree. It blew off a flower. It stuck to clothing. An animal moved it.

#### Online Resources



- Show this two-minute video, which gives an overview of how seeds are dispersed.

See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

- Then ask these questions. (See **Know the Science 2.**)
  - **Which seeds in the video are spread by animals?**
    - » acorns, berries, burrs
  - **Which seeds in the video are spread by wind or gravity?**
    - » dandelions, maple seeds
- Show this three-minute video for an overview of plant pollination. Then ask these questions:
  - **What is pollination?**
    - » An animal moves pollen from one flower to another. One of the cells in the pollen mixes with the egg of another flower and produces fruit and seeds.
  - **Which animals move pollen from flower to flower?**
    - » birds, bats, bees, butterflies

## Know the Science

## TEACHER DEVELOPMENT

**2. Seeds:** Depending on the time of year and location, students are likely to find different kinds of fruits containing seeds. At different times, a burdock fruit (burr) will be green or brown. Other “hitchhikers” like grappling-hook, beggar-ticks, and stick-tight seeds may or may not be abundant. Different types of maples release fruits that contain seeds, such as the familiar “helicopters,” at different times. Nut trees, including walnuts and hickory, drop fruits with seeds in the fall.

## 4. Check for understanding.

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Activity Page



AP 4.1.1

### Formative Assessment

Review student responses in the discussion and in Seed Search (AP 4.1.1) to determine student understanding of the following concepts:

- Animals help plants live and grow by pollinating and distributing seeds.
- Plants and animals interact in a habitat.

See the Activity Page Answer Key for correct answers and sample student responses.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

### Tie to the Anchoring Phenomenon

Monitor Progress

In this activity, students explored how animals help plants and to recognize that as animals, butterflies will help pollinate the plants in a butterfly habitat. Corbin will have to make sure that the habitat will have a lot of plants that attract butterflies.

## LESSON 4.2

# Animals Need Plants

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How can we model an animal spreading pollen or seeds?

**Today's Question:** How do animals depend on plants?

**Tie to the Anchoring Phenomenon:** In this lesson, students expand their awareness of how animals and plants depend on each other and consider how plants and animals will interact in a butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Summarize ways in which animals depend on plants in their environments.

### Instructional Activities

- teacher Read Aloud
- class discussion
- question generation

### NGSS References

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in Ecosystems

**Science and Engineering Practices:** 2 Developing and Using Models; 1 Asking Questions

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students will ask questions about the interdependence of plants and animals in a habitat.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)



## Core Vocabulary and Language of Instruction

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**need**      **pollen**      **seed**      **spread**

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**depend**      **ecosystem**      **model**      **organism**  
**pollinate/pollination**      **related/relationship**

### Instructional Resources

Student Book



Ch. 7

**Student Book, Chapter 7**  
“Plants and Animals Depend on Each Other”

Activity Page



AP 4.2.1

**Activity Page**  
Plants Pollinators Like (AP 4.2.1)

### Materials and Equipment

- internet access and the means to project images/video for whole-class viewing

## THE CORE LESSON 4.2

### 1. Focus student attention on Today’s Question.

NGSS Elements



CCC 2  
DCI LS2.A

#### How do animals depend on plants?

Review the seed collection activity in the last segment and how animals help to spread plant seeds. Then discuss these questions to activate prior knowledge:

- **How do plants need animals?**
  - » to move pollen from flower to flower to make seeds and to spread seeds
- **How do animals need plants?**
  - » Animals need plants for food and shelter.

- Explain that today you are going to read how plants and animals depend on each other. (See **Know the Science.**)

### Tie to the Anchoring Phenomenon

This lesson expands student awareness of the interconnections between plants and animals that will be the basis of a natural butterfly habitat.

## 2. Read together: “Plants and Animals Depend on Each Other.”

Student Book



Ch. 7

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

## Know the Science

## TEACHER DEVELOPMENT

**Interdependence:** Plants and animals assist each other with survival. In future grades, students will learn about the exchange of oxygen and carbon dioxide between animals and plants and the atmosphere. At this level, animals provide fertilizer through decomposition and waste, which plants use to grow. Animals also assist in pollinating plants and spreading plant seeds. Because plants make their own food, they are the base of the food web. Many animals eat only plants, but even carnivores depend on animals that eat plants. In addition to oxygen and food, plants also provide shelter for animals.

Pages 32–33

Ask students to turn to page 32 of the Student Book as you read aloud. Remind them that the title of this chapter is “Plants and Animals Depend on Each Other.” Tell them to think how they depend on plants.


Ask students to look at the pictures on pages 32 and 33 as you read aloud.

CHAPTER  
7

### Plants and Animals Depend on Each Other

Plants and animals live together in habitats. They share the same space. They share some of the same resources. Many plants and animals depend on each other to survive. Some plants cannot make new, young plants without the help of animals. Many animals would not have food or shelter if it weren't for plants.

How might trees help this frog survive?

A close-up photograph of a bright green tree frog with large, dark eyes, perched on a brown tree branch. The frog's skin is smooth and has a slight sheen. The background is dark and out of focus, showing some green foliage.

32

Many plants depend on animals to help them make new plants. Insects such as bees and butterflies land on flowers. They pick up a sticky powder called pollen. Then they carry the pollen to another flower. The plant uses this pollen to reproduce.

Larger animals carry fruits or seeds on their bodies. They can stick to an animal's fur. Squirrels bury seeds or fruits and forget about them. Some animals also eat plants and fruits from plants. Then they leave the seeds in their droppings.

Can you see the pollen on the butterfly's body?



These burrs have seeds inside. They stick to animal fur.

33

**INFERENTIAL**—What would happen if there were no plants?

- » Animals would die because they would have nothing to eat, and they would have no shelter.

**EVALUATIVE**—Some animals eat seeds. What plants do you like to eat?

- » Accept reasonable answers. Invite students to give reasons for their opinions.

**LITERAL**—How do plants depend on animals?

- » Animals pollinate plants and distribute seeds.

**CORE VOCABULARY**—Show a video about pollination. Explain that **pollen** is a fine powder produced by certain plants. Some pollen floats through the air and lands on other plants. Bees, butterflies, and other animals get covered with pollen when they eat nectar. They **spread** the pollen, called pollination, when they fly from flower to flower, drinking nectar. Plants **need** wind or pollinators to mix the pollen from two plants in order to make **seeds** that produce new plants.

Many animals depend on berries, buds, leaves, or fruits from plants for food. Birds, frogs, raccoons, and apes are some animals that use plants for shelter. Some animals climb trees for safety.



Plants provide shelter for butterflies. They also provide food. Butterflies drink a sweet nectar that flowers produce. Caterpillars hatch on plants and eat the leaves while they grow.



34

**LITERAL**—What needs do butterflies meet using plants?

» The butterflies get shelter and food.

**LITERAL**—How do butterflies use plants as part of the butterfly life cycle?

» They use plants to hatch the caterpillars. Caterpillars also eat the plants.

You have read a lot about many different types of plants, animals, and their habitats. Corbin has, too! He now knows that butterflies depend on certain plants for food. He knows butterflies cannot live in a habitat where those types of plants do not grow. Corbin also knows that for the right plants to grow and attract butterflies, the plants also must get what they need in their habitats.



35

**LITERAL**—What does a habitat need to attract butterflies?

- » flowers and water

**EVALUATIVE**—What type of habitats would be best for butterflies?

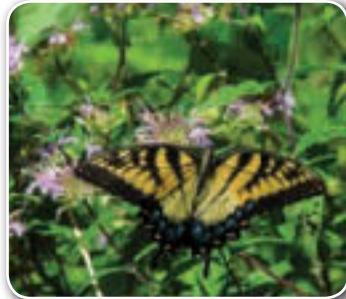
- » habitats with the right amount of water, sun, and heat for flowers to grow

**EVALUATIVE**—What type of habitats would be less likely for butterflies?

- » dry habitats where plants have trouble growing



Corbin and his friends discovered in the library that caterpillars like violets and milkweed. The caterpillars get energy from eating the plants. The group discovered that butterflies like a lot of flowers with nectar. The butterflies need a lot of food as they migrate. Each flower bed the butterflies stop at is a place to rest and get food. This gives Corbin an idea! What if the class added flowering plants to the land lab to attract butterflies? This could make a nice gift for Mrs. Carver, even better than a picture book.



36

**LITERAL**—What type of flowers do caterpillars like?

- » violets and milkweed

**LITERAL**—What about the flowers attracts the butterflies?

- » The butterflies like the nectar.

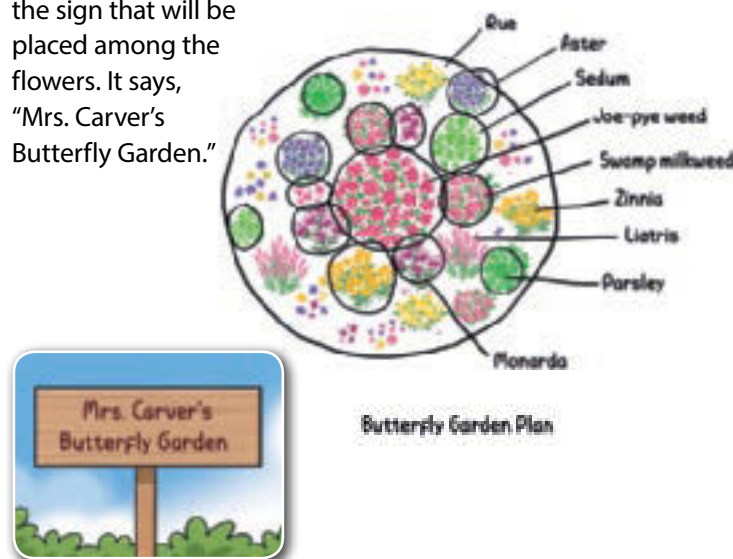
**EVALUATIVE**—Why would the butterflies need to rest and get food?

- » The butterflies have to fly over a long distance from the warm place they stay in the winter.

Corbin shares his idea with his classmates. They want butterflies to live at the land lab someday.

The students secretly meet with their principal. They get permission to plant a butterfly area in the land lab. They want butterflies to return there year after year. They will choose wildflowers that grow naturally year after year in this particular habitat, too.

On their next trip to the land lab, Mrs. Carver's students surprise her with their plan. They show her their list of plants and where they will plant them. They also present her with the sign that will be placed among the flowers. It says, "Mrs. Carver's Butterfly Garden."



37

### **LITERAL**—How do butterflies help plants?

- » Butterflies pollinate plants and help them reproduce.

### **LITERAL**—How do plants help butterflies?

- » Plants provide food and shelter for butterflies.

**INFERENTIAL**—Corbin and his classmates plan and build a butterfly flower bed at the land lab. How can you find out what types of plants butterflies like so that you and your class could build your own school butterfly flower bed?

- » Observe butterflies in a garden, ask people who have butterfly gardens, ask people at a plant store, look online, or look in the library.

Activity Page



AP 4.2.1

- Distribute Plants Pollinators Like (AP 4.2.1), and have students record plants they learn about that pollinators like.
- Show a video to learn about flowers that butterflies and other pollinators like.





See the Online Resources Guide for a link to the recommended video:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

**SUPPORT**—Assist students in learning about plants that butterflies and other pollinators like by searching together online and visiting the library for research. You can also provide a variety of research books with marked pages for students to use.

**CHALLENGE**—Challenge students to find out more about beekeeping. If possible, have a local beekeeper come and discuss with the class the importance of pollinators. Students can make posters with the title “Save the Bees.”

### 3. Check for understanding.

#### Activity Page



AP 4.2.1

#### Formative Assessment

Review student responses in the reading questions and to Plants Pollinators Like (AP 4.2.1) to determine student understanding of the following concepts:

- Plants depend on animals for fertilization, pollination, and spreading seeds.
- Animals depend on plants for food and shelter.
- Plants and animals depend on each other for survival in every habitat.

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

#### Monitor Progress

In this activity, students expanded their understanding of the interactions between plants and animals in any habitat. They can apply this understanding to their development of a butterfly habitat.

## LESSON 4.3

# Lesson 4 Roundup: Plants and Animals Depend on Each Other

**Big Question:** What must be done to make a natural butterfly habitat?

**Guiding Question:** How can we model an animal spreading pollen or seeds?

**Today's Question:** How can we model an animal spreading pollen or seeds?

**Tie to the Anchoring Phenomenon:** In this lesson, students model how butterflies and other animals disperse seeds in a habitat, including a butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Model the function of an animal dispersing seeds or pollinating a plant.

### Instructional Activities

- student investigation
- class discussion
- question generation

### NGSS References

**Performance Expectation:** 2-LS2-2

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in an Ecosystem

**Science and Engineering Practice:** 2 Developing and Using Models

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students will model the causes and effects of plant and animal interdependence.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

**need**      **pollen**      **seed**      **spread**

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

**depend**      **ecosystem**      **model**      **organism**  
**pollinate/pollination**      **related/relationship**

### Instructional Resources

Activity Page



AP 4.3.1

#### Activity Page

Modeling Animals and Plants  
(AP 4.3.1)

### Materials and Equipment

- materials to pollinate or move seeds (Seed materials can be cotton balls, confetti, glitter, packing peanuts, or similar. Moving materials can be hook-and-loop material, carpet pieces, felt, fake fur, tape, craft sticks, straws, or similar.)
- scissors (1 pair per student)
- question board

## THE CORE LESSON 4.3

### 1. Focus student attention on Today's Question.

NGSS Elements



CCC 2  
DCI LS2.A

#### How can we model an animal spreading pollen or seeds?

Review ways in which plants and animals depend on each other that students learned about in the previous segments.

- » Plants depend on animals for pollination and fertilizer and spreading seeds. Animals depend on plants for food and shelter.
- Have pairs of students pantomime and model how plants help animals. For example, they can pantomime eating a plant or using a plant for shelter. Give them a minute to decide what animal and plant they are pantomiming. Then have them present their pantomimes.
- **Discuss why plants need animals to help spread their seeds.**
  - » Animals can move around, but plants cannot. They often need animals to move their seeds or pollen to make new plants.

## Tie to the Anchoring Phenomenon

Students will develop further understanding of how plants and animals depend on each other in any habitat, including a butterfly habitat.

## 2. Hands-on interaction.

Activity Page



AP 4.3.1

- Distribute Modeling Animals and Plants (AP 4.3.1) to students. Explain that their challenge is to use available materials to model animals pollinating plants or dispersing seeds. They will pick either pollination or dispersal, but they cannot use their hands to move any materials in the demonstration.
- Present the available materials. Explain that they can choose a seed or pollen material to move and materials to help move the seeds or pollen. (See **Know the Standards.**)
- Give pairs a chance to decide what they want to do and record their plan on Modeling Animals and Plants (AP 4.3.1).
- Then give students about ten minutes to design their models and practice moving the pollen or seed.
- When students are ready, ask them to present their models. After each presentation, discuss these questions with the class:
  - **Is this a model of seed dispersal or pollination?**
  - **What type of animal and plant are you modeling?**
    - » for example, a butterfly pollinating a flower or a squirrel burying an acorn
  - **How is this model like and different from the real action of plants and animals?**
    - » Answers will vary depending on the model.
  - **What is the cause of the movement of the seeds or pollen?**
    - » An animal captures a seed or pollen in fur or a body part and moves it to a new location.
  - **What is the effect of the movement of the seeds or pollen?**
    - » Plants will make new plants.
- **Discuss which animals that pollinate or disperse seeds students think would most likely be in a natural butterfly habitat.**
  - » for example, other insects like ladybugs, frogs, squirrels, birds

## Know the Standards

## TEACHER DEVELOPMENT

**Performance Expectation 2-LS2-2:** Models allow students to demonstrate what they understand about a concept and communicate their understanding, as opposed to discussing or responding to questions. Students use models to describe phenomena and show cause-and-effect relationships.

**SUPPORT**—For students who cannot think of a model, ask them to think of the seeds they learned about in an earlier segment and how they were moved to the location they found them. They can employ tape or hook-and-loop material to brush up against the seed material. Remind them that butterflies have a long tube that eats nectar and that pollen sticks to that tube.

### 3. Check for understanding.

---

#### **Formative Assessment**

Review student models to determine student understanding of the following concepts:

- Animals need plants for food and shelter.
- Plants need animals to help pollinate or spread seeds.
- Animals pollinate plants and disperse seeds in different ways.

#### **Monitor Progress**

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### **Tie to the Anchoring Phenomenon**

In this activity, students recognized that there are ways animals and plants depend on each other in a butterfly habitat. For a successful habitat, Corbin will have to identify how the pollination and seed dispersal will affect the habitat.

# Plant and Animal Relationships

**Big Question:** What must be done to make a natural butterfly habitat?

**Tie to the Anchoring Phenomenon:** In this lesson students present plans for a butterfly habitat.

## AT A GLANCE

### Learning Objective

- ✓ Present plans for a sustainable butterfly habitat.

### Instructional Activities

- class discussion
- question generation
- student investigation

### NGSS References

**Performance Expectation:** 2-LS2-2

**Disciplinary Core Idea:** LS2.A Interdependent Relationships in an Ecosystem

**Science and Engineering Practice:** 2 Developing and Using Models

**Crosscutting Concept:** 2 Cause and Effect

In this lesson segment, students design a model for a butterfly habitat that shows the cause-and-effect relationships between plants and animals.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Core Vocabulary and Language of Instruction

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**Core Vocabulary:** Core Vocabulary terms are those that students should learn to use accurately in discussion and in written responses. During instruction, expose students repeatedly to these terms. However, these terms are not intended for isolated drill or memorization.

### types of animals

insect  
snail  
bird  
fish  
whale

### types of plants

tree  
bush  
vine  
cactus  
grass

### habitats

desert  
forest  
grassland  
lake  
ocean  
prairie  
pond  
river

### parts of animals

fur  
backbone  
leg  
wing

### parts of plants

flower  
fruit  
cone  
leaf  
needle  
root  
stem  
pollen  
seed

### seasons

spring  
summer  
winter  
fall

**Language of Instruction:** The Language of Instruction consists of additional terms, not considered a part of Core Vocabulary, that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves. A Glossary at the end of this Teacher Guide lists definitions for both Core Vocabulary and Language of Instruction.

**ecosystem**

**habitat**

**pollination**

## Instructional Resources

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Activity Pages



AP 1.4.1  
AP UC.1

### Activity Pages

Butterfly Habitat (AP 1.4.1)

Butterfly Habitat Checklist  
(AP UC.1)

## Materials and Equipment

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- question board
- internet access and the means to project images/video for whole-class viewing

## 1. Focus student attention on the Big Question.

NGSS Elements



CCC 2  
DCI LS2.A

Ask a volunteer to state the Big Question that you answered in this unit, which is posted somewhere in the room—**What must be done to make a natural butterfly habitat?**

- Briefly review the following concepts. (See **Know the Science.**)
  - Animals, including butterflies, need food, water, and shelter to survive.
  - Plants need water, sunlight, space, and nutrients to grow.
  - Plants and animals are interdependent in a habitat.
    - Animals pollinate flowering plants and spread seeds.
    - Plants provide food and shelter for animals.
- Remind students about the butterfly habitat design they worked on in Lesson 1 and Lesson 3. Have students take out Butterfly Habitat (AP 1.4.1), the plans they last worked on in the last segment of Lesson 3. Explain that today they are going to complete and present their plans. If students no longer have their copy of Activity Page 1.4.1, you can make more copies from Lesson 1.4.

Activity Page



AP 1.4.1

### Tie to the Anchoring Phenomenon

Students employ the information they acquired about plants and animals in this unit to complete their plans for a butterfly habitat.

## 2. Guide discussion.

Activity Page



AP UC.1

- Distribute Butterfly Habitat Checklist (AP UC.1). Have students make a checklist that addresses each of the categories for developing a butterfly habitat.
- Discuss student responses, and then develop a class checklist, which students can add to their own checklist.
- Then give students time to review and update their models.
- When students are ready, ask them to present their models. After each presentation, discuss these questions with the class:
  - **Why did you include the plants you did?**
    - » These plants flower over a long period and have bright colors that butterflies will want to go to for nectar.
  - **Why will butterflies be attracted to this habitat?**
    - » Many flowers will be blooming for butterflies to get food.

## Know the Science

## TEACHER DEVELOPMENT

**Habitat:** A habitat is a natural environment in which plants and animals live. In a habitat, any organism must find food, shelter, protection, and a way to reproduce.



- **How will you make sure the plants have enough water to stay healthy so they keep flowering and butterflies will have them for food?**
  - » If it doesn't rain, the plants will be watered.
- **How will you make sure the plants have enough sunlight to stay healthy so they keep flowering and butterflies will have them for food?**
  - » The habitat will be planted in an area where it is sunny most of the time.
- **What might harm butterflies in this habitat?**
  - » birds, other insects, not enough food
- **What will happen to this habitat next year?**
  - » The plants will come back up, and butterflies will also come back.
- **How will the plants produce new plants?**
  - » Butterflies will pollinate them. Other animals like birds and squirrels will spread the plant seeds.

#### Differentiation

**SUPPORT**—For students who have trouble identifying plants for the habitat, recall the video and reading from Lesson 4.2. Have them discuss their plant ideas with others or work with them to search for plants online. You can also provide a variety of butterfly garden books for students to use for flower ideas.

**EXTEND**—Depending on the time of year, help students arrange to design a class habitat on school grounds. If possible, get local communities involved to help with funding and/or building of the habitat.

### 3. Check for understanding.

#### Formative Assessment

Review student models to determine students' understanding of the following concepts:

- Animals, including butterflies, need food, water, and shelter to survive.
- Plants need water, sunlight, space, and nutrients to grow.
- Plants and animals are interdependent in a habitat.
  - Animals pollinate flowering plants and spread seeds.
  - Plants provide food and shelter for animals.

#### Monitor Progress

Review the questions and observations made on the question board. Encourage students to suggest additions for you to make to the board of any questions or new observations they have.

#### Tie to the Anchoring Phenomenon

In this activity, students completed a model for a butterfly habitat. Like Corbin, they included plants that provide butterflies with food and shelter. They also made sure the plants have what they need to survive.

# Science in Action:

## A Visit with a Naturalist

**Tie to the Anchoring Phenomenon:** Students join Mrs. Carver's class as they meet with a naturalist and learn more about living things in their natural habitats.

### AT A GLANCE

#### Learning Objective

- ✓ Observe things in nature and record findings.

#### Instructional Activities (2 Days)

- teacher Read Aloud
- student investigation

#### NGSS References

**Science and Engineering Practices:** 1 Asking Questions; 8 Obtaining, Evaluating, and Communicating Information

**Understandings About the Nature of Science:** Scientific Knowledge Is Based on Empirical Evidence; Science Is a Way of Knowing; Science Is a Human Endeavor

**Connection to Engineering, Technology, and Applications of Science:** Interdependence of Science, Engineering, and Technology

Students read about naturalists and their role in protecting natural habitats. They then act as naturalists and observe organisms in their habitat and design a nature center where others can visit.

For detailed information about the NGSS References, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

**Language of Instruction:** The Language of Instruction consists of terms that you should use when talking about any concepts in this exercise. Students will benefit from your modeling the use of these words without the expectation that students will use or explain the words themselves.

**data**  
**observe**

**habitat**  
**record**

**naturalist**

**nature center**

## Instructional Resources

Student Book



Ch. 8

**Student Book, Chapter 8**  
"Science in Action: A Visit with  
a Naturalist"

## Materials and Equipment

- magnifying glass/hand lens (1 per group)
- clipboard (1 per group)
- drawing paper (1 sheet per student)
- pencil (1 per student)

## 1. Day 1: Introduce the topic.

Remind students that they read about a class that explored habitats that do and do not support butterflies. Explain that today they will read more about what it's like to be a scientist who studies habitats.

## 2. Read together: "Science in Action: A Visit with a Naturalist."

Student Book



Ch. 8

While some advanced students may be able to read words on a given page of the Student Book, as a general rule students should not be expected or asked to read aloud the text on the Student Book pages. The text in the Student Book is there so that teachers and parents can read it when sharing the Student Book with students.

Ask students to turn to page 38 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “Science in Action: A Visit with a Naturalist,” and tell them to pay special attention to the pictures of nature as you read.

CHAPTER  
**8**

## Science in Action

### A Visit with a Naturalist

Mrs. Carver loves the plan for a butterfly habitat that Corbin and his classmates made for her. They discuss how they will create the habitat. They talk about how they must choose plants that are right for the habitat area. They discuss how the plants will make it a home for butterflies and other animals. Do they want it to look like a garden, or do they want to plant a more natural meadow? They want to make the place as much like a natural habitat as they can.



38

NGSS Elements



Scientific  
Knowledge Is  
Based on Empirical  
Evidence

**Call attention to the picture.** Talk about what they notice the students doing.

Explain that a **habitat** is the natural home of an animal or plant.

**LITERAL**—What are the students doing in the meadow? (See **Know the Standards 1.**)

» They are looking at the plants.

**SUPPORT**—Point out that the students are out in nature studying the plants, instead of studying the plants inside a classroom or lab. **Ask students to share whether they think it is better to observe plants in their habitat or inside in a lab.** Talk about the benefits of getting to see plants in their natural environments.

## Page 39

**Ask students to look at the picture on page 39.**

NGSS Elements



Interdependence  
of Science,  
Engineering, and  
Technology

It is also important to protect natural habitats. Learning about habitats is the first step in protecting them.

Tomorrow, the class will visit a nature center. They will meet a naturalist. The naturalist will show the students how to observe living things in their habitats.

When scientists make observations, they use tools and their senses to collect and record information. Observations help scientists understand and protect living things.



39

## Know the Standards

## TEACHER DEVELOPMENT

**1. Scientific Knowledge Is Based on Empirical Evidence:** Scientists are able to identify patterns and order when they make observations about living organisms in their habitats. Some patterns can also be detected when studying organisms in laboratories and other settings, but being out in the field can offer scientists information that they cannot always get from indoor investigations.

**LITERAL**—What is the first way to protect a habitat?

- » to learn about it

Explain that a **naturalist** is a scientist that studies nature.

**INFERENTIAL**—What kinds of things do you think a naturalist studies in nature?

- » A naturalist might study plants and why they live where they do. A naturalist might study animals and what kinds of animals live where.

**LITERAL**—What do scientists use when they make observations?

- » They use tools and their senses.

**INFERENTIAL**—What senses do you think scientists use to make observations?

- » They use their eyes to look at things. They use their ears to listen to the sounds around them. They use their hands to touch things that they find.

## Page 40

**Ask students to look at the two pictures on page 40.** Talk about what students see in the second picture.

NGSS Elements



Interdependence  
of Science,  
Engineering, and  
Technology

When the students arrive at the nature center, they meet the naturalist named Ms. Maddox. Ms. Maddox takes them into the woods. She shows them different ways to observe living things. They use hand lenses to look at insects under a fallen log. They watch a robin build a nest in a nearby tree. They see squirrels digging for nuts and seeds. They use small shovels to find worms in the soil.

Ms. Maddox shows the class how to record their observations in a notebook. They write the date and time. They write notes about what they see. They draw pictures, too.



40

**LITERAL**—What kind of tool is the student using in the picture? What is it for? (See **Know the Standards 2** and **3**.)

» That is a hand lens/magnifying glass. It helps see things up close.

Explain that a **nature center** is a place where visitors can go to see different plants and animals in their habitat.

**LITERAL**—What kind of habitat does Ms. Maddox take the students to?

» She takes them to a forest.

**LITERAL**—What do the students see there?

» They see insects under logs, a robin building a nest, squirrels digging, and worms in the soil.

## Know the Standards

## TEACHER DEVELOPMENT

**2. Interdependence of Science, Engineering, and Technology:** Scientists use tools to make observations, but they also use their senses. Our senses, such as our eyesight and ability to touch things and hear, can be considered tools. Such tools allow scientists to observe and record their findings.

**3. Interdependence of Science, Engineering, and Technology:** Discuss with students the tools that are used in the Student Book on page 40 to observe and record the things in nature. Remind students that the things scientists use to record or document their findings are also types of tools. Here, students are using hand lenses to look at things more closely, and they are using notebooks to write notes and draw pictures of what they see.





Next, the naturalist takes them to a wetland habitat. They hear a bullfrog calling from a wet pond. They spot a red-winged blackbird clinging to a reed. They see an egret using its long beak to hunt for fish in the shallow water. They watch a dragonfly land on a flower. The students count the animals they see. They record these observations in their notebooks, too.



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**LITERAL**—What is different about the habitat in these pictures?

» This is not the forest; this is a wetland habitat.

**LITERAL**—What do students observe in this habitat? (See **Know the Standards 4.**)

» They hear bullfrogs. They see red-winged blackbirds, egrets, and dragonflies.

**LITERAL**—How do the students keep track of what they observe?

» They count the animals they see and record everything in their notebooks.

## Know the Standards

## TEACHER DEVELOPMENT

**4. SEP 8 Obtaining, Evaluating, and Communicating Information:** Scientists can collect data by studying plants and animals firsthand in their natural habitats or by making observations from media and other materials. Here, the students in Mrs. Carver's class get to make firsthand observations, which can be used to answer questions about the natural world.



The class goes into a building at the nature center. Students will spend some time there comparing what they recorded in their notebooks. The sign on the front of the building says "Audubon Center."

Ms. Maddox asks, "Does anyone know why this place is called an Audubon center?" Then she explains. The name on the building refers to a naturalist named John James Audubon. This nature center is part of a big organization of many nature centers named after Mr. Audubon. The students also discover that learning about John James Audubon is what made Ms. Maddox want to become a naturalist!



**LITERAL**—What do the students do inside at the nature center building?

» They compare what they recorded in their notebooks.

**LITERAL**—Why is the nature center called an Audubon center?

» It was named after a naturalist named John James Audubon.

**INFERENTIAL**—Why was John James Audubon important to Ms. Maddox?

» He is what made Ms. Maddox want to become a naturalist.

**Ask students to look at the pictures on page 43.** Explain that one of the pictures is a portrait of John James Audubon.

NGSS Elements



Science Is a Human  
Endeavor

### John James Audubon

John James Audubon was a naturalist and painter. He lived during the time when the United States of America was a new country. He spent a lot of time observing birds in their natural habitats. Audubon made paintings of the birds in their habitats. He even tied strings around the legs of some birds so that he could track them. He found that the birds returned to the same place year after year.

Lucy Bakewell Audubon, Audubon's wife, was a teacher. She taught a student named George Bird Grinnell. Grinnell went on to form a group to study and protect birds. Grinnell named the group the Audubon Society. The Audubon Society still studies and protects birds, their habitats, and other wildlife.



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**LITERAL**—What did John James Audubon do? (See **Know the Standards 5.**)

» He was a naturalist and a painter.

**LITERAL**—What animal did John James Audubon spend a lot of time studying?

» birds

**LITERAL**—What did John James Audubon discover about birds?

» He discovered that birds returned to the same place year after year.

## Know the Standards

## TEACHER DEVELOPMENT

**5. Science Is a Human Endeavor:** People have practiced science for a long time. John James Audubon studied nature and birds during the 1800s. His discoveries have been used to prompt modern-day investigations about the behaviors and traits of animals.

**INFERENTIAL**—In what way do you think being a painter helped Audubon study nature?

» He could paint what he observed and use that to record his findings.

## 1. Day 2: Facilitate the activity.

NGSS Elements



SEP 1

Science Is a Way of  
Knowing

- Remind students that they previously read about scientists who study nature and the plants and animals in their natural habitats. Tell them that today they will work on an activity where they get to act like naturalists! First they will go outside to make observations of organisms in their habitat. And then they will design a nature center where others can visit. (See **Know the Standards 6.**)
- Have students form small groups, and give each group a hand lens, drawing paper, and pencils.
- Tell students that you are going to lead them on a nature walk around the school. They will have a chance to stop at different spots outside to make observations of the plants and animals they see in their natural habitat.
- **Ask students to describe the habitat where they live.**
  - » Students may describe the habitat as being a forest, a wetland, a desert, a beach, etc.
- Talk about any plants and animals that students expect to see along their nature walk.
- Lead the groups of students outside. Have an idea of where you want to take them, or allow them to stop to make their observations.
- As students make their observations, encourage them to use the hand lens to look more closely at the things that are small, like tiny insects or the leaves of small plants. Prompt students to record their observations on the drawing paper. Even though it is drawing paper, students can write notes on it, too.
- Remind students that there are several ways to make observations. They can use their different senses, such as sight, hearing, and touching (but no tasting outdoor specimens).
- Encourage students to notice as many things as they can about the plants and animals around them.

## Know the Standards

## TEACHER DEVELOPMENT

**6. Science Is a Way of Knowing:** People learn more about the natural world by studying it. Talk with students about the types of things they can know about the world from observing plants and animals outside.



- Lead the students back to the classroom, and give them some time in their groups to talk about what their pretend nature centers would look like if they could build them. They should use the information they recorded outside to come up with ideas for their nature centers. As students work on their ideas, circulate around the room, and ask questions to prompt their creativity, such as the following:
  - What kind of plants would your center have?
  - What kind of animals would be at your center?
  - What kind of habitat supports these plants and animals?
  - What would visitors get to do there?
- At the end of class, invite groups to share information on their nature centers.

**SUPPORT**—Help point out animals and plants along the nature walk, rather than leaving it up to the students to find them.

**CHALLENGE**—Challenge students to make connections between what they observe about the plants and animals and the factors that impact the habitat, such as climate.

**EXTEND**—Have students conduct additional research on habitats and how they change over time.

## 2. Check for understanding.

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Review the drawings to ensure students demonstrate an ability to make observations, but do not score them on artistic ability.

# Teacher Resources

**Activity Pages**

- What Do Butterflies Need to Live? (AP UO.1) 152
- Plants Around Me (AP 1.1.1) 153
- Plants in My Habitat (AP 1.2.1) 154
- Plant Changes (AP 1.3.1) 155
- Butterfly Habitat (AP 1.4.1) 156
- Testing What Plants Need (Light Test) (AP 2.1.1) 157
- Testing What Plants Need (Water Test) (AP 2.1.2) 159
- Plant Needs (AP 2.4.1) 161
- Animals Around Me (AP 3.1.1) 162
- Animals in My Habitat (AP 3.2.1) 163
- Animal Changes (AP 3.3.1) 164
- Seed Search (AP 4.1.1) 165
- Plants Pollinators Like (AP 4.2.1) 166
- Modeling Animals and Plants (AP 4.3.1) 167
- Butterfly Habitat Checklist (AP UC.1) 168

**Activity Pages Answer Key: *Organisms and Their Habitats*** 169–170

Name \_\_\_\_\_

Date \_\_\_\_\_

**What Do Butterflies Need to Live?**

**Draw a picture of what you think is the best home for butterflies.**

A large, empty rectangular box with a black border, intended for a student to draw their idea of the best home for butterflies.

Name \_\_\_\_\_

Date \_\_\_\_\_

**Plants Around Me**

**Draw pictures of six different plants you observe.**


Name \_\_\_\_\_

Date \_\_\_\_\_

Plants in My Habitat

Draw pictures of two of the plants you observed.

A large rectangular area defined by a dashed line, intended for drawing pictures of plants. The area is empty and occupies most of the lower half of the page.



Name \_\_\_\_\_

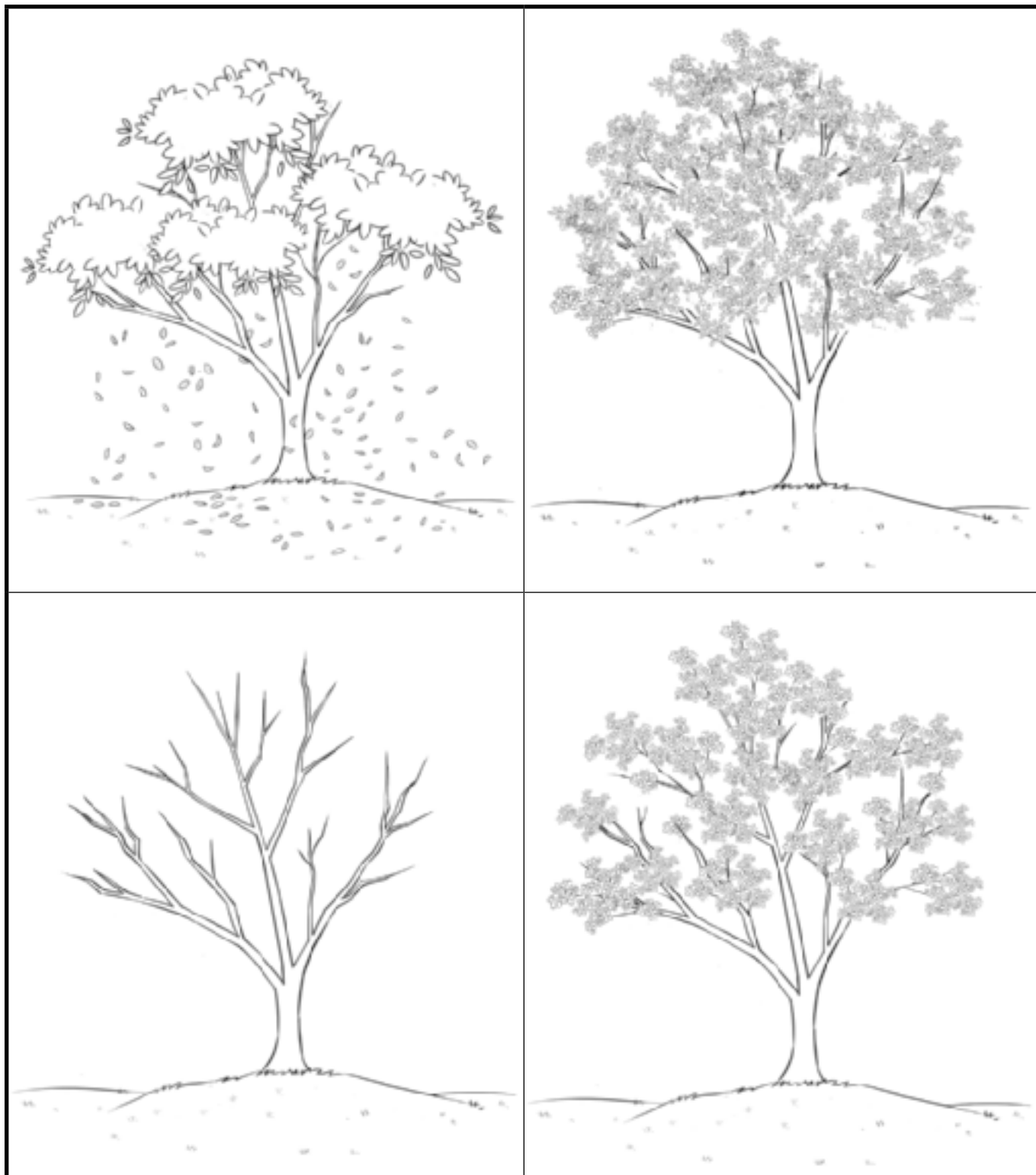
Date \_\_\_\_\_

Activity Page 1.3.1

Use with Lesson 1.3

## Plant Changes

Label the season in each picture.



Name \_\_\_\_\_

Date \_\_\_\_\_

**Butterfly Habitat**

**Draw a plan for a natural butterfly habitat. Draw at least five different plants.**

A large rectangular area defined by a dashed line, intended for drawing a plan for a natural butterfly habitat. The area is empty, providing space for the student to draw at least five different plants.

Name \_\_\_\_\_

Date \_\_\_\_\_

Activity Page 2.1.1

Use with Lessons 2.1–2.3 and 2.5

## Testing What Plants Need (Light Test)

Fill in the information for plants A and B.

<b>Observations and Questions</b>	<p><b>A</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p> <p><b>B</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p> <p>Is the plant upright?</p> <p>Is the plant healthy?</p>
<b>Hypothesis</b>	<p>If _____</p> <p>Then _____</p>
<b>Plan the Test</b>	
<b>Do the Test</b>	<p>Date _____</p> <p><b>A</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p> <p><b>B</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p>

	<p><b>Date</b> _____</p> <p><b>A</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>B</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>Date</b> _____</p> <p><b>A</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>B</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p>
<b>Conclusions</b>	

Name \_\_\_\_\_

Date \_\_\_\_\_

Activity Page 2.1.2

Use with Lessons 2.1–2.3 and 2.5

## Testing What Plants Need (Water Test)

Fill in the information for plants C and D.

<b>Observations and Questions</b>	<p><b>C</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p> <p><b>D</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p>
<b>Hypothesis</b>	<p>If _____</p> <p>Then _____</p>
<b>Plan the Test</b>	
<b>Do the Test</b>	<p>Date _____</p> <p><b>C</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p> <p><b>D</b></p> <p>Height _____</p> <p>Number of Leaves _____</p> <p>Color _____</p>

	<p><b>Date</b> _____</p> <p><b>C</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>D</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>Date</b> _____</p> <p><b>C</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p> <p><b>D</b></p> <p><b>Height</b> _____</p> <p><b>Number of Leaves</b> _____</p> <p><b>Color</b> _____</p>
<b>Conclusions</b>	

Name \_\_\_\_\_

Date \_\_\_\_\_

Activity Page 2.4.1

Use with Lesson 2.4

## Plant Needs

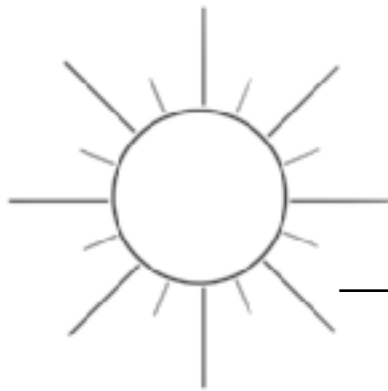
Label what plants need.

Sunlight

Water

Space

Air



\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

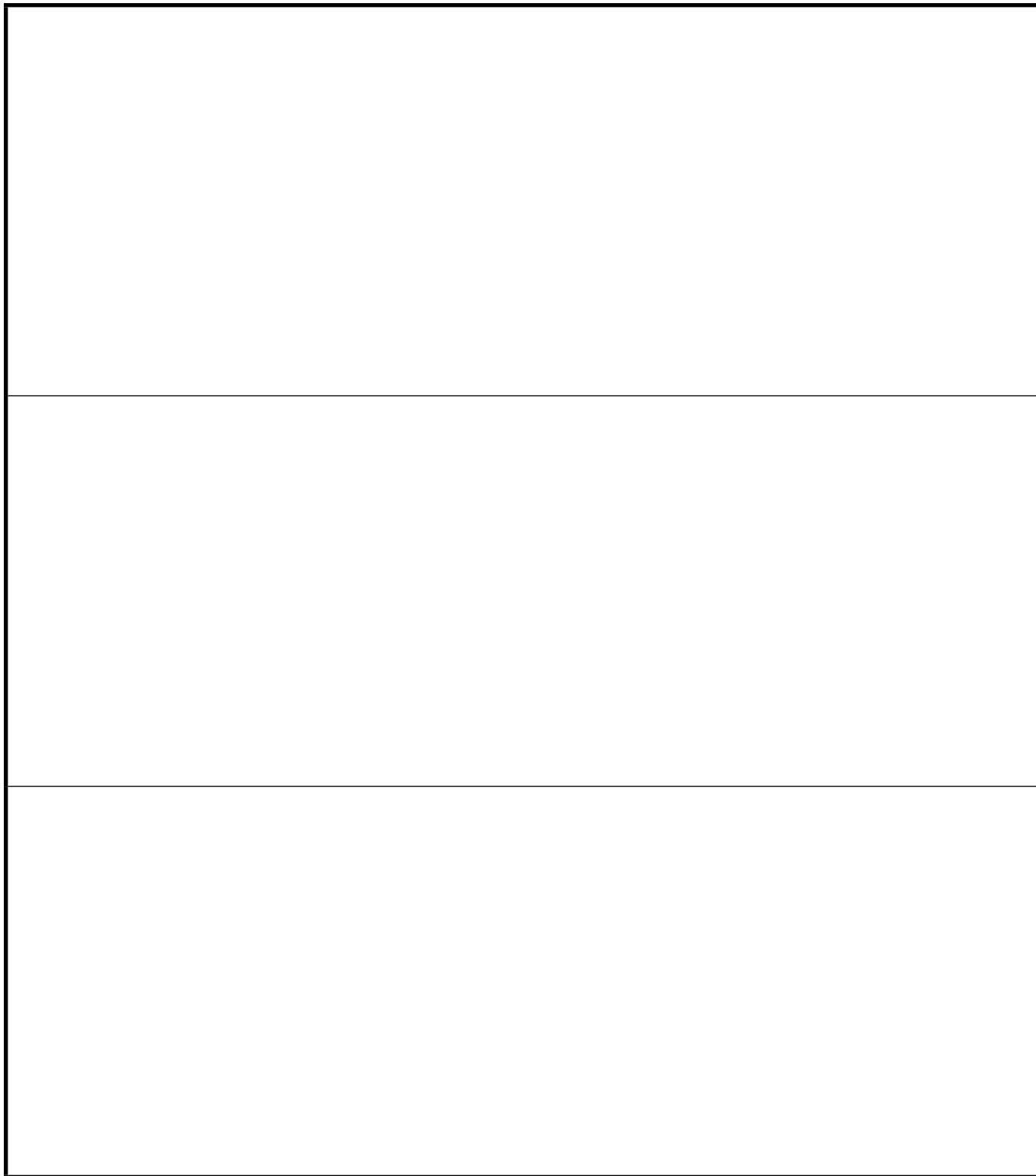
Date \_\_\_\_\_

Activity Page 3.1.1

Use with Lesson 3.1

## Animals Around Me

**Draw pictures of three different animals you see.**

A large rectangular box with a black border, divided into three equal horizontal sections by two horizontal lines. This box is intended for a student to draw three different animals they see.



Name \_\_\_\_\_

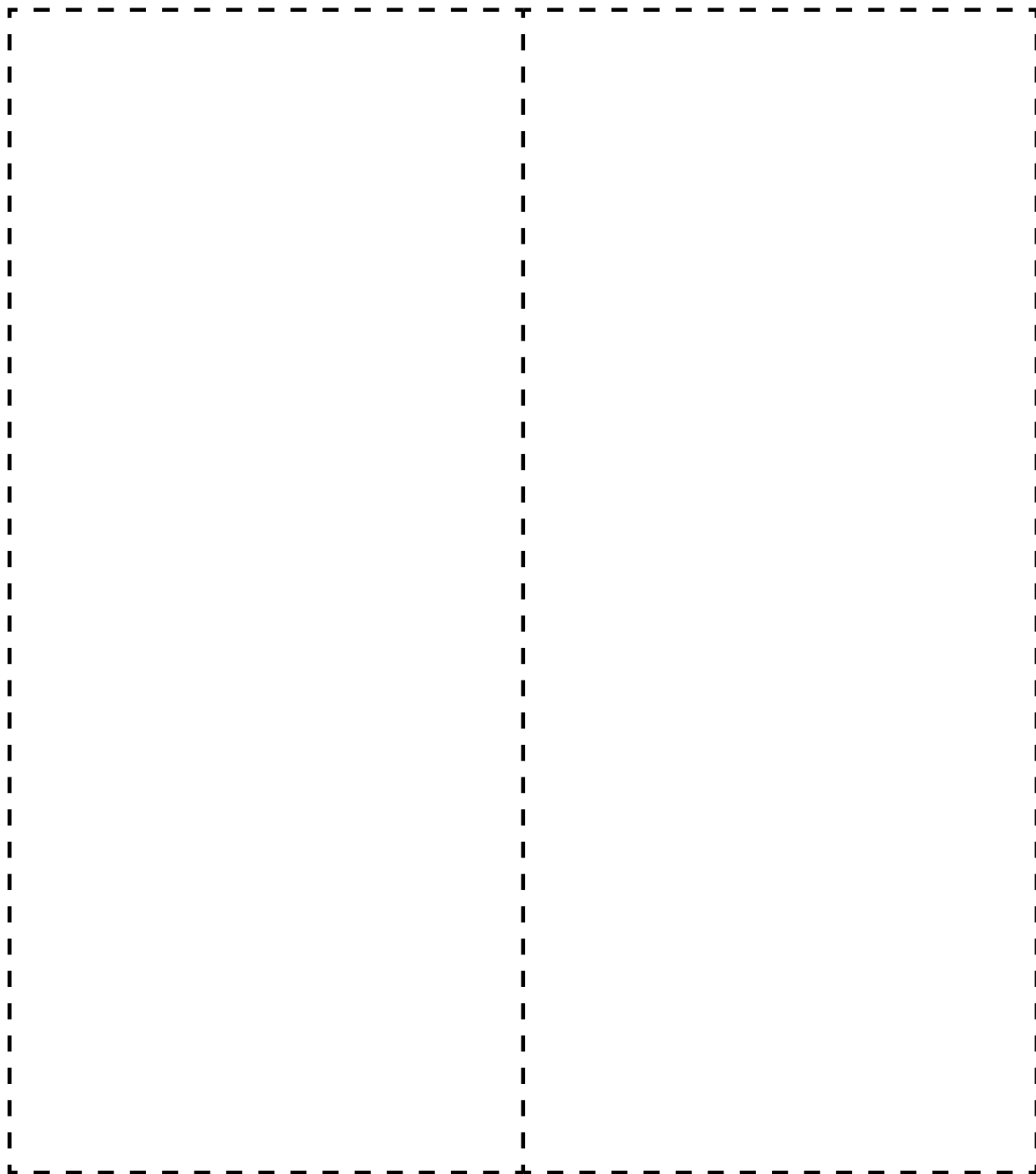
Date \_\_\_\_\_

Activity Page 3.2.1

Use with Lesson 3.2

## Animals in My Habitat

**Draw pictures or attach pictures of two of the animals in your habitat.**



Name \_\_\_\_\_





Date \_\_\_\_\_

Activity Page 3.3.1

Use with Lesson 3.3

## Animal Changes

Match the animal to its habitat.

	grassland
	desert
	ocean
	tropical habitat

Name \_\_\_\_\_

Date \_\_\_\_\_

Seed Search

Draw pictures of four different fruits/seeds you see.


Name \_\_\_\_\_

Date \_\_\_\_\_

**Plants Pollinators Like**

**Record plants that butterflies and other pollinators like.**


Name \_\_\_\_\_

Date \_\_\_\_\_

Activity Page 4.3.1

Use with Lesson 4.3

## Modeling Animals and Plants

**Make a plan for your model.**

Plant \_\_\_\_\_

Animal \_\_\_\_\_

Materials \_\_\_\_\_

Form of Movement \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

Butterfly Habitat Checklist

Write three different things to include in a butterfly habitat.

Size:
Shape:
Location:
What to Include for Butterflies
What to Include for Plants
Plants in the Habitat
Other Animals in the Habitat

## Activity Pages Answer Key: *Organisms and Their Habitats*

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This answer key offers guidance to help you assess your students' learning progress. Here you will find descriptions of the expected key understandings, correct answers, and desired observations for each Activity Page of this unit. At this grade level, students' written responses are not expected to reflect the specificity shown here, and students should not be evaluated on refined drawing ability. Use the answers below, not as direct models for ideal student responses, but as keys to what to look for in evidence of student learning.

### **What Do Butterflies Need to Live? (AP UO.1) (page 152)**

Students should draw a home for butterflies. Accept all drawings at this time.

### **Plants Around Me (AP 1.1.1) (page 153)**

Students should draw plants they see. If necessary, differentiate between plants and animals. If students do draw animals, ask them to draw a plant next to the animal that the animal might find where the animal lives.

### **Plants in My Habitat (AP 1.2.1) (page 154)**

Students should draw plants they see in their local habitat.

### **Plant Changes (AP 1.3.1) (page 155)**

Student should label the top left image as "fall," the bottom left image as "winter," the bottom right image as "spring," and the top right image as "summer."

### **Butterfly Habitat (AP 1.4.1) (page 156)**

Student drawings should include some form of flower the butterfly would get nectar from as well as a plant the butterfly could lay eggs on.

### **Testing What Plants Need (Light Test) (AP 2.1.1) (pages 157–158)**

Students should fill out the sheet with the necessary data as well as an "If ... then" hypothesis such as "If a plant does not get light, it will not grow as much as a plant that gets light" or "If a plant does not get light, it will not be as green as the plant that does get light." Students should conclude that the plant that receives less light does not grow as well as the plant that does get light.

### **Testing What Plants Need (Water Test) (AP 2.1.2) (pages 159–160)**

Students should fill out the sheet with the necessary data as well as an "If ... then" hypothesis such as "If a plant does not get water, it will not grow as much as a plant that gets water" or "If a plant does not get water, it will wilt." Students should conclude that the plant that receives less water does not grow as well as the plant that does get water.

### **Plant Needs (AP 2.4.1) (page 161)**

Students should note that plants need light, water, air, and space.

### **Animals Around Me (AP 3.1.1) (page 162)**

Students should draw three different animals they see. If necessary, differentiate between animals and plants. If students do draw plants, ask them to draw an animal next to the plant where the animal lives.

### **Animals In My Habitat (AP 3.2.1) (page 163)**

Students should redraw two of the animals they recorded during the last segment on Animals Around Me (AP 3.1.1) and then as a class sort the animals by different traits or properties.

### **Animal Changes (AP 3.3.1) (page 164)**

Students should match the whale to the ocean, the lion to the grassland, the scorpion to the desert, and the toucan to the tropical habitat.

**Butterfly Habitat (revisited) (AP 1.4.1)**  
**(page 156)**

Students should revisit their drawing of the butterfly habitat from Lesson 1.4 and include relevant plants and animals.

**Seed Search (AP 4.1.1)**  
**(page 165)**

Students should draw four different seeds they see on the nature walk. If necessary, differentiate between plants and seeds.

**Plants Pollinators Like (AP 4.2.1)**  
**(page 166)**

Students should list plants such as lavender, phlox, butterfly weed, goldenrod, coneflower, and daylily.

**Modeling Animals and Plants (AP 4.3.1)**  
**(page 167)**

Student plans for their model should include the pollinating animal and the plant as well as the materials students will use to model the pollinating. Students should have an explanation for how the seed is dispersed or the plant is pollinated.

**Butterfly Habitat Checklist (UC.1)**  
**(page 168)**

Student lists should include the size, shape, and location of the habitat. They should also list materials to include for the butterflies and what to include for the plants. They should also include plants and other animals that would go in the habitat.



## Glossary

**Blue words and phrases** are Core Vocabulary for the unit. **Bold-faced words and phrases** are Language of Instruction, additional vocabulary terms related to the unit that you should model for students during instruction. Vocabulary words are not intended for use in isolated drill or memorization.

### B

**backbone, n.** a column of small bones at the center of an animal's body that forms its spine

**bird, n.** an animal with wings, feathers, a beak, and females that lay eggs

**bush, n.** a plant with many branches that grows close to the ground (in contrast to trees)

### C

**cactus, n.** a desert plant with a thick stem and scales or spines for leaves

**change, v.** to become different; to make something different (also n. a difference from something's former condition)

**compare, v.** to examine characteristics of two or more things, particularly looking for similarities

**conclude, v.** to determine an explanation after considering evidence

**cone, n.** the reproductive part of a nonflowering plant like a pine tree

**contrast, v.** to look for differences between two things

**control, n.** the unchanged thing or group used as a comparison to the results of an experiment

**coral, n.** small sea creatures that live in colonies and are surrounded by a hard substance that they form

**cycle, n.** a series of events that repeats in the same order

### D

**data, n.** information that is observed or measured and recorded

**deciduous, adj.** describing plants that lose their leaves in the fall and grow new leaves in the spring

**depend, v.** to rely on something or someone

**desert, n.** an area with dry land and warm climate

**diverse, adj.** to have variety; many different types

**diversity, n.** a variety of things; the state of being diverse

### E

**ecosystem, n.** organisms and their environment together as an interrelated system

**enough, adv./adj.** as much of something as needed

**evidence, n.** a detail that supports a claim or helps prove an idea is true

### F

**fair test, n.** a science investigation that controls all but one variable in order to answer a specific question

**fall, n.** the season between summer and winter when temperatures start to cool

**fish, n.** an animal that lives in the water, has fins, has no limbs, and breathes with gills

**flower, n.** the bloom of a plant where pollination occurs

**forest, n.** an area with many trees and other plants

**fruit, n.** the soft, seed-bearing part of flowering plants

**fur, n.** the soft, short hair that covers most mammals

### G

**grass, n.** a plant with long, narrow leaves and jointed stems

**grassland, n.** an area covered primarily with grass

### H

**habitat, n.** the environment where organisms usually live

### I

**insect, n.** an animal with six legs and one or two pairs of wings

**investigate, v.** to observe and study something to collect information

### L

**lake, n.** a large body of water surrounded by land

**leaf, n.** the plant part that is attached to the stem and carries out photosynthesis

**leg, n.** an animal limb used for standing or walking

**less, adj.** smaller in size or amount

**light, n.** the type of energy that makes vision possible (also v. to brighten)

---

## M

**meadow, n.** an open area of grass and flowers

**model, n.** a representation of something that can help people learn about the real thing

**more, adj.** additional, greater

---

## N

**naturalist, n.** a person who studies the history of nature

**nature center, n.** a building, usually situated in a protected open space, designed to educate people about nature and the environment

**need, v.** to require something (also n. something that is necessary for a purpose)

**needle, n.** a leaf that is sharp and pointy

**nutrients, n.** a substance that provides chemicals essential for growth and life

---

## O

**observe, v.** to watch something and notice details about it (observation, n. the process of noticing details or a specific detail that is noticed)

**ocean, n.** a huge body of salt water that covers most of Earth's surface

**organism, n.** a living thing that can reproduce, grow, adapt, and respond to its environment

---

## P

**plankton, n.** tiny water organisms (including algae, bacteria, and protozoans) that drift and are the primary food source for many animals

**plant, n.** a living thing that needs light, water, and air to grow

**pollen, n.** the powdery substance produced in the center of flowers

**pollinate, v.** to transfer pollen from one flower to another flower of the same type (pollination, n. the process of transferring pollen)

**pond, n.** a small body of water surrounded by land, smaller than a lake

**prairie, n.** a large, flat area of grassland

---

## R

**record, v.** to collect and keep information

**related, adj.** connected in some way (relationship, n. the connection between two or more things)

**respond, v.** to react to something (response, n. a reaction to something)

**river, n.** a large, permanent, flowing body of water that flows across land into a lake, another river, or the ocean

**root, n.** the plant part that takes up water and minerals, typically underground

---

## S

**season, n.** a three-month part of the year determined by the weather and daylight hours

**seed, n.** a small, usually hard, plant structure that can grow into a new plant

**snail, n.** a small soft-bodied animal enclosed in a shell

**soil, n.** a mixture of rock pieces and once-living material that makes up much of Earth's top layer, the ground

**spread, v.** to cover or move out over a wide area

**spring, n.** the season between winter and summer when temperatures start to warm

**stem, n.** the central part of a plant that provides support

**stream, n.** a body of flowing water smaller than a river

**summer, n.** the season between spring and fall when days are longer and temperatures are warm or hot

**sun, n.** the star that Earth moves around and that provides Earth with light and heat

---

## T

**tree, n.** a tall plant with a woody trunk or stem and few branches on the lower part of the stem

**tropical, adj.** referring to the region located just north and south of Earth's equator

**tundra, n.** an area in the arctic with flat ground, no trees, and permanently frozen subsoil

---

## V

**varied, adj.** including a wide range of things

**variety, n.** a range of differences within a group

**vine, n.** a plant that grows very long and thin, often attaching itself to something above the ground

---

## W

**water, n.** a clear, tasteless, odorless liquid that covers most of Earth's surface and on which living organisms depend

**whale, n.** a large sea animal that breathes air

**wing, n.** a body part found in birds and insects that is often used for flying

**winter, n.** the season between fall and spring when days are shorter and temperatures are cooler or cold

### Classroom Safety for Activities and Demonstrations

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In the Core Knowledge Science program (CKSci), activities and demonstrations are a vital part of the curriculum and provide students with active engagement related to the lesson content. The activities and demonstrations in this unit have been selected and designed to engage students in a safe manner. The activities and demonstrations make use of materials and equipment that are typically deemed classroom safe and readily available.

Safety should be a priority when engaged in science activities. With that in mind, observe the following safety procedures when the class is engaged in activities and demonstrations:

- Be aware of students who have food allergies and adjust related activities or make materials substitutions as necessary. Check the ingredients of all food to make sure known allergies are not listed. Students with food allergies can still be affected even if they do not ingest the food item. Some common food allergies are peanuts, tree nuts (e.g., almonds, walnuts, hazelnuts, etc), and cow's milk (rice milk is a good nut-free alternative).
- Report and treat any injuries immediately.
- Check equipment prior to usage, and make sure everything is clean and ready for use.
- Clean up spills or broken equipment immediately using the appropriate tools.
- Monitor student behavior to ensure they are following proper classroom and activity procedures.
- Do not touch your eyes, ears, face, or mouth while engaging in an activity or demonstration.
- Review each step of the lesson to determine if there are any safety measures or materials necessary in advance.
- Wear personal protective equipment (e.g., safety goggles, aprons, etc.) as appropriate.
- Check for allergies to latex and other materials that students may have, and take appropriate measures.
- Secure loose clothing, hair, or jewelry.
- Establish storage and disposal procedures for chemicals as per their Safety Data Sheet (SDS), including household substances, such as vinegar and baking soda.

Copy and distribute the Student Safety Contract, found on the next page. Have a read-along and have students agree to the expectations for students when engaged in science activities prior to the start of the first unit.

#### Online Resources



For additional support for safety in the science classroom, follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Student Safety Contract

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When doing science activities, I will

- Report spills, breakages, or injuries to the teacher right away.
- Listen to the teacher for special instructions and safety directions. If I have questions, I will ask the teacher.
- Avoid eating or drinking anything during the activity unless told to by my teacher.
- Review the steps of the activity before I begin. If I have questions, I will ask the teacher.
- Wear safety goggles when working with liquids or things that can fly into my eyes.
- Be careful around electric appliances, and unplug them, just by pulling on the plug, when a teacher is supervising.
- Keep my hands dry when using tools and devices that use electricity.
- Be careful to use safety equipment like gloves or tongs when handling materials that may be hot.
- Know when a hot plate is on or off and let it cool before touching it.
- Roll or push up long sleeves, keep my hair tied back, and secure any jewelry I am wearing.
- Return unused materials to the teacher.
- Clean up my area after the activity and wash my hands.
- Treat all living things and the environment with respect.

I have read and agree to the safety rules in this contract.

\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Student signature and date

\_\_\_\_\_

Print name

Dear Parent or Guardian,

During science class, we want to create and maintain a safe classroom. With this in mind, we are making sure students are aware of the expectations for their behavior while engaged in science activities. We are asking you to review the safety rules with your daughter or son and sign this contract. If you have any questions, please feel free to contact me.

\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Parent or guardian signature and date

## Strategies for Acquiring Materials

The materials used in the Core Knowledge Science program (CKSci) are readily available and can be acquired through both retail and online stores. Some of the materials will be reusable and are meant to be used repeatedly. This includes equipment such as scales, beakers, and safety goggles, but also items such as plastic cups that can be safely used again. Often these materials are durable, can be cleaned, and will last for more than one activity or even one school year. Other materials are classified as consumable and are not able to be used more than once, such as glue, baking soda, and aluminum foil.

### Online Resources



The Material Supply List for this unit's activities can be found online. Follow the links in the Online Resources Guide for this unit:

[www.coreknowledge.org/cksci-online-resources](http://www.coreknowledge.org/cksci-online-resources)

## Ways to Engage with Your Community

The total cost of materials can add up for an entire unit, even when the materials required for activities and demonstrations have been selected to be individually affordable. And the time needed to acquire the materials adds up too. Reaching out to your community to help support STEM education is a great way to engage parents, guardians, and others with the teaching of science, as well as to reduce the cost and time of collecting the materials. With that in mind, the materials list can be distributed or used as a reference for the materials teachers will need to acquire to teach the unit.

### Consider some of the following as methods for acquiring the science materials:

- **School Supply Drive**—If your school has a supply drive at any point in the year, consider distributing materials lists as wish lists for the science department.
- **Open Houses**—Have materials lists available during open houses. Consider having teams of volunteers perform an activity to show attendees how the materials will be used throughout the year.
- **Parent Teacher Organizations**—Reach out to the local PTO for assistance with acquiring materials.
- **Science Fair Drive**—Consider adding a table to your science fair as part of a science materials drive for future units.
- **College or University Service Project**—Ask service organizations affiliated with your local higher education institutions to sponsor your program by providing materials.
- **Local Businesses**—Some businesses have discounts for teachers to purchase school supplies. Others may want to advertise as sponsors for your school/programs. Usually you will be asked for verifiable proof that you are a teacher and/or for examples of how their sponsorship will benefit students.

Remember: If your school is public it will be tax exempt, so make sure to have a Tax Identification Number (TIN) when purchasing materials. If your school is private, you may need proof of 501(c)(3) status to gain tax exemption. Check with your school for any required documentation.

## Advance Preparation for Activities and Demonstrations

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Being properly prepared for classroom activities and demonstrations is the first step to having a successful and enriching science program. Advance preparation is critical to effectively support student learning and understanding of the content in a lesson.

### **Before doing demonstrations and activities with the class:**

- Familiarize yourself with the activity by performing the activity yourself or with a team, and identify any issues or talking points that could be brought up.
- Gather the necessary materials for class usage. Consider if students will gather their materials at stations or if you will preassemble the materials to be distributed to the students and/or groups.
- Identify safety issues, such as food allergies, that could occur during an activity or demonstration, and plan and prepare how to address them.
- Review the Teacher's Guide before teaching, and identify opportunities for instructional support during activities and demonstrations. Consider other Support and/or Challenge opportunities that may arise as you work to keep students engaged with the content.
- Prepare a plan for postactivity collection and disposal of materials/equipment.

### **While engaged in the activity or demonstration:**

- Address any emergencies immediately.
- Check that students are observing proper science safety practices as well as wearing any necessary safety gear, such as goggles, aprons, or gloves.
- When possible, circulate around the room, and provide support for the activity. Return to the Teacher Guide as students work to utilize any Support and Challenge opportunities that will make the learning experience most meaningful for your students.

### **After the activity or demonstration:**

- Use your plan for students to set aside or dispose of their materials as necessary.
- Have students wash their hands after any activity in which they could come in contact with any potentially harmful substances.

When engaging students in activities and demonstrations, model good science practices such as wearing proper safety equipment, never eating during an investigation, etc. Good science practices at a young age will lead to students observing good science practices themselves and being better prepared as they move into upper-level science classes.

## What to Do When Activities Don't Give Expected Results

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Science activities and experiments do not always go according to plan. Microwave ovens, super glue, and x-rays are just some of the discoveries made when people were practicing science and something did NOT go according to plan. In your classroom, however, you should be prepared for what to do when activities don't give the expected results or when an activity doesn't work.

**When going over an activity with an unexpected result, consider these points in discussion with your students:**

- Was there an error in following the steps in order? You or the student may have skipped a step. To help control for this, have students review the steps to an investigation in advance and make a check mark next to each step as they complete it.
- Did students design their own investigation? Perhaps their steps are out of sequence or they missed a step when performing the activity. Review and provide feedback on students' investigation plan to ensure the work is done in proper sequence and that it supports the lesson segment's guiding question.
- When measurements were taken, were they done correctly? It is possible a number was written down incorrectly, a measurement was made in error, such as a wrong unit of measure or quantity, or the starting or ending point of a measurement was not accurate.
- Did the equipment or materials contribute to the situation? For example, chemicals that have lost their potency or a scale that is not measuring accurately can contribute to the success or failure of an activity.

One of the greatest gifts a student can learn when engaged in science is to develop a curiosity for *why something happened*. Students may find it challenging or frustrating to work through a problem during an activity, but guiding them through the problem and figuring out *why* something happened will help them to develop a better sense of how to do science.







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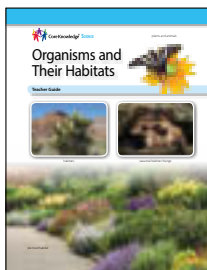
## Organisms and Their Habitats

Core Knowledge Science 2



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