

Needs of Plants and Animals

shelter



Teacher Guide



plant needs



people and food

animal needs



Needs of Plants and Animals

Teacher Guide



Core Knowledge

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Needs of Plants and Animals

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Needs of Plants and Animals

Teacher Guide

Core Knowledge Science™ K

Introduction

ABOUT THIS UNIT

The Big Idea

This unit focuses on the needs of plants and animals, including humans, to survive and how that relates to where they live.

All living things need resources such as water, air, and food to survive. These important natural resources are a part of the places plants and animals, including humans, live. Even though different living things can live in vastly different environments, the basic resources they need are the same. Through investigation, students will use what they learn to discover what plants and animals need from their different habitats.

In this unit, students learn that all animals need food to live and grow and that all animals obtain their food from plants or other animals. Students also learn that plants need air, water, and light to live and grow. Students also learn that living things need water, air, and resources from the land and that they live in places that have the things they need. Humans use natural resources for everything they do. Students describe the needs of plants and animals and their relationship with the local habitat as well as identify ways landscapes can be transformed into a habitat for plants and animals.

Students explore concepts that include the following:

- All animals need food to live and grow. They obtain their food from plants or from other animals. Plants need air, water, and light to live and grow.
- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

Engineers and engineering designers use knowledge of the properties of matter as they use materials in design solutions to 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

This unit introduces Kindergarten students to the needs of plants and animals. They will learn that plants and animals obtain the things they need to live from the environment in which they live. Students will use observations to describe patterns of what plants and animals (including humans) need to survive. They will also use models to represent the relationship between the needs of different plants and animals (including humans) and the places they live. The following are preliminary considerations for planning and instruction relative to this unit:

- Students should be able to differentiate between plants and animals, identify some basic characteristics of each such as their ability to move, and identify where they can be found.

Students will investigate plants, animals, and ecosystems in greater depth in Grades 1, 2, and 5.

- While the unit engages Kindergarten students in investigating different materials to collect data and determine their properties, the only quantitative data collected is length. However, descriptive data such as color, strength, flexibility, texture, hardness, and absorbency can be collected.

Students will investigate matter and its properties again and in greater depth in Grades 2 and 5.

Note to Core Knowledge Teachers

Thanks to ongoing research in the field, our understanding of how children learn continues to evolve. In the subject area of science, students benefit not just from 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

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?*

This unit, *Needs of Plants and Animals*, has been informed by the following Kindergarten Performance Expectations for the NGSS topic *From Molecules to Organisms: Structures and Processes* and *Earth and Human Activity*. Students who demonstrate understanding can do the following:

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

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

*NEXT GENERATION SCIENCE STANDARDS (NGSS) is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and their endorsement is not implied.

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.

A Special Note to Kindergarten Teachers Before Starting This Unit

Why Study Science in Kindergarten?

For many Kindergarten teachers, the suggestion that science should be a part of the Kindergarten curriculum may seem questionable. For many teachers, the instructional time is devoted to teaching reading and math fundamentals to students.

The study of science in Kindergarten, however, is consistent with the Core Knowledge approach to learning. Learning science provides students with the experiences necessary to accelerate an almost innate sense of excitement and wonder about the natural world around them. Now is the time they can grasp a more precise language, one that allows them to describe the living and nonliving environment they encounter every day.

Albert Einstein said, “Curiosity has its own reason for existing.” It is the nature of children to be curious about the world around them, and Kindergarten is the right time to witness, promote, and accelerate that curiosity in a systematic way.

Teaching science to young children affords them the opportunity to take a deeper look at the world around them. Most young students’ scientific knowledge is derived from their personal experiences, that is, from interactions with the air, water, land, and matter around them. All these lead to a student’s wonder about life, Earth, space, and physical science.

Before Starting *Needs of Plants and Animals*

Students come to Kindergarten classrooms across the country with a wide range of prior experiences. Some students have attended preschool, while others have not. Some have grown up in cities away from nature. Others have grown up in the country, intimately involved in nature.

Some have had teachers and/or family members who have been reading aloud and sharing the wonderful world of animals and plants with them for several years, while others have not. Some have traveled to other cities, states, and countries, while others may know only their own family and neighborhood.

Draw out students. Give them the opportunity to express what they know about the natural world, about rocks, the stars, motion, giraffes, or matter. You can assess the prior knowledge students have about science, and since science deals with everything around a child, the wealth of their background in science should not be underestimated.

Needs of Plants and Animals is one of four units in the Kindergarten CKSci series that we encourage teachers to use over the course of the school year. Kindergarten teachers who begin the year with a unit will have time to complete all four of the Kindergarten CKSci units in an academic year. Additional guidance regarding pacing is provided in each CKSci Teacher Guide.

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. Plants, Their Needs, and Places Where They Live

SEGMENTS 1–5

- Identify living things that are plants.
- Using data, explain where plants can survive in the school environment.
- Collect and organize data on the relationship between water and plant growth.
- Collect and organize data on the relationship between light and plant growth.
- Interpret data related to plants' needs for light and water.
- Model the relationship between plant needs for light, water, and soil and the environment in which they live.
- Explain how a vacant lot in their local community can provide the resources to support certain kinds of plants.

Lesson 2. Animals, Their Needs, and Places Where They Live

SEGMENTS 1–5

- Identify living things that are animals and classify them.
- Differentiate kinds of animals by whether they eat plants, animals, or both plants and animals.
- Organize and interpret data related to animals' needs for water.
- Show the relationship between animal needs for food, water, air, and shelter and the environments in which they live.
- Recognize animals and the resources in the places where they live as parts of a system.
- Explain how a vacant lot in their local community can provide the resources to support certain kinds of animals.

- Classify humans as animals.
- Identify humans as animals that eat both plants and animals.
- Organize and interpret data related to human needs for water.
- Identify relationships between humans and their environments.
- Model how a vacant lot in their local community can meet the needs of humans as well as other animals and plants.

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 *Needs of Plants and Animals* Student Book includes five 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

USING THE TEACHER GUIDE

Pacing

To meet NGSS Performance Expectations we encourage teachers to complete all Kindergarten 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 16–17 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 twenty days and a maximum of thirty days teaching the *Needs of Plants and Animals* unit so that you have time to teach the other units in the Kindergarten 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.

Unit Opener: Introduction to the Unit Phenomenon and Problem	Unit Opener: Needs of Plants and Animals	Big Question: What must an area have so that living things can live there?
Lesson 1: Plants, Their Needs, and Places Where They Live (K-LS1-1, K-ESS3-1)	1.1 Places Plants Live (2 class sessions)	Lesson 1 Guiding Question: What do plants need from the places they live? 1.1 In what places do plants live?
	1.2 Getting Water and Light (2 class sessions)	1.2 What happens to plants without light or water?
	1.3 Different Places Plants Live (2 class sessions)	1.3 Where are some different places plants get what they need?
	1.4 Plants and Their Needs	1.4 What is the relationship between plants and the places where they live?
	1.5 Mapping a Vacant Lot	1.5 What do plants need from the places where they live?
Lesson 2: Animals, Their Needs, and Places Where They Live (K-LS1-1, K-ESS3-1)	2.1 All Kinds of Animals	Lesson 2 Guiding Question: What do animals need from their environments? 2.1 What are animals, and how can they be grouped?
	2.2 Animal Needs for Food and Water	2.2 What are animals' needs for food and water?
	2.3 Places Animals Live	2.3 What resources do animals get from the places where they live?
	2.4 Animals and Their Needs	2.4 What is the relationship between animals and the places where they live?
	2.5 Animals in Our Lot	2.5 What do animals need from their environments?

Lesson 3: Humans, Their Needs, and Their Environments (K-LS1-1, K-ESS3-1)	3.1 Human Needs	Lesson 3 Guiding Question: What do humans need and use from their environments?
		3.1 Do people need the same things as plants and other animals?
	3.2 Materials Humans Use	3.2 What natural resources—things from nature—do humans need and use?
	3.3 Meeting Human Needs	3.3 How do humans meet their needs?
	3.4 Modeling a System for Living Things (2 class sessions)	3.4 What do humans need and use from their environments?
Unit Supplement	Science in Action	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 1.1.2
 AP 1.2.1
 AP 1.2.2
 AP 1.2.3
 AP 1.3.1
 AP 1.3.2
 AP 1.3.3
 AP 1.3.4
 AP 1.4.1
 AP 1.4.2

Black-line reproducible masters for Activity Pages, as well as an Answer Key, are included in Teacher Resources on pages 164–196. 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—A Place for Living Things (AP UO.1)

Lesson 1—A Carrot Is a Plant (AP 1.1.1)

Lesson 1—Where Plants Live (AP 1.1.2)

Lesson 1—How Our Plants Look as We Begin (AP 1.2.1)

Lesson 1—I Predict (AP 1.2.2)

Lesson 1—My Observations (AP 1.2.3)

Lesson 1—My Trip: The Sonoran Desert (AP 1.3.1)

Lesson 1—My Trip: The Tallgrass Prairie (AP 1.3.2)

Lesson 1—My Trip: The Redwood Forest (AP 1.3.3)

Lesson 1—My Trip: Cut and Paste (AP 1.3.4)

Lesson 1—What Plants Are in a Community Garden? (AP 1.4.1)

Lesson 1—What Plants Need (AP 1.4.2)



AP 1.5.1

AP 2.1.1

AP 2.1.2

AP 2.2.1

AP 2.2.2

AP 2.2.3

AP 2.3.1

AP 2.3.2

AP 2.3.3

AP 2.4.1

AP 2.4.2

AP 3.1.1

AP 3.2.1

AP 3.3.1

AP 3.4.1

AP 3.4.2

AP US.1

Lesson 1—Unit Project Scoring Rubric (AP 1.5.1)

Lesson 2—Living Things (AP 2.1.1)

Lesson 2—Animal Classification Cards (AP 2.1.2)

Lesson 2—What Do Animals Eat #1? (AP 2.2.1)

Lesson 2—What Do Animals Eat #2? (AP 2.2.2)

Lesson 2—How Much Water Does It Drink? (AP 2.2.3)

Lesson 2—My Trip to Yellowstone: Forest (AP 2.3.1)

Lesson 2—My Trip to Yellowstone: Grassy Valley (AP 2.3.2)

Lesson 2—My Trip to Yellowstone: Grassy Valley and Forests (AP 2.3.3)

Lesson 2—Help Wanted: Zookeeper (AP 2.4.1)

Lesson 2—What Animals Need (AP 2.4.2)

Lesson 3—Top Your Own Pizza (AP 3.1.1)

Lesson 3—Things Humans Use from Nature (AP 3.2.1)

Lesson 3—How Do People Meet Their Needs? (AP 3.3.1)

Lesson 3—Make a Welcome Sign (AP 3.4.1)

Lesson 3—Pictures for the Welcome Sign (AP 3.4.2)

Unit Supplement—Counting Samples (AP US.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

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 multipart 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.
Encourage scientific thinking.	<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>
Use continuous Core Vocabulary instruction.	<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 197–198.</p>
Emphasize observation and experience.	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.
Use science practices.	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.
Make frequent connections.	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.
Monitor student progress.	Use verbal questioning, student work, 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.

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.

Differentiation	<p>Adjustments to instruction appear in the text, indicated by SUPPORT, EXTEND, and CHALLENGE notations.</p> <p>SUPPORT—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>EXTEND—Extensions are suggested for students with high interest or who have already met the performance expectations.</p> <p>CHALLENGE—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>
Teacher Development	<p>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.</p>
Monitor Progress	<p>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.</p>
Math Connection	<p>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.</p>
Language Arts Connection	<p>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.</p>
Building Progressions	<p>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.</p>
 DCI SEP CCC PE	<p>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.</p> <p>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:</p> <p>www.coreknowledge.org/cksci-online-resources</p>

Icon Key:

DCI ESS3.A Natural resources

DCI LS1.C Organization for matter and energy flow in organisms

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.

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 199–203, 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:

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 is 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 is not repeated below.

Unit Opener

- large marker
- sticky notes

Lesson 1 Plants, Their Needs, and Places Where They Live

Lesson 1.1

- washed and dried carrots with stems and healthy leaves attached (1 bunch per class)
- brown construction paper (1 sheet 8.5 by 5.5 inches per student)
- clear tape (1 dispenser per group)
- crayons or markers (1 set per student)
- jar (1 per class)
- red food dye (10 drops per class)
- sharp knife (1 per class, teacher use)

Lesson 1.2

- potted tender-leaved herb plants, such as chives, basil, or cilantro (4 per class, all the same size and type of plant)

Lesson 1.2, continued

- digital camera or camera phone (1 per class)
- waterproof dishes, to place under each potted plant (4 per class)
- crayons or markers (1 set per student)
- folders (1 per student)

Lesson 1.3

- 8.5-in. by 11-in. white unlined paper (1 sheet per student)
- scissors (1 per pair)
- stapler (1 per class)
- paste or glue (1 per pair)
- map or globe

Lesson 1.4

- 12-inch strips of paper (50–100 per class)
- paper egg carton (1 per class)
- seed-starting potting mix (1 bag per class)
- herb seeds (3 different packets per class)

Lesson 1.5

- large sheet of brown craft paper (1 per class, minimum of 4 by 6 feet)

Lesson 1.5, continued

- thick black marker (1 per class)
- play putty (1 pack per class)

Lesson 2 Animals, Their Needs, and Places Where They Live

Lesson 2.1

- scissors (1 per pair)

Lesson 2.2

- poster-sized chart as shown in Step 2
- tacks or tacky putty
- one-gallon plastic jug

Lesson 2.3

- 8.5-in. by 11-in. white unlined paper (1 sheet per student)
- scissors (1 per pair)
- stapler (1 per class)
- paste or glue (1 per pair)
- map or globe

Lesson 2.4

- world globe
- blanket or towel
- chart paper (1 sheet per class)

Lesson 2.5

- map that the class began in Lesson 1.5 (1 per class)
- play putty (1 pack per class)

Lesson 3 Humans, Their Needs, and Their Environments

Lesson 3.1

- plate-sized round pieces of brown cardboard (1 per pair)
- scissors (1 per pair)
- glue or paste (1 per pair)

Lesson 3.2

- clipboard or writing board (1 per student or group)
- one-gallon plastic jug

Lesson 3.3

- soap bubble solution and wand
- shallow pan of water (1 per class)

Lesson 3.4

- map that the class began in Lesson 1.5 (1 per class)
- scissors (1 per group)
- glue or paste (1 per group)
- reusable putty adhesive (1 per class)

Science in Action

- tray (1 per group)
- combination of dirt and soil (to scatter around each tray)
- assorted animal figurines (5–6 per group)
- assorted plant figurines (2–3 per group)

NEEDS OF PLANTS AND ANIMALS PACING

_____’s Class

Note to Teacher: *Needs of Plants and Animals* is intended to be taught as the second unit of Kindergarten CKSci. As a general rule, we recommend that you spend a minimum of twenty days and a maximum of thirty days teaching the *Needs of Plants and Animals* unit so that you have time to teach the other units in the Kindergarten CKSci series.

Week 1

Day 1

Day 2

Day 3

Day 4

Day 5

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Week 2

Day 6

Day 7

Day 8

Day 9

Day 10

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Week 3

Day 11

Day 12

Day 13

Day 14

Day 15

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Week 4

Day 16

Day 17

Day 18

Day 19

Day 20

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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

Needs of Plants and Animals

OVERVIEW

Big Question: What must an area have so that living things can live there?

Anchoring Phenomenon: A city demolishes an old school building and tears out its parking lot and playground. The driving question we explore in this unit is “What must an area have so that living things can live there?” To answer this question over the course of the unit, students will **investigate the needs of plants and animals**, including humans. In investigating plants and animals, students will discover that plants and animals get what they need from the places where they live. Students recognize that there are many different types of plants and animals, and they and their habitats vary dramatically. Students learn that people are also animals that have needs, which they meet through their environments. (See **Know the Science**.)

Student Book storyline: Students at Greenville School have a brand new school building. The city of Greenville is removing the old, empty school building and its parking lot and playground. Citizens in the town are asked to tell the city council what they think the city should do with the space. Mrs. Patel’s Greenville School students think plants and animals should be allowed to live in the space. They need to do a presentation to city council to tell the town leaders how the area needs to change if it is to become a natural home for native plants and animals.

Long-term project: Students will prepare a presentation in parallel with the students in the Student Book, describing the needs of native plants and animals and their relationship with the local habitat.

Know the Science

TEACHER DEVELOPMENT

What Are the Most Basic Needs of Living Things? Living things must live in environments that meet their needs for energy and matter to live, grow, and reproduce. Plants need air, sunlight, water, space, and nutrients to survive. Animals need air, water, food, and shelter. Living things get what they need from their habitats, or they move or die out.

Plants (and other organisms with chlorophyll) obtain energy from sunlight through a chemical reaction called *photosynthesis*, which also requires water and carbon dioxide. This process produces food that the plant can use immediately or store and use as a source of energy and matter. Most plants also need mineral nutrients from soil. Animals obtain energy and matter by consuming plants and/or other animals. They break down these foods in several chemical reactions during digestion. Plants and animals also need oxygen to release energy from their food.

Introductory Class Session What to Do with an Old School

Students share their prior personal experiences of places that have become vacant lots and understandings of the needs of living things and discuss how an environment meets the needs of plants and animals. This will relate to the Big Question that they must answer before mocking up a presentation for their city leaders.

Unit Opener Objectives

- ✓ Clarify the unit anchoring phenomenon.
- ✓ Understand the Big Question and ask supporting questions.
- ✓ Identify plants and animals that live in an area.

NGSS References

Disciplinary Core Idea: ESS3.A Natural Resources

Science and Engineering Practices: 1 Asking Questions; 2 Developing and Using Models; 6 Constructing Explanations

Crosscutting Concept: 4 Systems and System Models

Students are introduced to the unit's Anchoring Phenomenon by asking questions and constructing explanations about how to create a model to change an empty lot into a wildlife 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

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.

environment

Instructional Activities

- student observation
- teacher Read Aloud
- drawing
- question generation

Instructional Resources

Student Book



Ch. 1

Activity Page



AP UO.1

Student Book, Chapter 1
“What to Do with an Old School”

Activity Page
A Place for Living Things
(AP UO.1)

Materials and Equipment

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

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

www.coreknowledge.org/cksci-online-resources

THE UNIT OPENER

1. Introduce the Anchoring Phenomenon.

NGSS Elements



SEP 6
CCC 4

- Explain that in this unit students will consider what to do with a land area created when a city demolishes an old school building and tears out its parking lot and playground.
- Students are likely to ask questions about how the old school was torn down. Make sure they understand that no people were in the building and all important or dangerous objects and materials have already been removed. Emphasize that the people who operate the wrecking machinery are experts in making sure no one is hurt during demolition and that the pieces of the building can be lifted onto trucks and carried away safely.
- For a shared experience, show an online video of a multistory building being demolished.

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

www.coreknowledge.org/cksci-online-resources

Online Resources



Ask students the following:

- **What parts of an old school might be removed before the building is torn down?**
 - » computers and tablets, books, art supplies, chairs and desks, kitchen appliances, white boards, playground equipment, class pets and plants
- **Why is it important for people to stand back while an old school building is taken down?**
 - » so that they are not injured by falling building materials
- **When have you seen a building torn down or an empty lot where a building was removed?**
 - » Students should share personal experiences from their community.

- **When the school building, playground, and parking lots are removed, what parts are left?**
 - » the ground, soil, rocks, maybe a tree or two, air

2. Read together: “What to Do with an Old School.”

Student Book



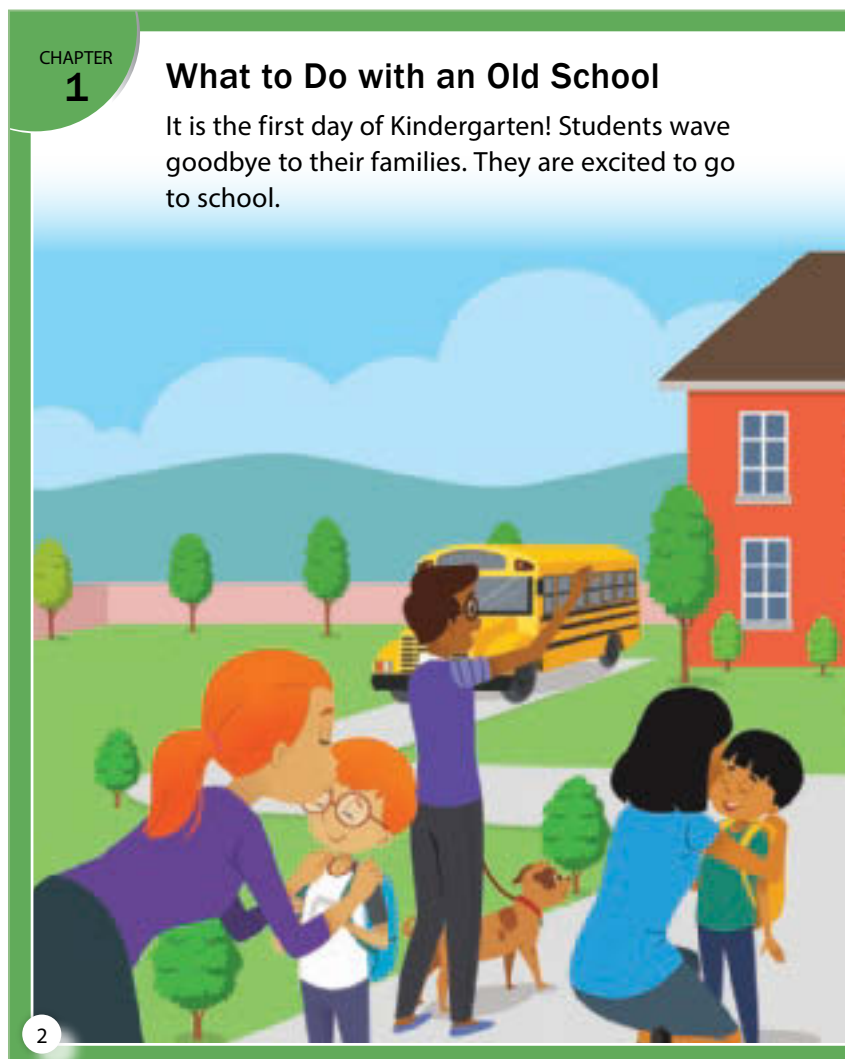
Ch. 1

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 “What to Do with an Old School,” and tell them to pay special attention to the decision the children in the story make as you read.



Ask students to look at the picture on pages 2–3. Explain that this is the new school the Kindergarten students in the story will attend.

Differentiation

LITERAL—Why are the children waving goodbye to their families?

- » They are going to school.

INFERENTIAL—What things will they do once they are inside the school?

- » play with other children, learn to read, draw and paint, eat snacks or lunch

EVALUATIVE—Is our school older or newer than the Greenville School in the story?

- » older unless it is also a new school

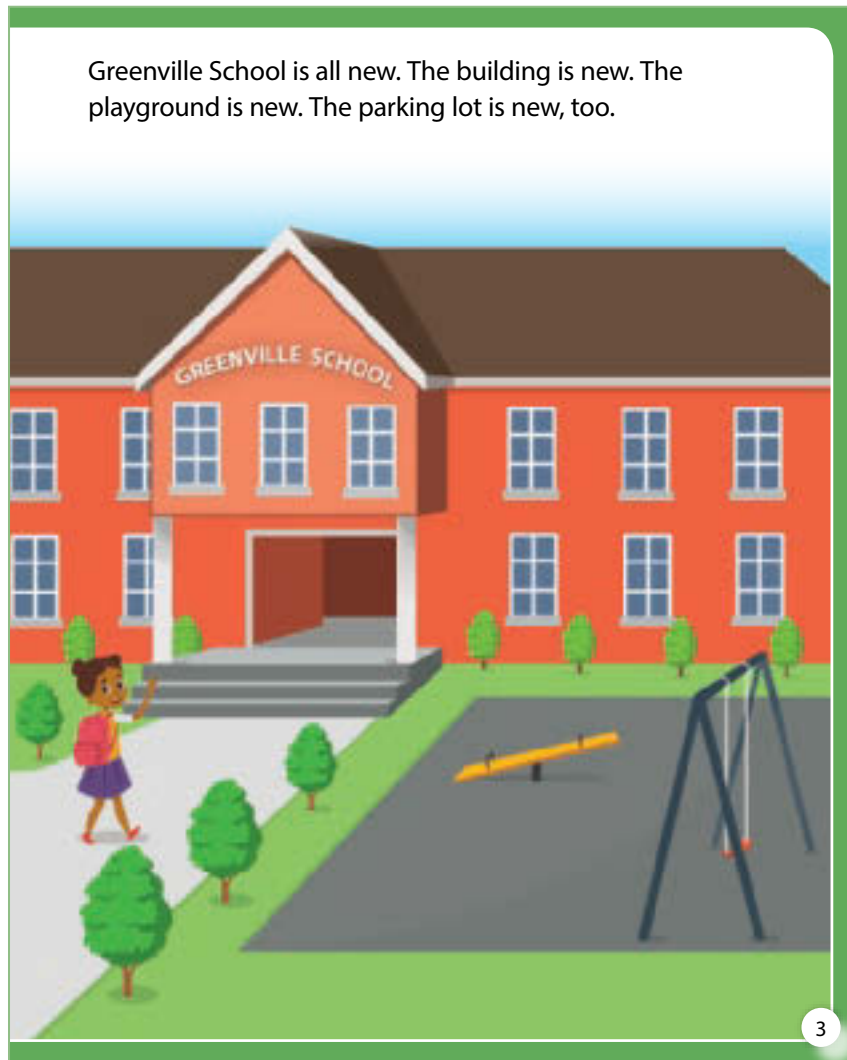
EVALUATIVE—How would you feel going to a brand new school?

- » excited, happy

EXTEND—What can students at our own school do and see outside the building?

- » play on the playground equipment
- » read books in the shade under a tree
- » look for bugs and worms

Ask students to continue looking at the picture on pages 2–3.



Ask students to point to the building, playground, and lawn.

INFERENTIAL—Who uses the playground during the school day?

» Students play there, and teachers watch them.

INFERENTIAL—Who uses the lawn?

» the students

"What will happen to the old school?" one child asks.

Mrs. Patel answers, "Our city will tear down the old school building. They will take away the playground. They will dig up the old parking lot."

"What will go in that big empty place?" another student asks.



NGSS Elements



SEP 6

LITERAL—What parts of the old school will be removed?

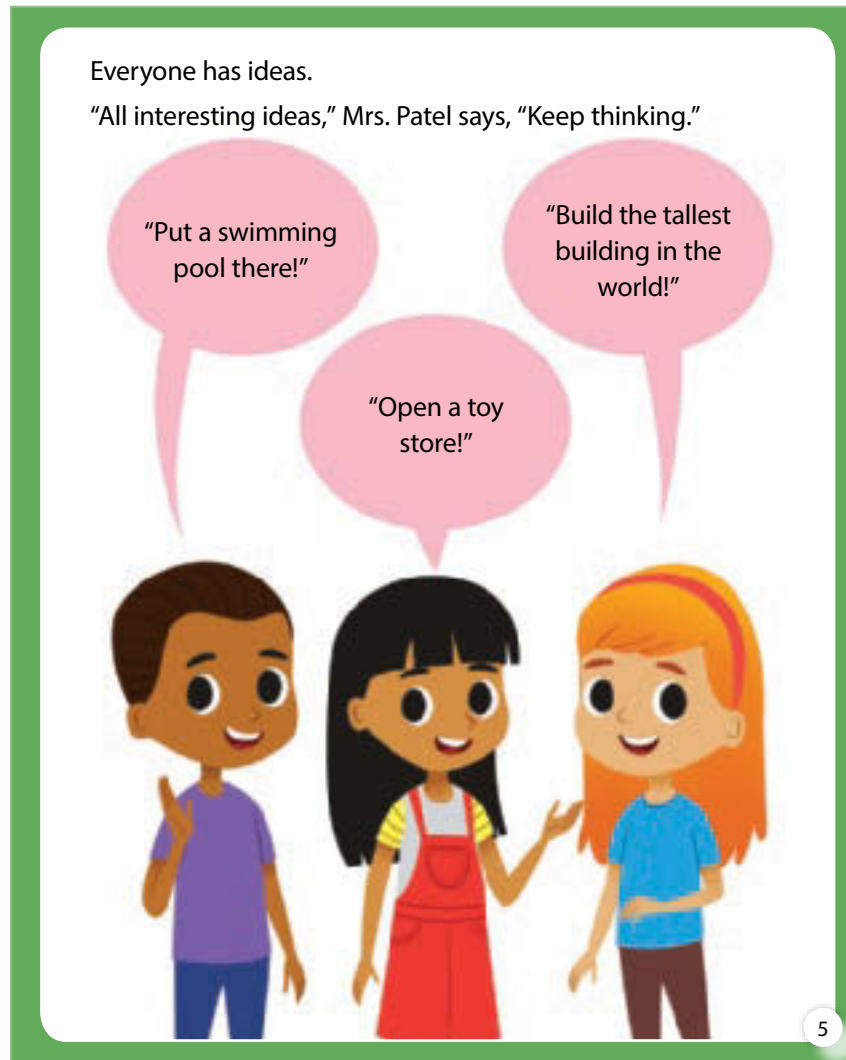
- » the building, the playground, the parking lot

INFERENTIAL—What will be left after the building, playground, and parking lot are removed?

- » Answers will vary but may include a fence, soil, dirt, air, some grass, and a tree.

INFERENTIAL—Have students propose answers to the text question "What will go in that big empty place?"

- » Answers will vary but may include a playground, a garden, and a pond.



NGSS Elements



SEP 6

LITERAL—What three ideas did the students suggest for filling the empty lot?

- » a swimming pool, a toy store, the tallest building in the world

INFERENTIAL—Why did Mrs. Patel tell the students to keep thinking?

- » She wanted to hear more ideas.

EVALUATIVE—What are some reasons why these might not be the best ideas for an empty school lot?

- » It might not be a good place for a swimming pool because the city has enough pools for people to use.
- » It might not be a good place for a toy store because the lot is far from the part of the city where people shop.
- » It might not be a good place for the tallest building in the world because people who live there do not want the building to make dark shadows on homes and streets.

The next day, the class talks again. "Let's make it a place for wild things to live," one child says. "Then people can go there to see flowers, butterflies, and birds."



6

LITERAL—What living things might live there if the city makes the lot a place for them?

» flowers, butterflies, birds

NGSS Elements



DCI ESS3.1

List on the board these three types of living things, and invite students to add more kinds of living things to the list.

Ask, What other kinds of living things can be found nearby that might visit or start to live on the lot?

» Responses will depend on the location of your school but might include dragonflies, deer, bees, raccoons, lizards, toads, ferns, vines, and trees.

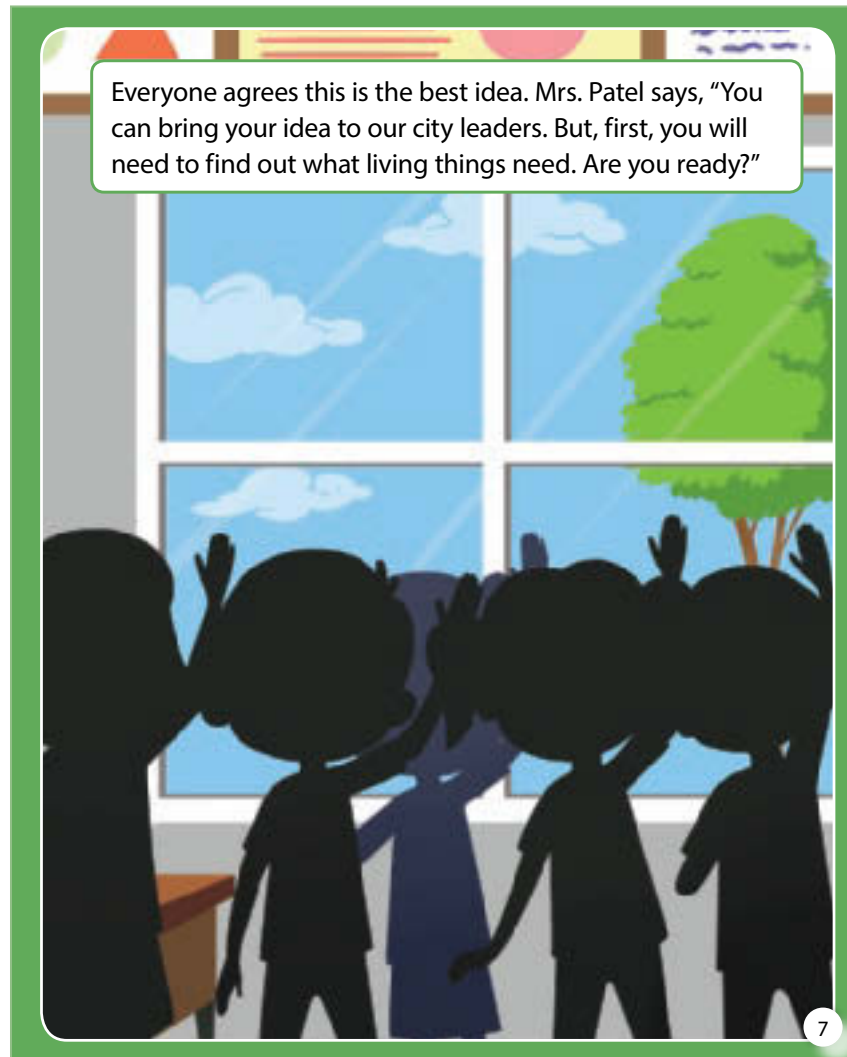
Differentiation

SUPPORT—If English language learners or other students seem unsure what a *living thing* is, point out things around the room or outside that are not living (chairs, books, pencils, rocks, water) and things that are living (wildflowers, poison ivy vines, trees, fish, flies, bees, snakes, owls), and record these examples on a T-chart.

CHALLENGE—Explain that living things that have lived in your area a very long time are called native wild things. Take students online or to the library to locate information on species that live in your area. Use a search engine and the key words “native species” with the geographical name of your region. Print images of native species and make a booklet that students can refer to as they continue this unit.

Page 7

Ask students to look at the picture on page 7 as you read aloud.



LITERAL—What is the idea everyone agrees on?

» to use the empty lot to make a place for plants or animals to live

INFERENTIAL—Why would they bring their ideas to their city leaders?

» because the city leaders will have to decide whether this idea or another idea should be chosen for how to use the empty lot

Activate prior knowledge by asking, What are some things plants and animals need?

» Accept all reasonable answers, and explain that this question will be explored in the rest of this unit.

3. Facilitate the activity.

Activity Page



AP UO.1

NGSS Elements



SEP 2

CCC 4

DCI ESS3.A

3D Learning

- Have students turn and talk in pairs about what an empty school lot in their community might have to look like before living things would move in.
- Then give each student a copy of A Place for Living Things (AP UO.1). Read aloud the directions, and explain that many parts are needed to make a place living things will want to visit. Provide pencils and markers so that students can draw the parts they think they will need. Circulate among students, and assist those who need help spelling the words for their labels.

3D Learning: Students use models to represent the parts of the environment living things need.

4. Generate questions.

NGSS Elements



SEP 1

Write the Big Question with a marker in large letters at the top of the question board: **What must an area have so that living things can live there?**

Invite volunteers to restate the question, making sure that the meaning is accessible to all students. **Ask students, What do we have to find out before we can answer this question?** Restate each student response as a question, write the question with a pen on a sticky note, and affix it to the question board.

Differentiation

Language Arts
Connection

SUPPORT—For English language learners, support this and other academic conversations by providing sentence frames, such as, “What do _____ need to _____ in the old school lot?” Encourage all students to adhere to classroom rules for respectful discussions, including speaking audibly and taking turns. (See **Know the Standards.**)

Explain to students that the class will revisit this question board, adding more student questions and thinking about answers, throughout the unit.

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: Providing sentence frames supports English Language Arts Speaking & Listening standards such as *Ask and answer questions in order to seek help, get information, or clarify something that is not understood* (CCSS.ELA-Literacy.SL.K.3). Establishing classroom rules for discussions supports *Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion)* (CCSS.ELA-Literacy.SL.K.1.A).

5. Check for understanding.

Monitor Progress

Formative Assessment

Ask students to show their ideas on A Place for Living Things (AP UO.1). Make a class list of the different elements that students included and labeled in their drawings.

Save the students' work as a pre-assessment that assesses prior knowledge about the needs of plants and animals. Review student labeled drawings (models) to determine their prior knowledge of the following concepts:

- They can convey science skill through drawings with labels.
- Living things have needs that can be met in the places they live.
- Parts work together in the natural and designed worlds.

Tie to the Anchoring Phenomenon

Through video, reading, discussion, asking questions, and model making, students put themselves in the place of the Kindergarten students in Mrs. Patel's class. They begin to develop the understandings needed to determine what conditions a former school lot should have to attract plants and animals to live there.

LESSON 1

Plants, Their Needs, and Places Where They Live

OVERVIEW

Guiding Question: What do plants need from the places where they live?

Lesson 1 Segments	Segment Questions	Advance Preparation
1.1 Places Plants Live (2 days) Students engage with the lesson phenomenon, observe a carrot plant, and take a plant walk to find environments where plants live.	In what places do plants live?	Purchase carrots with fresh green leaves and wash and dry them for Step 2. See Materials and Equipment.
1.2 Getting Water and Light (2 days) Students observe and collect data about the needs of plants for water and light. They identify patterns in their data and construct explanations about the needs of plants.	What happens to plants without light or water?	Purchase potted herbs at a food or garden store. See Materials and Equipment.
1.3 Different Places Plants Live (2 days) Students act out a tour of three natural environments, notice the different plants living in each, and use a model to explain how each kind of plant gets what it needs from its environment.	Where are some different places plants get what they need?	Make a folded and stapled trip journal as a model for students. Preview the videos/images you will show students. See Materials and Equipment.
1.4 Plants and Their Needs Students follow along in and discuss student book Chapter 2 and represent the main ideas in a diagram.	What is the relationship between plants and the places where they live?	Preview the slideshow or video you will show in Step 1. See Materials and Equipment. Read Chapter 2 in the Student Book.

<p>1.5 Mapping a Vacant Lot</p> <p>Students begin a class map of the vacant lot. They research and add to the map plants that can live locally.</p>	<p>What do plants need from the places where they live?</p>	<p>Locate a large roll of brown craft paper, and tear off a piece about 4 by 6–8 feet for your class. Decide what source to use to find native plants: a local expert, librarian, or online plant finder. See Materials and Equipment.</p>
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What's the Story?

Summary: In Lesson 1 (Segments 1–5), students explore patterns in the places plants live, work with data about plants' needs for light and water, and begin to use a model representing how a vacant lot in their community could provide resources for certain kinds of plants. The two Performance Expectations in this unit are addressed in all three lessons: as they relate to plants in Lesson 1, to animals in Lesson 2, and to humans in Lesson 3. The model students use to answer this unit's Big Question—**What must an area have so that living things can live there?**—is used in all three lessons.

Learning Progression: Lesson 1 builds student understanding of the Disciplinary Core Idea LS1.C (Organization for Matter and Energy Flow in Organisms), which will serve as a foundation for Grade 5 exploration of how organisms use matter and energy for body repair, growth, to move, and to maintain body warmth. In middle school, students will develop understanding of photosynthesis and the reactions that break down food.

Guiding Phenomenon: The plants in a community garden need lots of care from people.

Learning Objectives

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

- Identify living things that are plants.
- Using data, explain where plants can survive in the school environment.
- Collect and organize data on the relationship between water and plant growth.
- Collect and organize data on the relationship between light and plant growth.
- Interpret data related to plants' needs for light and water.
- Model the relationship between plant needs for light, water, and soil and the environment in which they live.
- Explain how a vacant lot in their local community can provide the resources to support certain kinds of plants.

NGSS Standards and Dimensions

Note: The following two Performance Expectations are partially met in this lesson on plants. Animals and humans will be met in Lessons 2 and 3.

Performance Expectation: K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Performance Expectation: K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

<p>Science and Engineering Practices</p> <p>1 Asking Questions</p> <p>Ask questions based on observations to find more information about the natural and/or designed world(s).</p> <p>2 Developing and Using Models</p> <p>Use a model to represent relationships in the natural world.</p> <p>3 Planning and Carrying Out Investigations</p> <p>Make observations (firsthand or from media) to collect data that can be used to make comparisons.</p> <p>Make predictions based on prior experiences.</p> <p>4 Analyzing and Interpreting Data</p> <p>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</p>	<p>Disciplinary Core Ideas</p> <p>LS1.C Organization for Matter and Energy Flow in Organisms</p> <p>All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p> <p>ESS3.A Natural Resources</p> <p>Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.</p>	<p>Crosscutting Concepts</p> <p>1 Patterns</p> <p>Patterns in the natural and human designed world can be observed and used as evidence.</p> <p>4 Systems and System Models</p> <p>Systems in the natural and designed world have parts that work together.</p> <p>6 Structure and Function</p> <p>The shape and stability of structures of natural and designed objects are related to their function(s).</p> <p>7 Stability and Change</p> <p>Some things stay the same while other things change.</p> <p>Connection to Nature of Science</p> <p>Scientific Knowledge Is Based on Empirical Evidence</p> <p>Scientists look for patterns and order when making observations about the world.</p>
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8 Obtaining, Evaluating, and Communicating Information		
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Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).

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

www.coreknowledge.org/cksci-online-resources

LESSON 1.1

Places Plants Live

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do plants need from the places they live?

Today's Question: In what places do plants live?

Tie to the Anchoring Phenomenon: Students encounter through observation and discussion patterns in where plants live and begin to recognize that transforming a vacant lot into a nature preserve requires consideration of the needs of plants.

AT A GLANCE

Learning Objectives

- ✓ Identify plants as living things.
- ✓ Explain where plants can get the water and light they need.

Instructional Activities (2 Days)

- student investigation
- student observation

NGSS References

Disciplinary Core Idea: ESS3.A Natural Resources

Science and Engineering Practices: 4 Analyzing and Interpreting Data; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concept: 1 Patterns

Students analyze and interpret data to find patterns in the places plants can live.

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

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.

leaf

pattern

plant

root

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.

living model underground

Instructional Resources

Activity Pages



AP 1.1.1

AP 1.1.2

Activity Pages

A Carrot Is a Plant (AP 1.1.1)

Where Plants Live (AP 1.1.2)

Materials and Equipment

- washed and dried carrots with stems and healthy leaves attached (1 bunch per class)
- brown construction paper (1 sheet 8.5 x 5.5 inches per student)
- clear tape (1 dispenser per group)
- crayons or markers (1 set per student)
- question board

For Extend activity:

- jar (1 per class)
- red food dye (10 drops per class)
- sharp knife (1 per class, teacher use)

THE CORE LESSON 1.1

1. Day 1: Introduce students to Lesson 1.

NGSS Elements



CCC 4

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 an area have so that living things can live there?**

Make sure students understand what you mean by an area or empty lot. Explain that when a building, such as an old school, is torn down and all the parts are removed, an empty lot or piece of land remains.

Ask, When the school building, playground, and parking lots are removed, what parts are left?

» Samples: the ground, soil, rocks, maybe a tree or two, air

Tell students that, before they can answer the unit's Big Question, they first need to understand the needs of plants and animals, including people. In Lesson 1, they will learn about the needs of plants in order to apply their understanding to the Big Question. Write the **Lesson 1 Guiding Question** where students can see it:

What do plants need from the places they live?

Tie to the Anchoring Phenomenon

Through observation of and modeling what a carrot plant needs to live and where plants can be found around the school, students learn that any plants they want to live in a vacant lot will need water, soil, and sunlight.

2. Observe and describe a carrot plant.

Tell students you are going to show them a living thing and that they should act like scientists and look closely and handle it gently. (See **Know the Science.**)

Divide the class into as many groups as you have carrots, and give a carrot plant to each group. Remind students not to eat the carrots during the science activity.

Point out that the plant was not always this big—that it started life as a tiny seed, the seed sprouted, and a tiny carrot plant grew bigger and bigger. Explain that this is one kind of evidence that carrot plants are alive—they grow!

Invite each group to identify the parts of their carrot plant: root, stems, leaves. Point out that they have found a pattern: all carrot plants have roots, stems, and leaves.

Give each student a copy of A Carrot Is a Plant (AP 1.1.1). Guide students to follow the directions to use crayons or markers to show the real colors of each part of the plant and to label the root, stems, and leaves.

Then, give each student a sheet of brown paper, and have them place it over the drawing to show what parts of the carrot grow in the ground and what parts are above the ground. Have students tape only the top edge of the brown paper so that it forms a flap that they can lift.

Activity Page



AP 1.1.1

NGSS Elements



SEP 2

DCI LS1.C

DCI ESS3.A

CCC 1

CCC 6

Know the Science

TEACHER DEVELOPMENT

Why Do Scientists Look for Patterns When Making Observations? A pattern is something that repeats. One way to organize observations is to look for patterns. Patterns in the natural world can be found in sets of numbers (odd and even numbers), in the shapes of objects (the number of petals on flowers), in the occurrences of certain colors (in a rainbow), in events (solar and lunar eclipses), in the motions of objects (objects fall toward the center of Earth), and in the behaviors of living things (yearly territorial and mating rituals). Recognition of patterns prompts scientists to explain cause-and-effect relationships, and scientists look for patterns in all fields of study—life sciences, physics, chemistry, and Earth and space sciences.

Differentiation

SUPPORT—Handling the tape without getting it balled up or stuck on the wrong part of the Activity Page can be difficult for students with less developed fine motor skills. Have these students use small pieces of removable putty to tack the brown paper in position. Then guide students to place short strips of clear tape along the top of the flap.

Have students use their Activity Page with the flap to show and answer these questions:

- Which part of the carrot plant grows underground?
 - » the orange root
- Which parts of the carrot plant grow above the ground?
 - » the stems and leaves

NGSS Elements



CCC 6

Point out that gardeners use a hose to soak the soil around the plant. Explain that this is because plants take in water from the soil through their roots. Have students label their drawing *water* under the flap.

Point out that the leaves are above the ground and take in light from the sun. Have students label their drawing *light* above the flap.

Differentiation

EXTEND—If your students show high interest, keep the carrot plants in your classroom a few days longer to learn what happens to water that is taken up by the root. Fill a jar with water, and stir in a few drops of red food dye. Use a sharp knife to cut the tip off the carrot root, and place the root in the jar of dyed water (with stems and leaves above the water). Place the jar on a windowsill in bright light for a few days. Then, remove the carrot, and make a sharp cut in the root from end to end. With the help of the contrasting colored dye, students should be able to see the long thin tubes that carry water from the bottom of the root up to the leaves.

1. Day 2: Take a plant walk around your school.

Activity Page



AP 1.1.2

Give each student a copy of Where Plants Live (AP 1.1.2) and a pencil. Explain that they will take the Activity Page on a walk to look for plants and use it to keep track of what they observe.

SUPPORT—If some students are not familiar with using tally marks to count, show them how to count the number of people in your classroom, marking a vertical line for the first four people and a horizontal line over them for the fifth person. (See **Know the Standards.**)

Take the class on a plant walk inside and outside the school to find the places listed in the left column of the chart on the Activity Page. Each time students find a new living plant, have them make a tally mark in the right column of the chart. If there are no plants around the school, take students for a walk around the block or to a local park.

Math
Connection

When you return to class, have the students count the number of tallies in each row and write the total number in the last column. If they have more than ten marks, show them how to circle two sets of five tallies to make a ten. Then have them count the groups by tens. Remind them to write zero for places without tally marks.

NGSS Elements



SEP 4
DCI LS1.C
CCC 1
3D Learning

Have students use their charts to answer the following questions:

- In what places around our school did you find many living plants?
 - » next to the sidewalk, next to a window, next to a playground
- What is the same about all these places?
 - » There is bright light there.
- In what places around our school were no living plants found?
 - » a closet, under a desk, under a rock
- What is the same about the places where no living plants were found?
 - » They are dark.

Know the Standards

TEACHER DEVELOPMENT

Math Connection: Some students may need extra mathematics support to work with the varied counting strategies required by this activity. At the Kindergarten level, students are expected to count up to twenty things arranged in a line—*count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects* (CCSS.Math.Content.K.CC.B.5). They are also expected to *write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects)* (CCSS.Math.Content.K.CC.A.3). Support with cardinality through *fifth* will also help them cluster the tally marks in groups of five—*understand the relationship between numbers and quantities; connect counting to cardinality* (CCSS.Math.Content.K.CC.B.4).

2. Check for understanding.

NGSS Elements



SEP 2

SEP 4

DCI LS1.C

DCI ESS3.A

CCC 1

Monitor Progress

Return to Today's Question, **In what places do plants live?** Remind students of the carrot plants they observed, and **ask the following:**

- What does a growing carrot plant need from the ground or soil?
 - » water
- What does a growing carrot plant need from above the ground?
 - » light
- How did making a model with the Activity Page and a paper flap help you understand something about plants?
 - » Having a flap for the ground meant we could see what part of the plant lives underground.

Remind students of the plant walk around the school, and **ask the following:**

- What did you notice about where plants can be found around our school?
 - » They all seem to be where there is bright light.
- What does this pattern tell you about the needs of plants?
 - » Plants need light to live and grow.
- How did using the tally chart help you find a pattern about plants?
 - » When we could count the tallies, it helped us know that plants can live in some places but not in others.

Differentiation

CHALLENGE—Challenge students to explain why some people keep artificial (nonliving) plants in their homes or the places they work. Guide students to infer that some people live and work in places that do not have enough light for plants to grow. So, while many people enjoy being around plants, they cannot always keep real plants alive.

Call attention to the question board. Revisit the questions recorded there so far, and ask students how looking at a live carrot plant and taking a plant walk around school might answer or relate to some of those questions. Encourage students to suggest additional questions for the question board.

Formative Assessment

This is an opportunity to get students to think directly about the Crosscutting Concept *Patterns* in numerical data in the context of the Disciplinary Core Idea ESS3.A: *Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.* In the rest of Lesson 1, students will continue to identify patterns related to plants' needs for water and light.

Review student work on A Carrot Is a Plant (AP 1.1.1) to determine student understanding of the following concepts:

- Plants have leaves to get the light they need.
- Plants have roots to get the water they need.

Review student work on Where Plants Live (AP 1.1.2) to determine student understanding of the following concepts:

- Plants need light.
- Plants need water.
- Plants need air.

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

Tie to the Anchoring Phenomenon

Students have learned that carrot plants have parts that help them meet their needs and have taken a walk around their own school to identify places where plants live. Through these experiences, students are developing knowledge about plants that they will use to propose where plants can be added to a vacant lot left after a school building was demolished, just like Mrs. Patel's class in the Student Book.

LESSON 1.2

Getting Water and Light

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do plants need from the places they live?

Today's Question: What happens to plants without light or water?

Tie to the Anchoring Phenomenon: When a city demolishes an old school, the community suggests ways to use the vacant lot. Through investigation of live plants and collection of data, students begin to understand that any plants they want to grow in the area have needs for sunlight and water that must be met.

AT A GLANCE

Learning Objectives

- ✓ Collect and organize data on the relationship between water and plant growth.
- ✓ Collect and organize data on the relationship between sunlight and plant growth.
- ✓ Interpret data related to plants' needs for sunlight and water.

Instructional Activities (2 Days)

(Two or more days, depending on the time needed for the plants to respond to their varied conditions.)

- class discussion
- student investigation

NGSS References

Performance Expectation: K-LS1-1

Disciplinary Core Idea: LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 1 Asking Questions; 3 Planning and Carrying Out Investigations; 4 Analyzing and Interpreting Data

Crosscutting Concepts: 7 Stability and Change; 1 Patterns

Connection to Nature of Science: Scientific Knowledge Is Based on Empirical Evidence

Students interpret data to identify how plants change depending on whether or not they got light 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

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.

light pattern plant 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.

investigate observe predict

Instructional Resources

Activity Pages



AP 1.2.1

AP 1.2.2

AP 1.2.3

Activity Pages

How Our Plants Look as We Begin (AP 1.2.1)

I Predict (AP 1.2.2)

My Observations (AP 1.2.3)

Materials and Equipment

- potted tender-leaved herb plants, such as chives, basil, or cilantro (4 per class, all the same size and type of plant)
- digital camera or camera phone (1 per class)
- waterproof dishes, to place under each potted plant (4 per class)
- crayons or markers (1 set per student)
- folders (1 per student)
- internet access and the means to project images/video for whole-class viewing
- question board

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

www.coreknowledge.org/cksci-online-resources

Advance Preparation

- Label the potted plants.
 - Label one potted plant “Light and water.”
 - Label a second plant “Light but no water.”
 - Label the third plant “Water but no light.”
 - Label the fourth plant “No water and no light.”
- You may want to set up this investigation with students and, while the plants are responding to the conditions of the investigation, move on to complete the rest of the segments in Lesson 1. Check the plants every day, and complete this lesson segment when the results are apparent to students.

THE CORE LESSON 1.2

1. Day 1: Focus student attention on Today's Question.

Online Resources



NGSS Elements



SEP 1
DCI LS1.C

What happens to plants without light or water? Take students online to explore the DK Find Out! web pages about Plants, clicking and reading the labels. For each interesting image, reinforce that it shows a plant and that plants are alive. Then show a video of a garden tour. **Ask students the following, and be prepared to guide their answers:**

- What types of plants did you see?
 - » trees, vegetables, grass, flowers
- Are plants alive?
 - » yes
- Can plants move around like animals that run or swim?
 - » no
- How big are plants? Are trees plants?
 - » Yes, trees are plants, and they can be bigger than a house.
- What plants do people eat?
 - » Samples: wheat, cocoa, rice, broccoli, string beans, parsley
- What do plants need to stay alive?
 - » Accept all reasonable answers.

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

www.coreknowledge.org/cksci-online-resources

Tell students you will carry out an investigation to find out what plants need to stay alive.

Tie to the Anchoring Phenomenon

Through investigation and collecting and analyzing data, students can infer that any plants they propose to introduce to a vacant lot will need to get water and light.

2. Conduct an investigation and organize data.

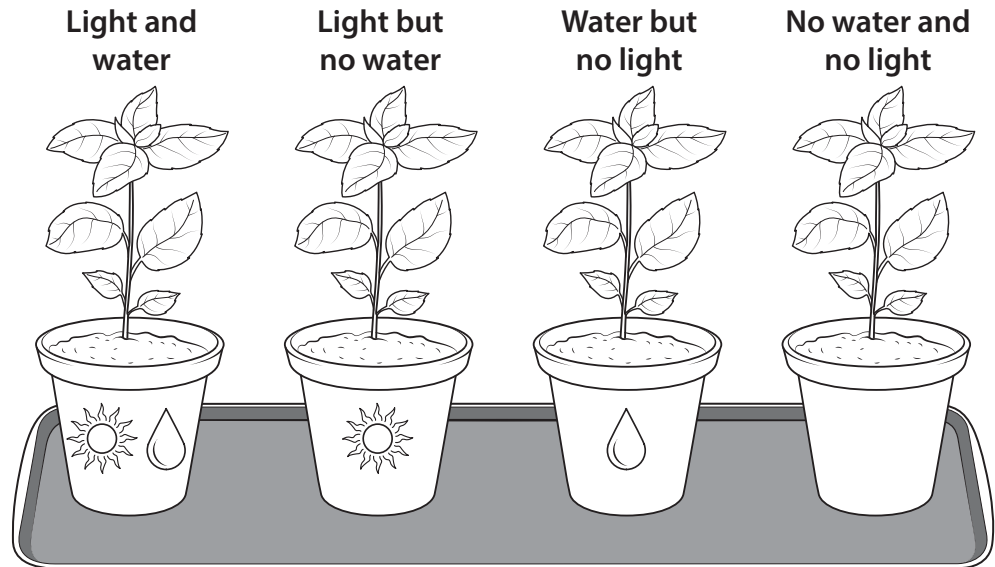
NGSS Elements



SEP 3
DCI LS1.C

- Set up and label four identical pots of herbs as shown in the illustration, and show them to the class. Read the labels or symbols on each pot and make sure students understand that one pot will get water and light, one will get just light, another will get just water, and the fourth will get neither water nor light.

- With students, place the two pots that will get light on a windowsill. Place the two pots that will not get light inside a cabinet or closet with a door. For the two pots that will get water (one on the windowsill and the other inside the cabinet), set up a daily watering schedule. Have a student feel the soil in the pot and give it just enough water until the soil feels uniformly damp. If the soil in the pot is already damp (as it may be inside the cabinet), do not water it.



Activity Pages



AP 1.2.1
AP 1.2.2

- Give each student a copy of How Our Plants Look as We Begin (AP 1.2.1) and crayons or markers. Have students draw the appearance of each plant at the start of this investigation. Make sure they pay attention to recording the relative sizes of each plant as they draw.
- Take a photo of the four plants so that students who are absent from class can reference it as a source of data.

Differentiation

SUPPORT—If some students struggle with drawing realistically, use guiding questions to connect observations with their representations on paper. Have students focus on details of the plants by asking the following:

- How tall is the plant compared to the pot? Are the stems straight or curved?
- Are the edges of the leaves straight or curved?
- Are all the parts of the plant the same color?

Encourage students to keep going by pointing out successful aspects of the drawing rather than mistakes.

- Give each student a copy of I Predict (AP 1.2.2) and crayons or markers. Have students draw their predictions about how each plant will look after several days. Later, they can compare their predictions to their collected data.

Differentiation

SUPPORT—Make sure English language learners understand that to *predict* is to tell what they think will happen. Connect making predictions to the work scientists do. Explain that scientists make predictions after thinking about patterns they already know about. Emphasize that as students, they can think about patterns that are seen not only in school, but in the world outside school, including other communities and cultures students have experienced.

Using the two completed Activity Pages, **ask students the following:**

- How do the sizes of the four plants compare at the beginning?
 - » They are all about the same size.
- How do you think the sizes of the plants will compare after they are cared for differently?
 - » Accept all answers. Sample: Some will be bigger, and some will be smaller.
- What other differences do you predict?
 - » Accept all answers. Sample: Some will be dried up and almost dead.
- What do you know that helped you make your predictions?
 - » Accept all answers. Sample: We had a plant at home that everyone forgot to water.

Activity Page



AP 1.2.3

Each day, check the plants that are to receive water, and water as needed. Line up all four plants, and have students make observations of their condition, changes in color, and changes in size. Then, return them to the windowsill or cabinet.

After a few days, the differences between the four potted plants should be obvious. Line them up in a row again. Give each student a copy of My Observations (AP 1.2.3). Have students draw the conditions of the plants as accurately as they can, making sure they record the relative sizes of the four plants.

Math Connection

CHALLENGE—Provide students with paper strips, snap cubes, or place-value rods that students can hold next to the plants to measure their heights and widths indirectly. Then have students lay the strips or rods in a row to directly compare their sizes. These data can then be used to make their observations more accurate. (See **Know the Standards.**)

Take another photo of the four plants, which students who are absent from class can reference as a source of data when they return.

Know the Standards

TEACHER DEVELOPMENT

Math Connection: This Challenge strategy allows students who are interested to explore Grade 1 skills for measurement and data, specifically CCSS.Math.Content.1.MD.A.1 (*Order three objects by length; compare the lengths of two objects indirectly by using a third object*) and CCSS.Math.Content.1.MD.A.2 (*Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object [the length unit] end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps*).

1. Day 1: Look for patterns and interpret data.

NGSS Elements



SEP 4
DCI LS1.C

Activity Pages



AP 1.2.1
AP 1.2.3

Return to students their completed Activity Pages 1.2.1 and 1.2.3. Give them materials needed to tape or paste the two pages side by side inside a paper folder.

Make available to students prints or projections of the photos you took during the investigation.

Have students compare their observations of the plants before and after the investigation. **Ask the following:**

- How did the plant that received both light and water look after our investigation?
 - » The plant grew bigger/taller/more leaves.
- How did the plant that received light but no water look after our investigation?
 - » The plant was flopped over and a paler green color.
- How did the plant that received water but no light look after our investigation?
 - » It was no bigger, and the stem and leaves were yellow in color.
- How did the plant that received no light and no water look after our investigation?
 - » It turned brownish in color and flopped over. It looked dead.

NGSS Elements



CCC 1

Have students look for patterns in data about light by pointing to the two plants on Activity Page 1.2.3 that did not get light. **Ask,** What happens to plants that do not get light?

- » They lose their green color and turn yellow or brown. (See **Know the Science.**)

Have students look for patterns in data about water by pointing to the two plants on Activity Page 1.2.3 that did not get water.

Ask, What happens to plants that do not get water?

- » They flop over and turn brown.

Know the Science

TEACHER DEVELOPMENT

What Makes Plants Green? Plants need light to carry out photosynthesis, the chemical reaction that converts carbon dioxide and water into glucose and oxygen. Glucose is a source of energy and matter for the plant that can be used quickly or converted into starch and stored for later use. A pigment in plant cells, called *chlorophyll*, is needed during photosynthesis to convert sunlight into the glucose the plant can use. This pigment appears green because it absorbs other colors of light but reflects green light back to our eyes.

Shift the discussion to using claims-evidence-reasoning language. **Ask the following:**

What evidence supports the claim that plants need both light and water to live and grow?

- » Only one plant we investigated stayed alive and continued to grow—the one that got both light and water.

2. Check for understanding.

NGSS Elements



DCI LS1.C

Activity Pages



AP 1.2.2

AP 1.2.3

Differentiation

Monitor Progress

Hand back to students their completed I Predict (AP 1.2.2). Have them compare their predictions to their final observations, as recorded on My Observations (AP 1.2.3).

Ask the following: What surprised you about how the plants looked at the end of our investigation?

- » I was surprised that the plants that did not get light looked so sick or died, even if they got plenty of water.

EXTEND—To learn more about plants, plan to take them to visit a member of the school community who cares for potted plants in their office or classroom. Have students get a list of questions ready that focus on what it takes to keep the plants alive and growing. During the visit and interview, ask the person to demonstrate some of the tasks needed to care for their plants.

Formative Assessment

- Review student work on How Our Plants Look as We Begin (AP 1.2.1), I Predict (AP 1.2.2), and My Observations (1.2.3) to determine student understanding of the following concepts:
 - Plants cannot live without water.
 - Plants cannot live without light.
 - Plants need both light and water to live and grow.
- Call attention to the question board. Revisit the questions recorded there so far, and **ask students** if today's lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the question board.
- Your students' work on the Activity Pages and in discussions in this lesson segment are building toward mastery of Performance Expectation K–LS1-1. In the next two lessons, they will address the needs of animals, including humans, for food and water.

Tie to the Anchoring Phenomenon

Just like Mrs. Patel's class, students learn through experimentation and discussion that any plant introduced to a vacant lot in their community would need to have access to light and water. If not, they could not survive and grow.

LESSON 1.3

Different Places Plants Live

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do plants need from the places they live?

Today's Question: Where are some different places plants get what they need?

Tie to the Anchoring Phenomenon: Students encounter through role playing and developing travel journals understanding that light and water resources vary in the different places plants live, and they will begin to think about how a vacant lot in their own community can support plant life.

AT A GLANCE

Learning Objectives

- ✓ Identify relationships between plants and their environments.
- ✓ Model the relationship between plant needs and the environment.

Instructional Activities (2 Days)

- class discussion
- role play

NGSS References

Disciplinary Core Idea: ESS3.A Natural Resources

Science and Engineering Practices:
2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concept: 4 Systems and System Models

Students use a model to develop understanding that environments have parts that work together to keep plants alive.

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

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.

desert forest light plant
prairie 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.

environment

Instructional Resources

Activity Pages



AP 1.3.1
AP 1.3.2
AP 1.3.3
AP 1.3.4

Activity Pages

My Trip: The Sonoran Desert
(AP 1.3.1)

My Trip: The Tallgrass Prairie
(AP 1.3.2)

My Trip: The Redwood Forest
(AP 1.3.3)

My Trip: Cut and Paste
(AP 1.3.4)

Materials and Equipment

- 8.5-in. by 11-in. white unlined paper (1 sheet per student)
- scissors (1 per pair)
- stapler (1 per class)
- paste or glue (1 per pair)
- question board
- map or globe
- internet access and the means to project images/video for whole-class viewing

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 1.3

Day 1: 1. Focus student attention on Today's Question.

NGSS Elements



DCI ESS3.A
CCC 4

Where are some different places plants get what they need?

Remind students that in the last lesson segment they investigated the needs of plants. **Ask**, What two needs did we investigate?

» the needs for water and light

Explain that in this lesson, they will explore three places outdoors where plants live. Invite students to help you list outdoor places they have already been where plants live. (See **Know the Science.**)

» park, woods, backyard

Tie to the Anchoring Phenomenon

Remind students to continue thinking about an area in their own community and how different kinds of plants can get the things they need to live there.

2. Act out a trip to the Sonoran Desert.

NGSS Elements



SEP 8

DCI ESS3.A

Language Arts
Connection
3D Learning

- Give each student a sheet of 8.5-in. by 11-in. paper. Have them fold it in half once and then again to make a 4.25-in. by 5.5-in. booklet. Help students use scissors to cut open the two folds along one of the short sides of the booklet. Then staple as close to the fold (the spine) as possible to make a bound booklet. Have students write their names and “My Trip” on the cover.
- Tell students the class is going to act out taking a trip to environments where plants and animals live. They will keep a trip journal of the three places they go. Show on a map or globe where the Sonoran Desert, the tallgrass prairie, and the redwood forest are in relation to where you live. Later, they will put stamps in the journal to remind them of the environments they saw.
- Have students act out packing up their backpack with food, water, a jacket, and sunglasses. Tell them to put on their hats.
- Have students sit in chairs arranged in rows of three seats on each side with an aisle down the middle like on a plane. Act out fastening their seat belts and taking off.

Differentiation

SUPPORT—Some students may not have had many opportunities to act out a story. These students will benefit from repetition of the activity. Consider modeling acting out the story yourself before inviting the class to join in with you.

Know the Science

TEACHER DEVELOPMENT

How Do Plants Vary in Different Biomes? Biomes are the largest-scale environments that biologists study to explain how plants meet their needs. Each biome has distinguishing plant (and animal) life that is suited to the temperature and rainfall conditions found on that part of Earth’s land surface. Land biomes include the wet tropical forest (densely growing trees and climbing vines), savanna (grasses with scattered trees), desert (cactuses and wildflowers that grow and flower and then disappear), temperate grassland (densely growing tall grasses with trees only along streams), temperate forests (tall deciduous trees such as maple or oak mixed with cone-bearing evergreen trees such as pines), boreal forests (tall cone-bearing evergreen trees), and the arctic tundra (very low-growing shrubs, grasses, and lichens).

Also, invite volunteers to take speaking roles (airplane captain, flight attendant, tour leader, small child) and improvise lines. (See **Know the Standards.**)

- Then tell students to look out of the plane’s windows at the land below. Direct them to picture seeing very dry, brown, rocky, and sandy soil with some plants growing there.
- As the plane lands, tell students to put on their sunglasses—the desert is very sunny in the daytime! Explain that it is time to take a hike in the desert.

Online Resources



Show one or two videos of the Sonoran Desert. **Then ask students the following:**

- What kind of living thing is a saguaro cactus?
 - » a plant
- It’s very dry in the desert, so how does the cactus get enough water to stay alive?
 - » It stores water inside. The outside is waxy and keeps water from escaping. The spines make a little shade and keep animals from drinking the water. It has a lot of shallow roots to take up water.
- How does the cactus get the light it needs?
 - » from the sun
- Does light from the sun reach the desert soil?
 - » yes
- What does the cactus get from the desert soil?
 - » water
- What other kinds of plants did you see in the desert?
 - » bushes and small trees

Activity Page



AP 1.3.1

Give each student a copy of My Trip: The Sonoran Desert (AP 1.3.1). Have them cut on the dotted line to remove the large rectangle and paste it across the first two inside pages of their booklets.

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

www.coreknowledge.org/cksci-online-resources

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: Acting out a story or scenario is a good opportunity to address Kindergarten English Language Arts Standards for Language and Speaking and Listening. Encourage students to *use words and phrases acquired through conversations, reading and being read to, and responding to texts* (CCSS.ELA-Literacy.L.K.6), to *continue a conversation through multiple exchanges* (CCSS.ELA-Literacy.SL.K.1.b.), and to *speak audibly and express thoughts, feelings, and ideas clearly* (CCSS.ELA-Literacy.SL.K.6).

Day 2: 1. Act out a trip to the tallgrass prairie.

Online Resources



NGSS Elements



SEP 8

DCI ESS3.A

Language Arts
Connection

Act out with students getting back on their plane and flying to the Tallgrass Prairie National Preserve. Show an online video or images to view and discuss with students, asking them to look out the “window” to see what looks like a sea of grass.

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

www.coreknowledge.org/cksci-online-resources

When they land, have them put on their backpacks and sunglasses and act out hiking through the tallgrass prairie. If they step off the trail, the grasses are very tall—sometimes taller than they are!

Then discuss the following with students:

- What kinds of plants are found in this place?
 - » grasses, wildflowers, but only a few trees in the distance
- It is very windy on the prairie. How do the plants survive the winds that push on them?
 - » Their stems bend instead of breaking.
- Do plants growing near the ground on the prairie get more light than in the desert? Explain.
 - » They get less light because grasses grow close together and make some shade.
- Point out that it rains a little more on the prairie than it does in the desert. How do the grasses and wildflowers on the prairie get the water they need?
 - » They have roots in the soil.
- What other kinds of living things did you see or hear in the tallgrass prairie?
 - » butterflies, birds, and bison

Activity Page



AP 1.3.2

Differentiation

Give each student a copy of My Trip: The Tallgrass Prairie (AP 1.3.2). Have them cut on the dotted line to remove the large rectangle and paste it across the second two inside pages of their booklets.

EXTEND—The tallgrass prairie environment played a central role in the history of humans who have come to live in North America—Native American tribes, European immigrants, and more. Introduce your students to prairie literature with a picture book, Claudia McGehee’s *A Tallgrass Prairie Alphabet* (University of Iowa Press, 2004), where they can learn through the eyes of an artist about more species of plants and animals that inhabit the prairie.

2. Act out a trip to a redwood forest.

Online Resources



NGSS Elements



SEP 8
DCI ESS3.A

Act out with students getting back on their plane and flying to a redwood tree forest in California. As they look out the window of the plane, they will only see the pointed tops of evergreen trees. Tell them to put their sunglasses in their backpacks—they will not need them down on the forest floor. Show online videos or images, and stop the videos for students to make observations.

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

www.coreknowledge.org/cksci-online-resources

Then discuss the following with students:

- What kind of living thing is a redwood tree?
 - » a plant
- It rains a lot in redwood forests. How do you think the trees get the water they need to stay alive?
 - » Their roots in the ground take up water from rain. Sometimes the forest floods.
- It is so dark on the ground in this forest. How do the trees get the light they need?
 - » While it is dark near the ground, the treetops get sunshine.
- Some plants need less light than others. How much light do the plants that live under the trees need?
 - » not much, because it is dark there, even in the daytime

Activity Page



AP 1.3.3

Differentiation

Give each student a copy of My Trip: The Redwood Forest (AP 1.3.3). Have them cut on the dotted line to remove the large rectangle and paste it across the third two inside pages of their booklets.

CHALLENGE—If your class is eager to learn more about redwood trees, read aloud the 2010 ALA Notable Children’s Book called *Redwoods* by Jason Chin (Roaring Brook Press, 2009). In this picture book that has a story within a story, a young boy riding the subway in New York City reads a book that takes him to a redwood forest.

3. Check for understanding.

Formative Assessment

Monitor Progress

Ask students to think about their acted-out trip to three environments.

Then ask Today’s Question—Where are some different places plants get what they need?

- » the Sonoran Desert, the tallgrass prairie, a redwood tree forest

Next, ask, What do plants need that they get in these places?

- » They need light, water, and soil.



Give each student a copy of My Trip: Cut and Paste (AP 1.3.4). Have students cut out the “stamps” and discuss where to place them into their journal booklets before affixing them with paste or glue. **Ask “how do you know” for each of the following questions:**

- How much light do the plants on the ground in the Sonoran Desert get?
 - » a lot of light
- How much water do the plants on the ground in the Sonoran Desert get?
 - » a little water
- How much light do the plants on the ground in the tallgrass prairie get?
 - » medium light
- How much water do the plants on the ground in the tallgrass prairie get?
 - » medium water
- How much light do the plants on the ground in the redwood forest get?
 - » a little light
- How much water do the plants on the ground in the redwood forest get?
 - » a lot of water

Differentiation

SUPPORT—Build academic vocabulary with English language learners with a direct instruction in the amount comparison words for quantities on Activity Page 1.3.4. Make word cards that use *a little*, *medium*, and *a lot* with pictures of a familiar situation. For example, draw a clear glass with only an inch of juice in it, the glass half filled with juice, and the glass filled with juice.

- Look for participation by all students in this discussion, and circulate around the classroom to see if any students are struggling to match the light and water “stamps” with the correct environments. This activity provides evidence of student learning of the CCC *Systems and System Models* (light and water are parts of each natural environment where plants live), the DCI ESS3.A (living things’ needs are met in the places they live), and the SEP *Obtaining, Evaluating, and Communicating Information* (students can communicate in oral and written forms using models).
- Ask students how organizing what they learned in their My Trip journals helped them answer these questions.
- Call attention to the question board. Revisit the questions recorded there so far, and ask students if today’s lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the question board.

Tie to the Anchoring Phenomenon

Through virtual tours of three natural environments, discussion, and developing a model in the form of a travel journal, students learn that plants live and grow only where their needs for light and water can be met. In the last segment of this lesson, they will apply that understanding to planning how to turn a vacant lot into a place for plants in parallel to Mrs. Patel’s class in the Student Book.

LESSON 1.4

Plants and Their Needs

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do plants need from the places they live?

Today's Question: What is the relationship between plants and the places where they live?

Tie to the Anchoring Phenomenon: Through reading, discussion, and concept mapping, students synthesize what they have learned about plants and prepare to apply that learning to deciding how to introduce plants to an open area in their community.

AT A GLANCE

Learning Objective

- ✓ Recognize plants and the resources in the places where they live as parts of a system.

Instructional Activities

- teacher Read Aloud
- class discussion
- modeling

NGSS References

Disciplinary Core Ideas: LS1.C Organization for Matter and Energy Flow in Organisms; ESS3.A Natural Resources

Science and Engineering Practices: 2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts: 1 Patterns; 4 Systems and System Models

Use a model to represent how parts work together to keep plants alive.

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

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.

air light living thing nature
pattern plant

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.

related **underground**

Instructional Resources

Student Book



Ch. 2

Activity Pages



AP 1.4.1

AP 1.4.2

Student Book, Chapter 2
“Plants and Their Needs”

Activity Pages
What Plants Are in a
Community Garden? (AP 1.4.1)
What Plants Need (AP 1.4.2)

Materials and Equipment

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

For the Challenge activity:

- 12-inch strips of paper (50–100 per class)

For the Extend activity:

- paper egg carton (1 per class)
- seed-starting potting mix (1 bag per class)
- herb seeds (3 different packets per class)
- question board

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 1.4

1. Focus student attention on Today’s Question.

Online Resources



What is the relationship between plants and the places where they live? Show students an online slideshow or video to introduce them to a community garden. Afterwards, **ask students the following:**

- What is a community garden?
 - » It is a garden that is shared by all the people who live nearby.

NGSS Elements



SEP 8
DCI ESS3.A
CCC 4

- What kinds of plants do people grow in community gardens?
 - » tomatoes, beans, sunflowers, raspberry bushes, okra, kale, lettuce, peppers
- What do these plants need to grow?
 - » They need water and sunlight.
- What work do people do together in a community garden?
 - » They dig in the soil and plant seeds. They use a hose to water the plants. They pick the vegetables and fruits when they are ready to eat. They build fences and benches. They build raised bed frames.

Activity Page



AP 1.4.1

- Distribute What Plants Are in a Community Garden? (AP 1.4.1). Have students draw different plants they would like to have in a community garden.

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

www.coreknowledge.org/cksci-online-resources

Tie to the Anchoring Phenomenon

Students will have to think about the kinds of plants that are native to their area to carry out a plan to use a vacant lot to attract native plants and animals.

2. Read together: “Plants and Their Needs.”

Student Book



Ch. 2

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 8 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “Plants and Their Needs,” and tell them to pay special attention to how plants get the things they need as you read.

Ask students to look at the picture on pages 8 and 9 as you read aloud. Explain that it shows a community garden.



LITERAL—What are the children doing?

» They are looking at some carrots that they just dug out of the soil.

CORE VOCABULARY—Explain that a **plant** is a living thing that needs light, water, and air to grow.

INFERENTIAL—What kinds of plants grow in this community garden?

» Students should name vegetable- and fruit-bearing plants.

INFERENTIAL—How does having a community garden help the people who live in the city?

- » It gives them a place to grow food they can eat and flowers they can take inside, even if they do not have a garden at their home.

Page 9

Ask students to look at the picture on page 9 as you read aloud.

NGSS Elements



SEP 8

DCI ESS3.A



LITERAL—What kind of work do people do in this community garden?

- » planning, working the soil, planting seeds, watering

INFERENTIAL—What did people need to think about when they planned this garden?

- » where in the community to make the garden; where there would be enough sunlight for the plants; where inside the garden to place planting beds and walking paths; how to get water for the plants; what kind of fence to put around the garden

INFERENTIAL—Invite students to answer the text question—Why does the garden need so much care?

- » Plants need to get certain things to grow bigger and make flowers and fruits.

EVALUATIVE—In what ways could a community garden be better than having a garden at home?

- » People can share the work. You can learn how to plant seeds from other people. You can be with your friends. You can meet new friends.

Page 10

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

Plants are living things. Living things need certain things to live and grow. Plants need light. They get light from the sun.



10

LITERAL—Where do plants get light?

- » from the sun

CORE VOCABULARY—Explain that a **living thing** is something that is alive or that was once alive. Emphasize that plants are living things that need light to live, grow, and change. (See **Know the Science 1.**)

CORE VOCABULARY— Have students point to the source of light in the photo. Explain that **light** is the type of energy that makes vision possible. It carries energy from the sun that plants need to live and grow.

NGSS Elements



SEP 8

DCI ESS3.A

CCC 1

3D Learning

Remind students of the plant walk they took around the school in Lesson 1.1. **Ask the following:**

- In what places did you find plants living?
 - » Samples: on windowsills, along the sidewalk, next to the playground
- In what places were there no plants living?
 - » Samples: in a closet, under a desk, under a big rock
- What was missing from the places there were no plants?
 - » There was no light or only a little light.

Activity Page



AP 1.4.2

Give each student a copy of What Plants Need (AP 1.4.2). In the first oval below “Plants Need,” have students write something plants need that they learned about on page 10.

Know the Science

TEACHER DEVELOPMENT

1. What Are the Characteristics of Living Things? Living things, also called *organisms*, exhibit several common characteristics. They grow and develop during a life cycle. They respond to stimuli in their environments. They reproduce, or produce offspring. They use energy for life processes, such as movement and making new body parts. They are made of cells—some organisms are made of only one cell, and others have trillions of cells.

Plants also need water to live and grow. They get water from rain. They cannot live if there is no water.



11

NGSS Elements



SEP 8
DCI ESS3.A
CCC 4
Building
Progressions

LITERAL—Where do plants get water?

» from rain

INFERENTIAL—What might happen to a plant if it does not get the water it needs?

» It could die.

Remind students of the tour they look of places plants live in Lesson 1.3. **Ask the following:**

- Which place got very little rain?
» the desert
- Do the cacti and other plants in that desert need water?
» Yes, all plants need water.
- How does a cactus take in water?
» It must have roots in the soil to take in water.

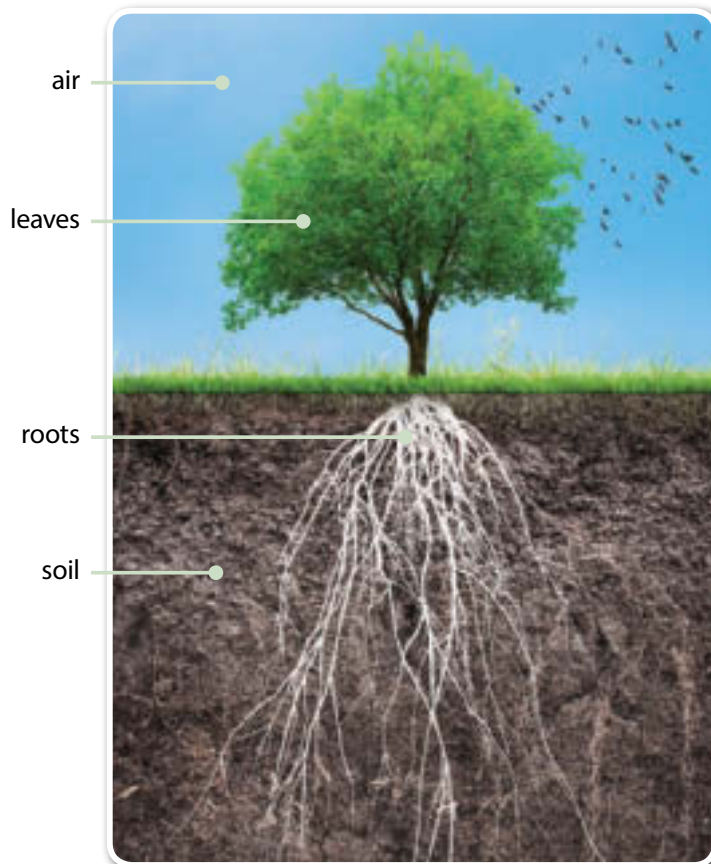
On the graphic organizer What Plants Need (AP 1.4.2), have students write something plants need that they learned about on page 11.

Activity Page



AP 1.4.2

Plants need air and soil, too. Their leaves take in air. Their roots take in water from soil.



12

NGSS Elements



DCI ESS3.A

INFERENTIAL—Remind students of the carrot plants they observed in Lesson 1.1. **Ask the following:**

- What body parts did the carrot have?
 - » leaves, stems, and roots
- Which part grows underground and takes up water in the soil?
 - » roots

CORE VOCABULARY—Explain that **air** is all around us, that people breathe air, and that plants need air to live, too. Air is a mix of invisible gases that are all around us and that animals and plants breathe in.

Activity Page



AP 1.4.2

On the graphic organizer What Plants Need (AP 1.4.2) in the remaining two bubbles, have students write two things plants need that they learned about on page 12.

Invite students to point to the roots and leaves in the picture on page 12. Then have them draw leaves and roots on their graphic organizer. Next, have them draw over the lines to connect each plant part to the materials it takes into the plant. (See **Know the Science 2.**)

Page 13

Ask students to look at the pictures on page 13 as you read aloud.

Many kinds of plants live in nature.

Huge trees are plants. Many of them live where there is plenty of rain.



These round cacti are plants. They can live where there is little rain.

Tiny duckweeds are plants. They need to live ON water! They float on the surface of the water.



13

Know the Science

TEACHER DEVELOPMENT

2. What Do Plants Get from Soil? Roots take up liquid water that seeps into the ground and fills the spaces between the solid parts of soil. Those solid parts include mineral nutrients, such as compounds containing iron, zinc, copper, magnesium, and nickel, that roots take up in small quantities to use for growth and development. One essential plant nutrient, nitrogen, is needed to build new plant cells. In addition, plant roots take up gaseous oxygen from the soil, and root cells use the oxygen to break down food made in the leaves (a point not made in the Student Book or required on Activity Page 1.4.2).



SEP 8
DCI ESS3.A
CCC 4

Differentiation
Math Connection

INFERENTIAL—Where do plants live?

» all over the world, on land, in water, and in dry and wet areas

CORE VOCABULARY—Explain that **nature** is all the places, wild plants, and wild animals that are not affected by humans.

It's a common misconception that plants are small organisms so trees cannot be plants. Explain to students that trees are, indeed, plants and can be huge. Remind students that they saw redwood trees in Lesson 1.3, and explain that redwoods are the tallest plants on Earth.

CHALLENGE—Tell students interested in a math challenge that some redwood trees are as tall as a building with 35 floors (350 feet). Have them picture themselves walking up that many floors of stairs (or march in place and count 10 steps 35 times). Then challenge them to try to show how long 350 feet is by laying 12-inch strips of paper end to end in a school hallway. Since school hallways are not likely this long, explain that they would need an open space longer than a football field to lay 350 strips of paper. (See **Know the Standards.**)

Have students point to the picture of the round cacti, and remind them that they saw saguaro cacti in the desert in Lesson 1.3. **Ask**, What shape were those cactus plants?

» They were tall and narrow with arms.

SUPPORT—Support kinesthetic learners by inviting students to use their bodies to show the shapes of the round cactus (crouched down with arms around their knees) and the saguaro cactus (standing tall with arms outstretched straight or bent at the elbow).

INFERENTIAL—If the duckweed leaves sit **ON** the water, where are the duckweed roots?

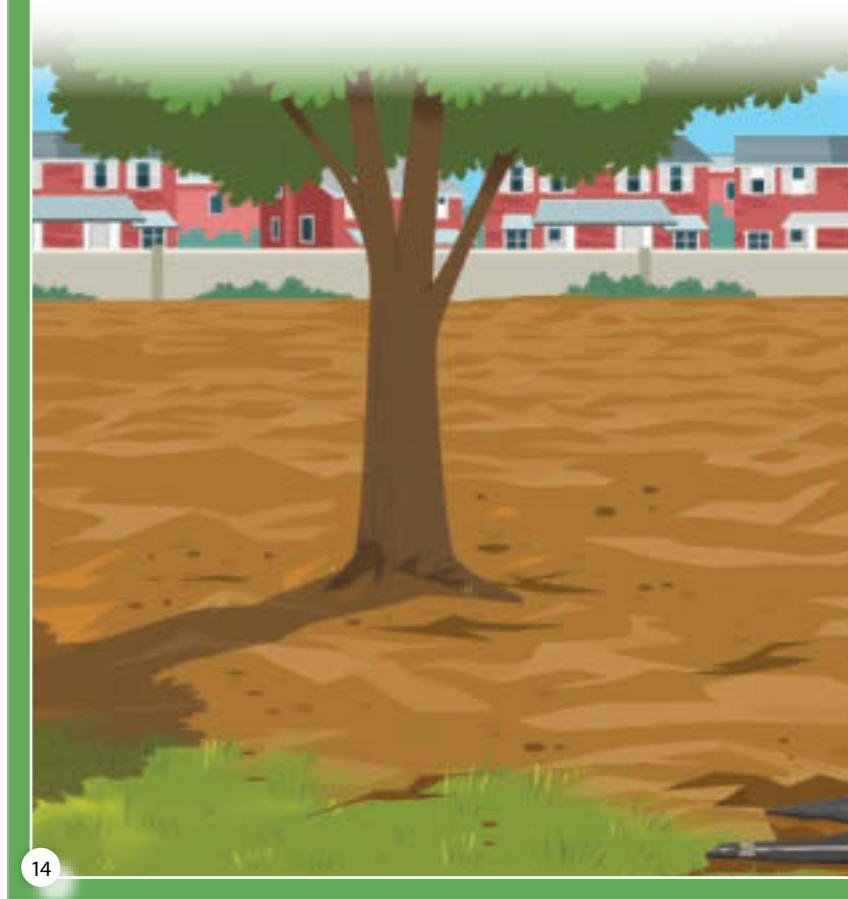
» They are **IN** the water (under the surface). They provide balance for the plant.

Know the Standards

TEACHER DEVELOPMENT

Math Connection: This Challenge activity invites Kindergarten students to explore a Grade 1 mathematics Measurement and Data standard—CCSS.Math.Content.1.MD.A.2 (*Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object [the length unit] end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps*).

Mrs. Patel asks, "What kinds of plants can meet their needs in our old school lot?" The children think about patterns in their weather. How much sunshine is there? How often does it rain?



NGSS Elements



SEP 8
DCI ESS3.A
CCC 1

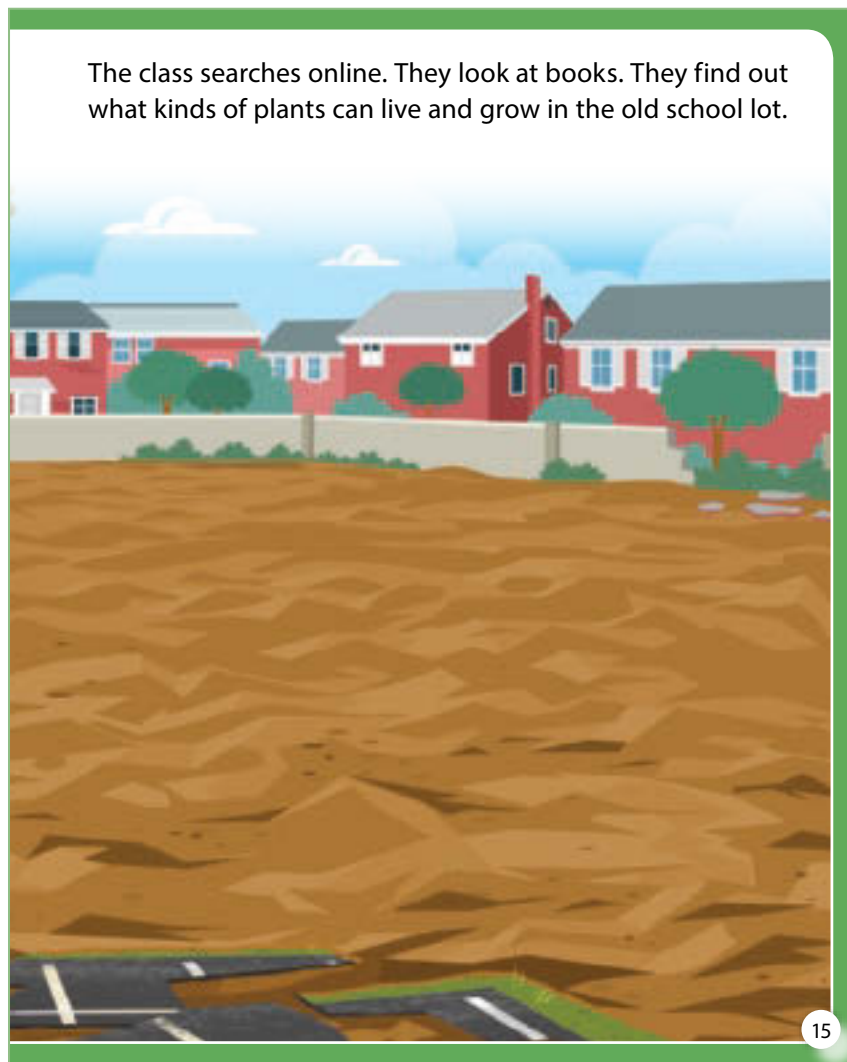
CORE VOCABULARY—Explain that a **pattern** has parts that repeat. An example of a weather pattern is that in some places, it rains in the winter and spring but not during the summer or fall seasons.

LITERAL—What used to be in this empty lot?

» There was an old school that was torn down.

INFERENTIAL—If there are no clouds, will the light hit this lot?

» yes, except where the tree and taller buildings make shadows



LITERAL—What question will the students try to answer?

- » What kinds of plants can live and grow in the old school lot?

INFERENTIAL—What if we had an empty lot in our community? How could we find out what kinds of plants could live there?

- » We could go online and search for the names of local plants.
- » We could go to a nature center and take a nature walk.
- » We could ask an expert in plants.

EVALUATIVE—Who could give you the best answer—someone who grows vegetables in their garden or someone who leads hikes at a nature center?

- » someone who leads hikes at a nature center because nature centers are where plants are growing

NGSS Elements



SEP 8

DCI ESS3.A

Differentiation

SUPPORT—Some students may be unfamiliar with nature centers. Explain that they are places where people can go to take walks or hike to see plants and animals in nature. Take students online to look at the website of a nature center in your local community. From the home page, you should be able to show students all the activities available and some plants and animals that live there.

Online Resources



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

www.coreknowledge.org/cksci-online-resources

3. Check for understanding.

Monitor Progress

Call attention to Today's Question, and **ask**, What is the relationship between plants and the places where they live? Make sure that students understand that a relationship is the way two things are connected. Then have students think about the Student Book chapter they just read and **discuss each question**:

- Where did Mrs. Patel take her class to learn about plants and the places they live?
 - » to a city community garden
- How are plants in the garden connected to the sun?
 - » Plants need light from the sun.
- How are plants in the garden connected to water?
 - » Plants need water to stay alive and grow.
- How are the garden plants connected to the soil?
 - » They use their roots to get their water from the soil.
- How are plants in the garden connected to air?
 - » Plants need air to stay alive and grow.

EXTEND—Give students a chance to model a community garden. Get an empty cardboard egg carton, remove the lid, and add seed-starting potting mix to the twelve depressions. Assign students to the twelve “garden plots,” and have each group choose one type of seed to plant from several different herb seed packs. Add more soil over the seeds, and water gently. Keep the soil moist until the seeds sprout, and then discuss how to meet the growing plants’ needs for light and other resources.

Activity Page



AP 1.4.1

AP 1.4.2

Have students look at What Plants Are in a Community Garden? (AP 1.4.1) again and decide, based on this lesson, if they want to add any information to the page about what plants need.

Formative Assessment

Review student responses to What Plants Need (AP 1.4.2) to determine student understanding of the following concepts:

- Plants need light, water, air, and soil to live and grow.
- Leaves are parts of plants used to take in light and air.
- Roots are parts of plants in the soil and are used to take in water.

Graphic organizers can be used to show how things are connected.

Students completing the graphic organizer on Activity Page 1.4.2 exhibit the Science and Engineering Practice of Developing and Using Models (*use a model to represent relationships in the natural world*). In the next lesson segment (Lesson 1.5), students will continue to develop this practice by using another kind of model—a map—to answer this unit’s Big Question—**What must an area have so that living things can live there?**

Call attention to the question board. Revisit the questions recorded there so far, and ask students how reading the chapter and talking about the story of the city garden and plants might answer or relate to any of those questions.

Tie to the Anchoring Phenomenon

In the reading and discussion about Mrs. Patel’s class, students encountered the concepts needed to discuss the use of an open area in their local community.

LESSON 1.5

Lesson 5 Roundup: Mapping a Vacant Lot

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do plants need from the places they live?

Today's Question: What do plants need from the places where they live?

Tie to the Anchoring Phenomenon: Through research and mapping, students begin to develop a model proposing how to use an open area such as a vacant lot.

AT A GLANCE

Learning Objectives

- ✓ Use a map to represent a vacant lot.
- ✓ Ask questions to find plants that can survive locally.
- ✓ Represent plants on the map.
- ✓ Explain how the vacant lot can provide resources to support these plants.

Instructional Activities

- class discussion
- student investigation
- modeling

NGSS References

Performance Expectation: K-ESS3-1

Disciplinary Core Ideas: ESS3.A Natural Resources; LS1.C: Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 1 Asking Questions; 2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts: 1 Patterns; 4 Systems and System Models

Students reflect on using a model to discuss how the parts of a piece of land provide resources for plant life.

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

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.

map plant

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.

native resource

Instructional Resources

Activity Page



AP 1.5.1

Activity Page

Unit Project Scoring Rubric
(AP 1.5.1)

Materials and Equipment

- large sheet of brown craft paper (1 per class, minimum of 4 by 6 feet)
- thick black marker (1 per class)
- play putty (1 pack per class)
- question board
- internet access and the means to project images/video for whole-class viewing

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 1.5

1. Focus student attention on Today's Question.

What do plants need from the places where they live? Remind students of the story they read in their Student Book about Mrs. Patel's Kindergarten class. Her students started Kindergarten in a new school, called Greenville School. The city of Greenville planned to tear down the old school and remove the playground and parking lot. The city leaders want ideas for what to do with the empty lot. Mrs. Patel's students decide that it should be turned into a place for living things to live.

Tell students to think about how they could do the same thing. **Ask**, What if there were an empty area in our community? What living things could live and grow there?

» Accept all reasonable answers. (See **Know the Science**.)

NGSS Elements



SEP 1

Explain that the class will begin to work on a large map showing their plan to change an empty lot into a place for living things. Answer any questions students may have about making a plan and, later, sharing the plan.

Tie to the Anchoring Phenomenon

Students will use a model to answer Today's Question about how a vacant lot in their own community can be used and learn what plants will need to survive there.

2. Mapping a vacant lot.

NGSS Elements



SEP 2

Place a large sheet of brown craft paper on the floor, and gather students around it. Explain that the class will make a map to show an empty lot in their town. **Ask**, Where have you seen an empty area where we live?

» Accept all reasonable answers. Sample: There is an empty lot where a gas station used to be.

Have students think about what shape their area might be. Depending on the community where your students live, typical lots may be rectangular or follow the contours of natural land features, such as streams and hills.

With suggestions from the class, draw the outline of the lot your class will map with a thick black marker. It could be a real or imaginary place. Explain that a map shows a place from above, as if we could fly over it and look down. Also point out that this map is a model that is much smaller than a real empty lot would be.

Point out that the map is brown because only soil is in the lot right now. Remind students that, like Mrs. Patel's class, they will show how the lot will become a place for living things.

Explain that the map will be filled soon. It will show plants and animals that can live there. **Ask**, What name should we give this place for living things in our community? Brainstorm possible names, and have the students vote on the best name for a sanctuary for wildlife. Then write the name above the outline of the lot.

Know the Science

TEACHER DEVELOPMENT

Plants and Habitats: Scientists estimate that there are about 400,000 known plant species on Earth, and more are discovered every year. In part, there are so many species because there are so many habitats (places to live). Within each habitat are many ecological niches. The concept of *niche* describes how well a species is suited to the place it lives, especially in relation to how it gets resources and how it is a resource for other species.

Differentiation

Online Resources



SUPPORT—For students who want more time to look closely at plants and their parts, many states have their own native plants organizations that offer drawings of plants that you can download and that students can color and label. In addition, the U.S. Forest Service has downloadable wildflower coloring pages that include information about the appearance and distribution of each plant.

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

www.coreknowledge.org/cksci-online-resources

3. Guide research on native plants.

NGSS Elements



SEP 1
SEP 2
DCI ESS3.A

Explain to students that they will add pictures of native plants, including weeds, to their map of the lot. If possible, guide students to choose at least one low-growing plant, one shrub, and one tree. To do this, they will have to ask questions about what plants can live in your community. One source to ask is a local expert, such as a naturalist at a local nature center. Another source could be a librarian who can find suitable reference materials.

A third way to find native and naturalized plants for your area is to submit students' questions to an online search engine. If you choose this method, access state wildflower sources, or also go directly to the Ladybird Johnson Wildflower Center's native plants database. Scroll down to "Combination Search," and select your state. It is not necessary to check light requirements, but you may choose soil moisture requirements based on the climate in your region. Once you get a list of native plants from the database, click on the scientific name of a plant to see a whole page of data, including images.

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

www.coreknowledge.org/cksci-online-resources

Online Resources



Differentiation

EXTEND—Relate this lesson to how plants are adapted to weather patterns. The connection will be most apparent with deciduous trees (those that drop all their leaves at once). Have students research one native tree species and draw how it appears in each season of the year. Discuss how the tree changes throughout the year as the weather changes. Explain that seasonal changes are a pattern that repeats year after year. (See **Know the Standards.**)

Know the Standards

TEACHER DEVELOPMENT

K-ESS2-1, K-ESS3-2, K-PS3-1, K-PS3-2, CCC 1: In Unit 4: Weather Patterns, Kindergarten students will explore weather (K-ESS2-1), weather forecasting (K-ESS3-2), and sunlight's effect on Earth's surface (K-PS3-1 and K-PS3-2). That unit has a Crosscutting Concept in common with this one on the needs of living things—patterns (*Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence*). While weather patterns are taught in Kindergarten, the concept of climate is not defined formally until Grade 3 (3-ESS2-2: *Obtain and combine information to describe climates in different regions of the world*).

Have students choose a few plant images to cut out and tack down on the map, using an adhesive, like play putty, that can be lifted and repositioned later. Alternately, students can use the images as references and draw and label pictures of the native plants they would like to see growing in their lot.

NGSS Elements



CCC 1

For each plant, ask the following:

- What is the name of this plant?
 - » Answers will depend on the native plants the class chose.
- What will it need to live and grow?
 - » It will need water, sunlight, air, and soil.
- How do we know it can live in our community?
 - » We asked questions of an expert/a librarian/a search engine.

4. Check for understanding.

- Ask students to think about their work today. **Then ask Today's Question—What do plants need from the places where they live?**
- **Ask students the following clarifying questions:**
 - What does the map our class made show?
 - » It shows the outline of an empty lot in our community. It also shows three kinds of plants that can live there.
 - How will we use the map when it is done?
 - » We will use it to show other people how an empty lot can be used for living things.
 - Our lot has many resources plants need. What are these parts of the lot that plants will need to stay alive?
 - » sunlight, water, air, and soil
- Each of the three lessons in this unit addresses the same two Performance Expectations (K-LS1-1 and K-ESS3-1). Lesson 1 focuses on the needs of plants, Lesson 2 focuses on the needs of nonhuman animals, and Lesson 3 focuses on human needs. As your students move on to Lessons 2 and 3, they will have several opportunities to integrate their understanding about plants with new learning about animals.
- Have students reflect on the entire lesson, and return to the Lesson 1 Guiding Question—**What do plants need from the places they live?**
 - » They need light, water, air, and soil to stay alive and grow.

Monitor Progress

- Call attention to the question board. Revisit the questions recorded there so far, and ask students if today's lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the question board.

Differentiation

CHALLENGE—For students who like to learn from narrative literature, have them read, or read to them, *The Empty Lot* by Dale H. Fife with pictures by Jim Arnosky (Sierra Club Books for Children, 1996). This picture book tells the story of a man who owns an empty lot, plans to sell it to developers, but then discovers that it is not vacant after all. The story has a message for readers about the value of nature in urban communities.

Monitor Progress

Activity Page



AP 1.5.1

Formative Assessment

Make a copy of the Unit Project Scoring Rubric (AP 1.5.1) for each student. This rubric can be used to assess student performance of the scoring elements marked for Lesson 1 and inform your teaching for Lessons 2 and 3, as the learning objectives are very similar in all three lessons. Retain this rubric to use at the conclusions of Lesson 2 and Lesson 3, where it can be used as a summative assessment.

Tie to the Anchoring Phenomenon

Through model making and research, students will be able to explain how a vacant lot in their own community can become an environment for wildlife, just like Mrs. Patel's class.

LESSON 2

Animals, Their Needs, and Places Where They Live

OVERVIEW

Guiding Question: What do animals need from their environments?

Lesson 2 Segments	Segment Questions	Advance Preparation
2.1 All Kinds of Animals Students take a virtual tour of a zoo to compare different kinds of animals and play a game to group animals by their observable characteristics.	What are animals, and how can they be grouped?	Preview and choose a video about a zoo to show students. See Materials and Equipment.
2.2 Animal Needs for Food and Water Students find patterns in data about what animals eat and how much water they need.	What are animals' needs for food and water?	Print Activity Pages 2.2.1 and 2.2.2 double-sided. Make the wall chart needed for Step 2. See Materials and Equipment.
2.3 Places Animals Live Students act out a tour of three natural environments, notice the different animals living in each, and use a model to explain how each kind of animal gets what it needs from its environment.	What resources do animals get from the places where they live?	Preview the videos for Steps 2–4. Gather materials for making the trip journals. See Materials and Equipment.
2.4 Animals and Their Needs Students follow along in and discuss student book Chapter 3 and represent the main ideas in a diagram.	What is the relationship between animals and the places where they live?	Read Chapter 3 in the Student Book. See Materials and Equipment.
2.5 Animals in Our Lot Students continue mapping a vacant lot. They research and add to the map animals that can live locally.	What do animals need from their environments?	Get out the scoring rubric from Activity Page 1.5.1 and the large map begun in Lesson 1.5. See Materials and Equipment.

What's the Story?

Summary: In Lesson 2 (Segments 1–5), students engage with the animal kingdom and observe patterns in data related to the food animals eat and how much water they need (K-LS1-1). They explore various environments animals live in and do research to identify animals that can survive in their own community along with the plants they identified in Lesson 1. This work builds toward Lesson 3, when they add understanding of the needs of humans to their study of plants and other animals and complete their model of a wildlife sanctuary (K-ESS3-1).

Learning Progression: Lesson 2 builds on student understandings of the Disciplinary Core Ideas LS1.C (*Organization for Matter and Energy Flow in Organisms*) and ESS3.A (*Natural Resources*) that were introduced in Lesson 1. Concepts about natural resources will serve as a foundation for Grade 4 exploration of human needs for energy and fuels and renewable and nonrenewable resources. Concepts related to matter and energy flow in organisms will be further explored in Grade 5, when students learn how organisms use matter and energy for body repair, for growth, to move, and to maintain body warmth.

Guiding Phenomenon: To determine what kinds of animals would be part of a local habitat, visiting a zoo gives students a chance to learn about animals' needs from their environments, including the different foods and different amounts of water that animals need.

Learning Objectives

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

- Identify living things that are animals and classify them.
- Differentiate kinds of animals by whether they eat plants, animals, or both plants and animals.
- Organize and interpret data related to animals' needs for water.
- Show relationships between animal needs for food, water, air, and shelter and the environments in which they live.
- Recognize animals and the resources in the places where they live as parts of a system.
- Explain how a vacant lot in their local community can provide the resources to support certain kinds of animals.

NGSS Standards and Dimensions

Note: The following two Performance Expectations are partially met in this lesson on animals. Plants were met in Lesson 1, and humans will be met in Lesson 3.

Performance Expectation: K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Performance Expectation: K-ESS3.1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

<p>Science and Engineering Practices</p> <p>1 Asking Questions</p> <p>Ask questions based on observations to find more information about the natural and/or designed world(s).</p> <p>2 Developing and Using Models</p> <p>Use a model to represent relationships in the natural world.</p> <p>3 Planning and Carrying Out Investigations</p> <p>Make observations (firsthand or from media) to collect data that can be used to make comparisons.</p> <p>Make predictions based on prior experiences.</p> <p>4 Analyzing and Interpreting Data</p> <p>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</p> <p>6 Constructing Explanations and Designing Solutions</p> <p>Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.</p> <p>8 Obtaining, Evaluating, and Communicating Information</p> <p>Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).</p>	<p>Disciplinary Core Ideas</p> <p>LS1.C Organization for Matter and Energy Flow in Organisms</p> <p>All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p> <p>ESS3.A Natural Resources</p> <p>Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.</p>	<p>Crosscutting Concepts</p> <p>1 Patterns</p> <p>Patterns in the natural and human designed world can be observed and used as evidence.</p> <p>4 Systems and System Models</p> <p>Systems in the natural and designed world have parts that work together.</p> <p>6 Structure and Function</p> <p>The shape and stability of structures of natural and designed objects are related to their function(s).</p> <p>7 Stability and Change</p> <p>Some things stay the same while other things change.</p> <p>Connection to Nature of Science:</p> <p>Scientific Knowledge Is Based on Empirical Evidence</p> <p>Scientists look for patterns and order when making observations about the world.</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

LESSON 2.1

All Kinds of Animals

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do animals need from their environments?

Today's Question: What are animals, and how can they be grouped?

Tie to the Anchoring Phenomenon: Through discussion, video, and playing a classification game, students familiarize themselves with the diversity of animals that could live in a local area, like the one Mrs. Patel's class is investigating.

AT A GLANCE

Learning Objectives

- ✓ Identify living things that are animals and classify them.
- ✓ Distinguish animals from plants.

Instructional Activities

- class discussion
- student observation
- student investigation

NGSS References

Disciplinary Core Idea: LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 1 Asking Questions; 6 Constructing Explanations; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts: 1 Patterns; 4 Systems and System Models

Connection to Nature of Science: Scientific Knowledge Is Based on Empirical Evidence

Students reflect on patterns they might find in how animals get food.

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

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.

animal **living thing**

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.

classify **feature**

Instructional Resources

Activity Pages



AP 2.1.1
AP 2.1.2

Activity Pages

Living Things (AP 2.1.1)
Animal Classification Cards
(AP 2.1.2)

Materials and Equipment

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

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 2.1

1. Introduce students to Lesson 2.

Monitor Progress

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 an area have so that living things can live there?**

Remind students that, in Lesson 1, they started a map to show a plan for an empty lot right in their own community. **Ask the following:**

- What kinds of living things did we find to live and grow in the lot?
 - » Answers will vary, but there should be three (or more) kinds of plants.
- What needs of plants will be met in the lot?
 - » their needs for light, water, air, and soil



Tell students that, before they can continue to answer the unit's Big Question about an empty lot in their community, they need to understand what animals need. In Lesson 2, they will learn different ways animals meet their needs in order to apply their understanding to the Big Question. Write the **Lesson 2 Guiding Question** where students can see it:

What do animals need from their environments?

Remind students that, once they add animals to their map of the lot, they will be getting closer to fully answering the Big Question. Ask students what they would like to know about animals that can live in their community. Add their questions to the question board for this unit.

Tie to the Anchoring Phenomenon

Through discussion, video, and playing a game, students will develop understanding needed to find kinds of animals suited to survive in an empty lot in their community.

2. Lead a video tour of a zoo.

Online Resources



- Show students a video tour for children about animals at a zoo. Tell them to notice what the animals are doing so that you can list them later. **Ask the following:**
 - What kinds of animals did you see?
 - » birds, snakes, lizards, monkeys, turtles, otters, penguins, oxen, tigers, lions, gorillas, apes, zebras, rhinoceroses, giraffes, kangaroos, fish, octopuses, and more
 - What were the animals doing?
 - » They move around, eat, sleep, drink water, and play.
 - How do the people who work at the zoo make sure the animals get the things they need?
 - » They give them food to eat. They give them water to drink. They make shelters for them in go into.

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

www.coreknowledge.org/cksci-online-resources

NGSS Elements



Activity Page



- Give each student a copy of Living Things (AP 2.1.1). Remind them that in Lesson 1 they explored a big group of living things called *plants*. Have students draw two different kinds of plants in the rectangles connected to the bubble for Plants on the graphic organizer.

SUPPORT—For students who are not sure how to draw two kinds of plants, take out the map on brown craft paper the class worked on in Lesson 1.5. There should be three kinds of local native plants students can reference as they draw.

NGSS Elements



DCI ESS3.A
Connection
to Nature of
Science

- Next, remind students that the video about the zoo showed another big group of living things. Have students label the empty bubble “Animals.” Then, have them draw two different kinds of animals in the rectangles connected to the bubble for Animals. **Ask students**, What makes a living thing an animal and not a plant?
 - » They move around, they eat food, and they go into shelters. (See **Know the Science**.)

3. Facilitate a classification game.

Activity Page



AP 2.1.2

NGSS Elements



SEP 4
CCC 1

- Give each pair of students a copy of Animal Classification Cards (AP 2.1.2), and have them use scissors to cut apart the cards on the dashed lines.
- Tell students to put on their “scientists’ hats” and think about how the animals on the cards are alike and different.
- Direct students to separate the animals in three groups based on one attribute (feature or trait). Allow time for thinking and discussion of the student pairs. Then invite pairs to share with the class how they grouped the animals.
 - » Samples: by the number of legs, the number of wings, how big the animals really are, its body covering
- Next, have students shuffle the cards and put them into two groups based on one attribute. Invite pairs to tell the class how they grouped the animals.
 - » Samples: can fly/cannot fly, has a beak/no beak, has a tail/no tail

Know the Science

TEACHER DEVELOPMENT

Are There Living Things That Are Not in Either the Plant or Animal Groups? Yes, many! The number of kingdoms is an ongoing issue in biology. Biologists look at cellular structures, genetic relationships, and how organisms meet their needs. The plant and animal kingdoms, containing the organisms explored in this unit, are well accepted. Classification is an ongoing process of modern biology, and many taxonomic systems are currently in use.



CHALLENGE—When students make two groups, have them count the number of animals in each group. Point out that the groups do not have to have an equal number of animals. Then have students identify which group has the largest number of members. (See **Know the Standards**.)

- Discuss students' scientific thinking as they played the game. **Ask the following:**
 - What patterns did you look for when you sorted the animals?
 - » patterns in the number of legs or wings
 - How did you find the patterns?
 - » We looked closely at the drawing of each animal and compared them.

SUPPORT—If some English language learners are not ready to discuss patterns that they observe, offer simpler sorting activities that will get them more comfortable with the language of classification. For example, guide them to sort a collection of crayons by color, length, or brand. Encourage them to use words such as *group* and *feature* to explain what they did.

4. Check for understanding.



Ask students to think about their science work today. **Then ask Today's Question—What are animals, and how can they be grouped?**

Discuss the following clarifying questions:

- What are some animals you saw in the zoo video?
 - » birds, fish, lions, tigers, turtles, and more
- How are all animals the same?
 - » They are alive. They need to eat food. They need to drink water. They need to have shelter.
- What are some ways to group all the different kinds of animals in the world?
 - » by the number of legs they have, the number of wings, their size, and so on
- Could you also group animals by what they eat or how much water they drink?
 - » yes (This question foreshadows the content of the next lesson segment.)

Know the Standards

TEACHER DEVELOPMENT

Math Connection: Classification and counting objects is one way Kindergarten students use measurement and data (*CCSS.Math.Content.K.MD.B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count*). This activity also addresses a Grade 1 measurement and data standard (*CCSS.Math.Content.1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another*).

- When you sorted the animal cards, how did you act like a scientist?
» We looked for patterns in how the animals looked.

Differentiation

EXTEND—Some students will enjoy further opportunities to look for patterns in animals. Provide them with a printed image that shows a variety of butterflies, such as the historical scientific illustration shown here. Have them tell you all the wing features they could use to group the butterflies and look for understanding that sizes, colors, shapes, and the number of wing spots could be used.

Online Resources



See the Online Resources Guide for a link to the recommended image.

www.coreknowledge.org/cksci-online-resources

Monitor Progress

Formative Assessment

The SEP (*Use observations [firsthand or from media] to describe patterns in the natural world in order to answer scientific questions*) Connection to Nature of Science (*Scientists look for patterns and order when making observations about the world*) and CCC (*Patterns in the natural and human designed world can be observed and used as evidence*) addressed here are tightly woven together. As students move into Grades 3 through 5, they will also use patterns to analyze simple rates of change and to make predictions.

Review student work on Living Things (AP 2.1.1) to determine student understanding of the following concepts:

- Animals are living things but are not plants.
- There are many kinds of animals.

Tie to the Anchoring Phenomenon

Through a video tour and playing a sorting game, just like Mrs. Patel's class, students develop understanding that living things are animals and how there are many kinds of animals that might live in a lot in their own community.

LESSON 2.2

Animal Needs for Food and Water

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do animals need from their environments?

Today's Question: What are animals' needs for food and water?

Tie to the Anchoring Phenomenon: Through analyzing data about food and water needs, students will gain understanding that their community can attract only some kinds of animals to a vacant lot they wish to convert into a place for wildlife.

AT A GLANCE

Learning Objectives

- ✓ Organize data about animal food sources.
- ✓ Identify patterns in animal food and water data.
- ✓ Use evidence from data to answer questions about animals' needs for food and water.

Instructional Activities

- class discussion
- student investigation
- modeling

NGSS References

Performance Expectation: K-LS1-1

Disciplinary Core Idea: LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 4 Analyzing and Interpreting Data; 6 Constructing Explanations

Crosscutting Concept: 1 Patterns

Students organize data from media to find patterns in what animals use for food.

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

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.

animal **pattern**

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.

survive

Instructional Resources

Activity Pages



AP 2.2.1

AP 2.2.2

AP 2.2.3

Activity Pages

What Do Animals Eat #1?
(AP 2.2.1)

What Do Animals Eat #2?
(AP 2.2.2)

How Much Water Does It
Drink? (AP 2.2.3)

Materials and Equipment

- poster-sized chart as shown in Step 2
- tacks or tacky putty
- one-gallon plastic jug
- question board

For the Challenge activity:

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

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 2.2

1. Focus student attention on Today's Question.

NGSS Elements



DCI LS1.C

Monitor Progress

What are animals' needs for food and water?

- Take students to a window where they can see an outdoor plant, and **ask students to recall what they learned about plants in Lesson 1:** What does this plant need to stay alive?
 - » It needs light, water, air, and soil.
- Then point to an animal such as an ant, fly, squirrel, or bird, and **ask,** What about this animal? What does it need to stay alive?
 - » Accept all answers demonstrating students' prior knowledge about the food, shelter, and water needs of animals.



- Tell students that they will look for patterns in the needs of many kinds of animals to answer Today's Question. (See **Know the Science.**)

Tie to the Anchoring Phenomenon

Students will encounter through printed media evidence that there are differences in animals' requirements for food and water. These understandings will support them when they think about what animals can survive in their own community.

2. Play a game to organize animals by what they eat.

Activity Pages



AP 2.2.1

AP 2.2.2

Give each student and yourself a copy of the double-sided What Do Animals Eat #1? (AP 2.2.1). Have students cut out the four animal cards. Then, repeat with a copy of What Do Animals Eat #2? (AP 2.2.2).

Have students lay all eight cards face up in an array on a table. Then challenge them to predict if each animal eats only plants, only other animals, or both plants and animals.

NGSS Elements






SEP 4

DCI LS1.C

CCC 1

As students take turns making predictions and discussing them, tack the animal cards from your set onto a large chart for the class as shown here.

Eats Only Plants 	Eats Only Other Animals 	Eats Both Plants and Animals 

Know the Science

TEACHER DEVELOPMENT

How Do Animals Differ from Plants in the Way They Get Food? Both plants and animals need food for growth and other life processes; however, they differ in how they obtain it. Plants make food (glucose) inside their cells through photosynthesis, a chemical reaction that requires an input of carbon dioxide, water, and light energy. The sugar (glucose) plants make is used to make new cells and as a source of energy for other life functions. Photosynthesis is why plants do not need to eat. Animals cannot perform photosynthesis. They must ingest other living things to get food. Through the process of digestion, animals break down parts of plants and other animals into substances that support growth or can release energy.

Then have students check their predictions by turning over one card at a time. Read the data aloud, and **ask students**, Should this card be moved to another part of the chart? Have students explain their reasoning using evidence from the animal card.

Differentiation

CHALLENGE—Allow students to watch a music video called “Herbivore, Carnivore, Omnivore Song” to learn the science terms for plant eaters (herbivores), animal eaters (carnivores), and animals that eat both (omnivores). Afterward, invite students to hold up their animals and use these terms to describe each one.

Online Resources



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

www.coreknowledge.org/cksci-online-resources

Differentiation

EXTEND—Allow pairs of students to play a matching game with a set of the eight cards. Have them turn all the cards faceup showing the animal pictures. Then have them take turns turning over two cards at a time looking for matches in what the animals use for food. If they get a match, for example two animals that eat only plants, they keep the cards.

3. Organize and interpret data about animals’ needs for water.

Activity Page



AP 2.2.3

Give each student a copy of How Much Water Does It Drink? (AP 2.2.3).

Show students a one-gallon jug. If possible, fill it with water in front of the students. Explain that the numbers on their Activity Page show the number of times a farmer must fill the jug for each animal to have enough to drink for a day.

NGSS Elements



DCI LS1.C

Math
Connection

Differentiation

Have students organize the data provided in the table in the graphic, filling in one box above the animals’ name for each gallon of water. With your class, count aloud the number of boxes they have filled in for each animal, pointing to each box as they count. (See **Know the Standards**.)

SUPPORT—For students who are not ready to transfer the data to a graphic, have them organize the data by reordering the animals from least amount of water per day to most amount of water per day. Provide a strip of paper they can use to draw the animals and write the numbers. Ask them to think about how they will show animals that need the same amount of water, and accept all reasonable strategies.

Know the Standards

TEACHER DEVELOPMENT

Math Connection: Formal graph making is not required by Common Core Math Standards until Grade 2. However, with scaffolding from the teacher, this activity also supports Kindergarten counting standards CCSS.Math.Content.K.CC.B.5 (*Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects*) and CCSS.Math.Content.K.CC.C.6 (*Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies*).

CCC 1
SEP 4**Have students look for patterns in the data by asking the following:**

- Which animals do not need water?
 - » None. They all need water.
- Which two animals need the most water?
 - » cows and horses
- Which two animals need the least water?
 - » goats and pigs
- Which two animals need a medium amount of water?
 - » llamas and donkeys
- What does the chart tell you about the needs of animals?
 - » They all need water.

4. Check for understanding.

CCC 1

Return students' attention to Today's Question: **What are animals' needs for food and water? Ask the following:**

- What pattern did you find in the foods animals eat?
 - » Some eat only plants, some eat only other animals, and some eat both plants and other animals.
- Were there any animals that did not need any food?
 - » No.
- What patterns did you find from the chart about animals and water?
 - » All the animals need water, but they need different amounts.

Differentiation

SUPPORT—For ELL students who may struggle to understand the questions or express their answers by speaking, have them act out short skits, with you as the narrator. Have the student choose an animal to act out and ask, "What kind of animal are you?" "Do you eat plants, or animals, or both?"

Return to the **Lesson 2 Guiding Question—What do animals need from their environments?**

Have students explain what they learned about animals today and how they can use the information to think about animals that can live in the area in their community. Through discussion bring out the idea that for animals to live there, the area would have to have food and water resources.

Call attention to the question board. Revisit the questions recorded there so far, and ask students how looking at an animal and taking an animal walk around school might answer or relate to some of those questions. Encourage students to suggest additional questions for the board.

Formative Assessment

Review student work on How Much Water Does It Drink? (AP 2.2.3) to determine student understanding of the following concepts:

- Animals vary in the amount of water they need each day.
- All animals need water.

Students' understanding that all animals need water builds on learning from Lesson 1—that all plants need water. Consider asking students a synthesis question to answer the scientific question, "Do all living things need water?"

Call attention to the question board. Revisit the questions recorded there so far, and ask students if today's lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the question board.

Tie to the Anchoring Phenomenon

Through manipulating data sources and discussion, students develop understanding that an empty lot in their community would need to supply food and water resources if animals are to live there.

LESSON 2.3

Places Animals Live

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do animals need from their environments?

Today's Question: What resources do animals get from the places where they live?

Tie to the Anchoring Phenomenon: Students develop an understanding that food and water resources vary in the different places animals live and will begin to think about how an area in their own community can support animal life.

AT A GLANCE

Learning Objectives

- ✓ Answer questions based on observing videos of animals in their natural environments.
- ✓ Use models to represent relationships between animals and their environments.

Instructional Activities

- class discussion
- student observation
- role play

NGSS References

Disciplinary Core Ideas: ESS3.A Natural Resources; LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concept: 4 Systems and System Models

Students use a model to develop understanding that animals need resources from the places they live.

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

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.

forest grassland shelter

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.

environment resource

Instructional Resources

Activity Pages



AP 2.3.1
AP 2.3.2
AP 2.3.3

Activity Pages
My Trip to Yellowstone: Forest (AP 2.3.1)
My Trip to Yellowstone: Grassy Valley (AP 2.3.2)
My Trip to Yellowstone: Grassy Valley and Forests (AP 2.3.3)

Materials and Equipment

- 8.5-in. by 11-in. white unlined paper (1 sheet per student)
- scissors (1 per pair)
- stapler (1 per class)
- paste or glue (1 per pair)
- question board
- map or globe
- internet access and the means to project images/video for whole-class viewing

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 2.3

1. Focus student attention on Today’s Question.

What resources do animals get from the places where they live?

- Remind students that in the last lesson segment they investigated the needs of animals.
- **Ask,** What two needs did we investigate?
 - » the needs for food and water
- Explain that resources are the things living things use from the places they live.
- Show a video called “What Do Animals Eat?” Since the video is without narration, invite students to call out the names of animals, where they live, and what they think each animal is eating.

Online Resources



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

www.coreknowledge.org/cksci-online-resources



- Tell students they are about to act out a hiking trip to Yellowstone National Park, where many large animals live. Show where Yellowstone is located on a map or globe in relation to where you live. Tell students to look for resources from the park that the animals use to meet their needs. (See **Know the Science.**)

Tie to the Anchoring Phenomenon

Remind students to continue thinking about an area in their own community and the kinds of animals that might be able to meet their needs there.

2. Watching Yellowstone owls.

- As you did in Lesson 1, make trip journals. Give each student a sheet of 8.5-in by 11-in. paper. Have them fold it in half once and then again to make a 4.25-in. by 5.5-in. booklet. Help students use scissors to cut open the two folds along one of the short sides of the booklet. Then staple as close to the fold (the spine) as possible to make a bound booklet. Have students write their names and “My Trip to Yellowstone” on the cover.
- Remind students of how they acted out trips to study the plants that live in the desert, tallgrass prairie, and redwood forest in Lesson 1. Tell them the class will now act out another trip—this time to a huge park with several environments where plants and animals live. They will keep a trip journal of the three places they go.
- Have students act out packing up their backpack with clothes, food, water, a hat, and binoculars.
- Arrange students’ chairs in rows as in a plane. Act out fastening their seat belts and taking off.
- Then tell students they are about to land at Yellowstone National Park and to look out of the plane’s windows at the land below. Direct them to picture seeing very tall mountains without trees on top, forests and grassy meadows between the mountaintops, and big grassy valleys at the bottoms of the mountains.
- As the plane lands, tell students to put on their hats. Explain that it is time to take a walk to see great horned owls.

Know the Science

TEACHER DEVELOPMENT

What Is the Natural Environment Like at Yellowstone National Park? Yellowstone National Park, the first national park established in the United States, sits on top of a part of Earth with high volcanic activity. The park is famous for geothermal geysers and hot springs. It also contains a large variety of animal species. The park’s upper elevations have forests dominated by lodgepole pine trees. Between the forests are small meadows with low-growing grasses and wildflowers. The park’s lower elevations have dry habitats dominated by sagebrush and broad grasslands traversed by streams and rivers.

Online Resources



NGSS Elements



SEP 2
DCI ESS3.A
DCI LS1.C
CCC 4

- Show a video about great horned owls in Yellowstone National Park. **Then ask students the following:**
 - What kind of living thing is an owl?
 - » It is a bird, and a bird is an animal.
 - What foods do you see the owls getting in the video?
 - » They are eating mice or rats.
 - Is this food from animals or plants?
 - » from animals
 - Where do you think the mice or rats live that the owls catch?
 - » on the ground among the grasses and bushes and rocks
 - Did the video have any evidence that owls eat plants?
 - » No, the owls were only seen eating animals.

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

www.coreknowledge.org/cksci-online-resources

- Point out to students that great horned owls eat only animals. **Ask**, What bird on the animal cards (from Lesson 2.2) also eats only animals?
 - » a bald eagle
- Based on what they know about the needs of animals, have students think about what else the owls get from their environment. Explain that the owls were not shown drinking water in the video but that they do need water. They get most of their water from eating their food and only drink water occasionally, such as when they take a bath.
- Then discuss with students the owls' need for shelter. **Ask guiding questions such as the following:**
 - Where are the owls sitting in the video?
 - » in trees
 - How do they use the tree to protect their young?
 - » They make a nest high in the tree that the babies can stay in until they are ready to fly.
 - Where does the food for the baby owls come from?
 - » The parents leave the tree and catch mice in the forest to feed the babies.

NGSS Elements



DCI ESS3.A

Differentiation

Activity Page



AP 2.3.1

- Reinforce through discussion that a nest is a kind of shelter. Shelter gives animals protection from bad weather or from other animals that may want to eat them.

SUPPORT—For English language learners and others who do not know the word *shelter*, preteach the word by pointing to appealing related images. Consider images of bird nests, a doghouse, a tent, or a small animal under a large leaf. For each image, speak a sentence that uses the word in context.

- Give each student a copy of My Trip to Yellowstone: Forest (AP 2.3.1). Have students cut on the dotted line to remove the large rectangle and paste it across the first two inside pages of their booklets. Then have students draw three resources the great horned owl gets from the place it lives in Yellowstone National Park.

3. Watching Yellowstone bison.

Online Resources



NGSS Elements



SEP 2

DCI ESS3.A

DCI LS1.C

CCC 4

- Act out with students filling up their water bottles, putting on their backpacks, and hanging binoculars around their necks. Explain that they are now hiking through a wide grassland in Yellowstone National Park with a river running through it. Show an online video of Yellowstone bison grazing. **Ask students the following:**
 - What does the land look like where we see bison?
 - » It looks like a big grassy place with a river going through it.
 - What are the bison eating?
 - » grasses
 - Did you see any evidence that bison eat other animals?
 - » no
 - Where do you think the bison drink water?
 - » from the river and maybe from eating the snow

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

www.coreknowledge.org/cksci-online-resources

- Although the video does not show evidence that bison have shelters, explain to students that when the weather is windy, snowy, or too sunny, the bison will walk to the nearest forest to stand among the trees. Trees shelter them by stopping the wind and making shade.
- Give each student a copy of My Trip to Yellowstone: Grassy Valley (AP 2.3.2). Have students cut on the dotted line to remove the large rectangle and paste it across the second two inside pages of their booklets. Then have students draw three resources the bison gets from the place it lives in Yellowstone National Park.

EXTEND—Tell students that scientists found that, on a hot day, a bison needs about 12 gallons of water. Remind them that they learned on How Much Water Does It Drink? (AP 2.2.3) that cows and horses drink about 15 gallons of water

Activity Page



AP 2.3.2

Math Connection

a day. Have students use counting objects to compose and decompose the numbers 12 and 15 into tens and ones. (See **Know the Standards.**)

4. Watching Yellowstone bears.

Online Resources



- Act out with students getting ready for another hike in Yellowstone National Park. Show an online video about Yellowstone bears.

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

www.coreknowledge.org/cksci-online-resources

NGSS Elements



SEP 2
DCI ESS3.A
DCI LS1.C
CCC 4

- **Then discuss with students the following:**
 - What do bears get from the park to meet their needs?
 - » They get food and water.
 - What did you learn about what bears eat in the video?
 - » They eat plants and will eat the same foods humans eat. They also eat grasses, flowers, roots, and animals including fish.
 - Do humans eat only plants, only other animals, or both plants and animals?
 - » both plants and animals

NGSS Elements



SEP 8

Activity Page



AP 2.2.3

- Challenge students to explain how Yellowstone bears get water to drink. Point out that the grassy valleys have rivers in them and that the bears can drink water from the rivers.
- Explain to students that bears seek shelter in winter, when they dig dens in the ground and spend the winter sleeping (hibernating) there.
- Give each student a copy of My Trip to Yellowstone: Grassy Valley and Forests (AP 2.3.3). Have students cut on the dotted line to remove the large rectangle and paste it across the third two inside pages of their booklets.

5. Check for understanding.

- Ask students to think about their acted-out trip to Yellowstone National Park. **Then return to Today's Question—What resources do animals get from the places where they live?**
 - » They get food, water, and shelter.

Know the Standards

TEACHER DEVELOPMENT

Math Connection: This Extend activity gives students an opportunity to build place-value understanding by working with numbers from 11 to 19. (*CCSS.Math.Content.K.NBT.A.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation [such as $18 = 10 + 8$]; understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.*)



- **Ask the following:**
 - How did making your trip journal help you understand the needs of animals?
 - » It gave me a place to show what I learned about the three animals.
 - How do you think the grasses, flowers, and trees you saw in Yellowstone National Park meet their needs?
 - » The plants get what they need from the land there. They get water from the soil, light from the sun, and air. Plants need sunlight to live, but the animals do not.
- Point out that students can keep their journals as a reminder of the living things they saw in the videos and how they meet their needs in Yellowstone.

Differentiation

SUPPORT—For students who need reading support from picture books with minimal text, share an easy-to-read board book called *Welcome Home, Bear: A Book of Animal Habitats* by Il Sung Na (Knopf Books for Young Readers, 2016). In this story, Bear gets tired of the place he lives and searches the world for a new place. In the end, he realizes that the forest he came from is the best place.

- Call attention to the question board. Revisit the questions recorded there so far, and ask students if today's lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the board.

Monitor Progress

Formative Assessment

Collect and review the trip journals students made to determine their understanding of the following concepts:

- All animals need food—plants, animals, or both plants and animals—and get it from the places they live.
- Animals need water and other resources from the places they live.
- Great horned owls, bison, and black bears all live in Yellowstone National Park because the environments there meet their needs.

After completing Lessons 1 and 2, students should understand that living things get the things they need from their environments. In Lesson 3, they will explore the natural resources humans use. (*ESS3.A: Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.*)

Tie to the Anchoring Phenomenon

Through virtual tours of Yellowstone National Park environments, discussion, and developing a model in the form of a travel journal, students learn that animals live and grow only where their needs for food, water, and shelter can be met. In the last segment of this lesson, students will apply that understanding to discovering what kinds of animals might be attracted to an area in their community like the one Mrs. Patel's class is investigating.

LESSON 2.4

Animals and Their Needs

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do animals need from their environments?

Today's Question: What is the relationship between animals and the places where they live?

Tie to the Anchoring Phenomenon: Through reading, discussion, and concept mapping, students cite evidence to support their ideas about what animals might be attracted to an area in their community.

AT A GLANCE

Learning Objectives

- ✓ Recognize animals and their land resources as parts of a system.
- ✓ Develop a graphic organizer to show relationships.

Instructional Activities

- drawing
- teacher Read Aloud
- modeling

NGSS References

Disciplinary Core Ideas: LS1.C Organization for Matter and Energy Flow in Organisms; ESS3.A Natural Resources

Science and Engineering Practices:
2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts: 1 Patterns; 4 Systems and System Models

Students use information from media to find patterns about the needs of living 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

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.

den living thing nature nest
shelter

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.

environment survive

Instructional Resources

Student Book



Ch. 3

Activity Pages



AP 2.4.1

AP 2.4.2

Student Book, Chapter 3
"Animals and Their Needs"

Activity Pages

Help Wanted: Zookeeper
(AP 2.4.1)

What Animals Need (AP 2.4.2)

Materials and Equipment

For the Challenge activity:

- world globe
- blanket or towel

For the Extend activity:

- chart paper (1 sheet per class)
- question board

THE CORE LESSON 2.4

1. Focus student attention on Today's Question.

What is the relationship between animals and the places where they live?

Remind students that they read in Chapter 2 how Mrs. Patel took her students to visit a community garden in their city. **Ask students the following:**

- What kinds of living things were in the community garden?
» plants
- How did the gardeners make sure the plants got what they needed to grow?
» They planted seeds where the plants would get enough light, and they watered the plants.
- How do you think the gardeners decided what kinds of seeds to plant?
» They chose seeds of plants that they like to eat or that make nice flowers.
- Next remind students that they took a video tour of a city zoo. Point out that the zoo has animals that come from all over the world. Have students think about what zookeepers must do to make sure the animals get what they need in the zoo.
- To elicit students' prior knowledge, give each student a copy of Help Wanted: Zookeeper (AP 2.4.1). Explain that when the zoo needs to hire more zookeepers, a job description is written that people can read online. Tell students that their sheet is a job description and that they should draw three things a zookeeper has to do to make sure animals have the things they need.
- Have student share the ideas recorded on their Activity Pages.

Building
Progressions

Activity Page



AP 2.4.1

Tie to the Anchoring Phenomenon

Remind students that they are planning a place for wildlife in an area in their community. In the last lesson, they chose native plants for the lot. In this lesson, they are getting ready to identify native animals that might visit the lot.

2. Read together: “Animals and Their Needs.”

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

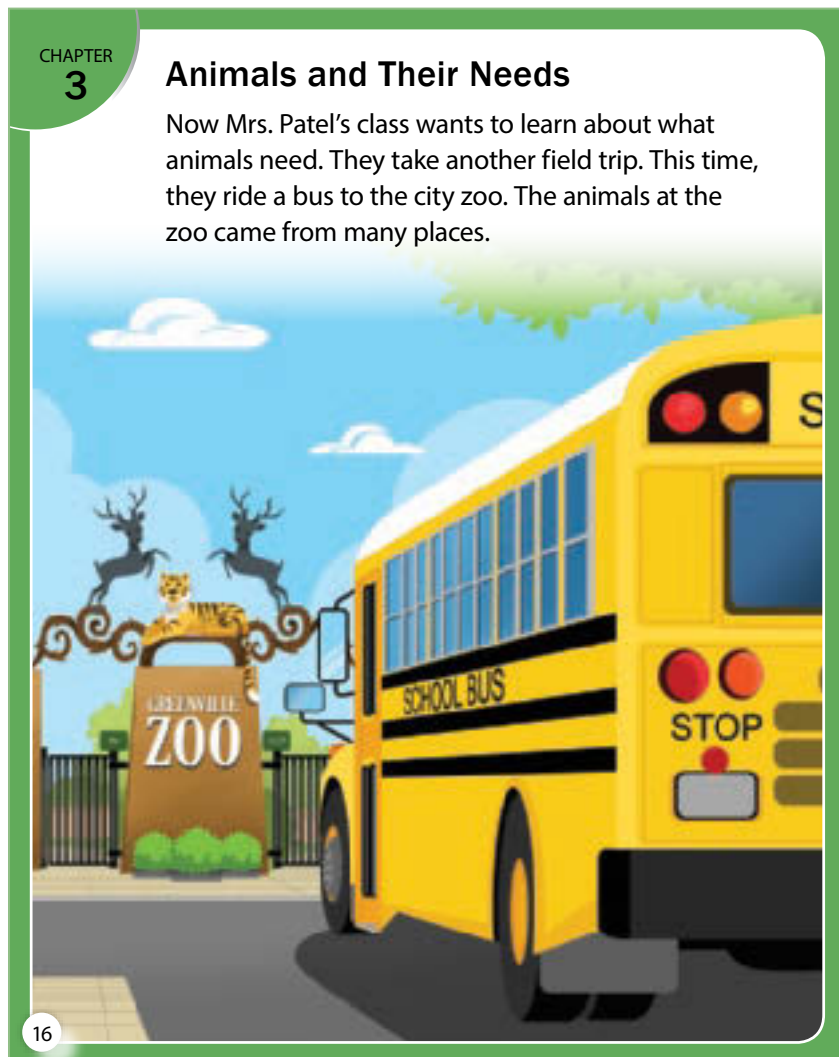
Page 16

Student Book



Ch. 3

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 “Animals and Their Needs,” and tell them to pay special attention to how animals get the things they need as you read.





Ask students to look at the picture on page 16 as you read aloud. Explain that it shows a city zoo. Point out that the kinds of animals in the zoo come from environments in nature that may be very far away.

LITERAL—Where has Mrs. Patel taken her class today?

» They went to the Greenville Zoo.

INFERENTIAL—What can the students expect to see at the zoo?

» all kinds of animals

Invite students to share their own experiences at zoos, including the animals they have seen and the people who work there.

Page 17

Ask students to look at the picture on page 17 as you read aloud.

The children watch the zookeepers work. The animals get food, but different kinds. The animals get water, but some get more than others. Why is this so?



17

LITERAL—What are two jobs of a zookeeper?

- » giving food to the animals
- » giving water to the animals



INFERENTIAL—Why do animals need different kinds of food?

- » because some animals eat only plants, some eat only animals, and some eat both plants and animals

INFERENTIAL—Why do you think some kinds of animals need more water than other kinds of animals?

- » Bigger kinds of animals may need more water than smaller animals.
- » Some animals come from places where they are used to having a lot of water or only a little water.

EVALUATIVE—Point out that the zookeeper in the picture is touching and petting the giraffes. Do you think it is a good idea for zookeepers to be able to get near the animals? Explain.

- » yes, because then the zookeeper can see if they ate all their food or have an injury
- » no, because if the animals are not afraid of people, people who might hurt the animals can get close to the animals

Page 18

Ask students to look at the pictures on page 18 as you read aloud.

Animals are living things. They need certain things to live and grow. Animals need to eat food.

At a zoo, zookeepers give animals the kinds of foods they need.





SEP 8

DCI ESS3.A

CCC 1

Differentiation

Activity Page



AP 2.4.2

Page 19

CORE VOCABULARY—Remind students that a **living thing** is something that is alive or that was once alive. It grows and changes. Emphasize that, unlike plants, animals are living things that need to eat food.

LITERAL—What kind of food is the orangutan eating—plant or animal?

» plant

INFERENTIAL—What kind of food is the zookeeper giving the sea lion—plant or animal?

» There are fish in the bucket, so it is animal food.

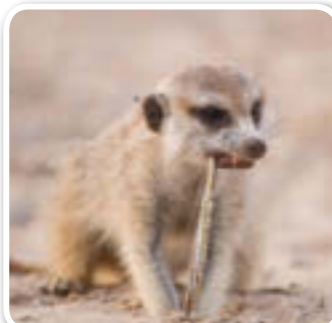
SUPPORT—Some students may need direct instruction to develop inferential thinking. Break it down for students into four steps. **First, ask**, What clues are there to help answer the question. **Next, ask**, How can I add those clues to what I already know about the question? Then, make sure students understand that these questions can have more than one answer. Finally, demonstrate for students how they need to support their inferences with evidence.

Give each student a copy of What Animals Need (AP 2.4.2). In the first oval below “Animals Need,” guide students to write something animals need that they learned about on Student Book page 18.

Ask students to look at the pictures on page 19 as you read aloud.

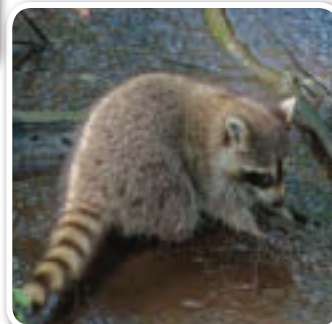
In nature, animals get food from the places where they live.

Some kinds of animals eat plants for food.



Some eat other animals.

Some eat both plants and animals.



19



SEP 8

DCI ESS3.A

CCC 1

CORE VOCABULARY—Remind students that they learned when they read Chapter 2 that **nature** is the places, wild plants, and wild animals that are not affected by humans. Point out that animals in nature (outside the zoo) must find their own food.

LITERAL—So, where do animals get the food they eat?

» from the places they live

INFERENTIAL—What do you think the rabbit in the picture is eating?

» clover

INFERENTIAL—What kind of environment does the rabbit live in?

» a grassy meadow or field

Tell students that the animal in the second picture is a meerkat and that it is eating a snake. Explain that meerkats are small animals that live in deserts in Africa and mostly eat insects, spiders, mice, and small lizards and snakes. (See **Know the Science 1.**)

INFERENTIAL—What is the raccoon in the third picture doing?

» It is putting its front paws into shallow water.

Explain that raccoons live in many habitats, including forests and grasslands with access to water. They use their front paws to feel around the bottom of the stream to find animals such as crayfish and large insects to eat. They also eat fruits growing on plants and have become adapted to finding foods placed outdoors by humans—including garden melons and pet foods.

On What Animals Need (AP 2.4.2), have students draw in the three boxes what they learned on page 19 about three patterns of getting food.

Know the Science

TEACHER DEVELOPMENT

1. What Other Species of Animals Are Meat Eaters? Students are likely to be interested in carnivores—animals that mainly eat other animals for food. Examples of carnivorous animals include mountain lions, polar bears, orcas, red-tailed hawks, praying mantises, rattlesnakes, and sea lions. Each species has adaptations for hunting, immobilizing, and ingesting meat. These include fang-shaped teeth (the mammals), talons on their feet (hawks), and poisons that can be injected into the prey (rattlesnakes).

Animals also need water to live and grow. At a zoo, zookeepers give them water. This camel drinks from a hose.



In nature, animals live where they can find the water they need. This lion drinks from a rain puddle.



20

NGSS Elements



DCI ESS3.A

Students may know that camels can live in deserts where there is little water but may think that camels do not have to drink. Explain that camels do need water but can walk in the desert environment for up to a week without drinking.

INFERENTIAL—How does the lion drink?

- » She uses her tongue to lick the top of the water and bring some water into her mouth.

On What Animals Need (AP 2.4.2), have students write another thing animals need that they learned about on page 20.

Animals need air, too. They get air from the places they live.
Fish get air that is in the water. Worms get air that is in the soil.
Birds get air above the land.



21

LITERAL—Do fish need air?

» yes (See **Know the Science 2.**)

Clarify for students that soil is a mixture of substances, including bits of rock and decayed living things, water, and air. While humans and many other animals use body parts called *lungs* to breathe, earthworms take in air right through their moist skins.

Know the Science

TEACHER DEVELOPMENT

2. How Do Fish Breathe? Some students may think that, because humans cannot breathe underwater, fish (who live in water all the time) do not need air. Atmospheric air that land animals breathe is a mixture of gases, including oxygen. Oxygen is the substance all animals need to take into their bodies for survival. Fish use organs called *gills* to extract oxygen gas that is dissolved in water. The oxygen fish need is not the oxygen that makes up water (H_2O). A fish takes in water through its mouth, and as the water passes through the gills, oxygen gas dissolved in the water moves into the tiny blood vessels in the gills. While there are bubbles of air in water large enough for humans to see, the dissolved particles of oxygen that gills take in are too small to see.

INFERENTIAL—Is there air to breathe higher in the sky than you can jump? How do you know?

» Yes! I know because birds can fly higher than I can jump.

Differentiation

CHALLENGE—Show students a globe, and explain that it is a model of planet Earth. Place a towel or blanket around the globe to model the layer of air that surrounds the land and water parts of the real Earth. Point out that the layer of air around Earth is quite thin compared to the size of the planet.

On What Animals Need (AP 2.4.2), have students write a third thing animals need that they learned about on page 21.

Page 22

Ask students to look at the pictures on page 22 as you read aloud.

Animals also need shelter. They find or make shelters in the places where they live.



A mother bear dug this underground den.



This mother bird used tall grasses to make a nest.



This crab found a shell on the beach and moved in!



This cheetah finds shelter from the hot sun under a tree.

22



CORE VOCABULARY—Explain that **shelter** is a place to get protection from bad weather or from danger. Animals need shelter, in addition to food, water, and air, to survive.

SUPPORT—It may be helpful to preteach the word *shelter* to English language learners. Provide more familiar examples of how the word is used, such as *bus shelter* or *animal shelter*. Show pictures of an animal shelter, and explain how people provide for the needs of the animals there. Then explain that animals find or build their own shelters in the places they live. (See **Know the Standards.**)

LITERAL—What is the name for the bear’s shelter?

» a den

INFERENTIAL—What do you think it is like inside the den?

» It could be dark but dry and warmer or cooler than the air outside the den.

LITERAL—What is the name for the bird’s shelter?

» a nest

INFERENTIAL—How do the grasses provide the bird with shelter, too?

» The grasses might make it less windy and make shade on the nest.

INFERENTIAL—Where did the shell the hermit crab moved into come from?

» It was made by another kind of animal and left on the sand after the animal died.

Point out that most hermit crabs try to find a shell that is big enough that they can hide their entire body, including all their legs, inside.

INFERENTIAL—What might weather patterns be like where cheetahs live?

» It may be very hot and sunny.

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: This vocabulary activity supports teaching of English Language Arts Language Standards CCSS.ELA-Literacy.L.K.4.a (*Identify new meanings for familiar words and apply them accurately [e.g., knowing duck is a bird and learning the verb to duck]*) and CCSS.ELA-Literacy.L.K.5.c (*Identify real-life connections between words and their use [e.g., note places at school that are colorful]*).



INFERENTIAL—Why do the students have to ask themselves so many questions to answer Mrs. Patel?

- » They have to think about all the needs of animals before deciding which kinds can live there.

INFERENTIAL—What if we had an empty lot in our community? How could we find out what kinds of animals could live there?

- » We could go online and search for the names of local animals. We could go to a nature center and take a nature walk. We could ask an expert in animals.

EVALUATIVE—Who could give you the better answer—someone who grows vegetables in their garden or someone who leads hikes at a park such as Yellowstone National Park?

- » someone who leads hikes at a park because they might be more familiar with animals and the habitats they prefer

NGSS Elements



SEP 8

DCI ESS3.A

CCC 4

3. Check for understanding.

Call attention to Today's Question, and ask, What is the relationship between animals and the places where they live? Remind students that a relationship is the way two things are connected. Then have students think about the Student Book chapter they just read and **discuss each question:**

- Where did Mrs. Patel take her class to learn about animals and their needs?
 - » to a city zoo
- What do the zookeepers have to make sure the animals get?
 - » the right foods, enough water, air, and shelter
- How do animals that live in nature get the food they need?
 - » They must find their own plants, animals, or both to eat from the place they live.
- How do animals that live in nature get the water they need?
 - » They must find water to drink.
- How do animals get the air they need?
 - » They can get it from all around them, from water if they are fish or from the soil if they are earthworms.
- How do animals find shelter where they live?
 - » Animals find shelter in all kinds of ways. They may make dens or nests, sit under a tree, or move into a shell another animal made.

Differentiation

EXTEND—Invite students to contribute to an anchor chart called “Animals Need Shelter.” Have students use library books and other reference materials or their own knowledge to draw or write about one kind of animal and how it seeks or makes a shelter. Leave space on the chart for additional examples that students may discover in Lesson 2.5.

Monitor Progress

Formative Assessment

Review student responses to What Animals Need (AP 2.4.2) to determine student understanding of the following concepts:

- Animals need food, water, air, and shelter to live and grow.
- Animals may eat only plants, only animals, or both plants and animals.
- Graphic organizers can be used to show relationships in the natural world.

The graphic organizer on Activity Page 2.4.2 complements the one students completed in Lesson 1 (AP 1.4.2), reinforcing the Science and Engineering Practice of Developing and Using Models (*Use a model to represent relationships in the natural world*). In the next lesson segment (Lesson 2.5), students will continue to develop this practice by working on their class map proposing the kinds of plants and animals that could survive in their own community (*ESS3.A Natural Resources*).

Call attention to the question board. Revisit the questions recorded there so far, and ask students how reading the chapter and talking about the story of the city zoo might answer or relate to any of those questions.

Tie to the Anchoring Phenomenon

Through reading, discussion, and concept mapping, students encountered the concepts needed to discuss the use of an area in their local community by native animals, just like Mrs. Patel's class is doing.

LESSON 2.5

Lesson 2 Roundup: Animals in Our Lot

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do animals need from their environments?

Today's Question: What do animals need from their environments?

Tie to the Anchoring Phenomenon: Through research and mapping, students continue to develop a model proposing how to transform an area in their community into a place for wildlife.

AT A GLANCE

Learning Objectives

- ✓ Use a map to model a vacant lot.
- ✓ Ask questions to find animals that can survive locally.
- ✓ Represent animals on the map.
- ✓ Explain how the vacant lot can provide resources to support animals.

Instructional Activities

- class discussion
- student investigation
- modeling

NGSS References

Performance Expectation: K-ESS3-1

Disciplinary Core Ideas: ESS3.A Natural Resources; LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 1 Asking Questions; 2 Developing and Using Models; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concept: 4 Systems and System Models

Students ask questions about the relationships between native animals and the places they live.

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

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.

animal **map**

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.

native **resource**

Instructional Resources

Activity Page



AP 1.5.1

Activity Page

Unit Project Scoring Rubric
(AP 1.5.1)

Materials and Equipment

- map that the class began in Lesson 1.5 (1 per class)
- play putty (1 pack per class)
- internet access and the means to project images/video for whole-class viewing

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 2.5

1. Focus student attention on Today's Question.

What do animals need from their environments? Invite students to help you retell the story they read in their Student Book about Mrs. Patel's Kindergarten class. Her students started Kindergarten in a new school, called Greenville School. The city of Greenville planned to tear down the old school and remove the playground and parking lot. The city leaders want ideas for what to do with the empty lot. Mrs. Patel's students decide that it should be turned into a place for plants and animals to live.

Online Resources



Show a video about attracting wildlife to backyards in towns and cities. When finished, **check for student understanding by asking the following:**

- What are three things wildlife needs that people need to think about?
 - » food, water, and shelter



- Do people planning for most wildlife also need to think about providing air?
 - » no, because there is plenty of air everywhere
- Why, after choosing animals to attract, will we have to think again about plants for our lot?
 - » Animals need certain kinds of plants for food and shelter. (See **Know the Science**.)

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

www.coreknowledge.org/cksci-online-resources

Remind students that they are working on a similar problem related to their own community. Get out the map they started in Lesson 1.5, and review the information they have added so far. Explain that today they will work on finding out what kinds of animals they can attract to their lot to live with the plants.

Tie to the Anchoring Phenomenon

Students will use a model to answer Today's Question about how a vacant lot in their own community can be used to attract animals.

2. Add a water source to the lot.



Discuss with students the needs of plants and animals for water. Brainstorm types of water sources that can be added to the area that will help meet the needs of living things such as a stream, a pond, a birdbath, a fountain, a faucet and hose, rain barrels, puddle area.

SUPPORT—Consider building students' science vocabulary by making a word wall out of the list of possible water sources. Add to the wall other terms the class has written on their map or will write on their map during this lesson segment.

Have students discuss and choose at least one of these water sources and draw and label it on their class map.

Know the Science

TEACHER DEVELOPMENT

What Makes Ecosystems Healthy? An ecosystem consists of a community of living things that interacts with the nonliving resources in the area. Healthy ecosystems are somewhat stable in the kinds and numbers of species that live there and provide ample resources for them. Among the resources that animals need are plants. Native and naturalized plants provide food, shelter, and nesting materials for animals. Even animals that only eat other animals indirectly need plants for food. This is because nearly all land-based birds feed insects to their young and these insects depend on plants for their food.

CHALLENGE—For students who want to know more about how animals get the water they need, read to students *Water Hole Waiting* by Jane Kurtz and Christopher Kurtz (Greenwillow Books, 2002). In this story of a whole day at a savanna watering hole, monkeys, hippos, zebras, and crocodiles come and go, taking turns drinking water.

3. Guide research on native animals.

NGSS Elements



SEP 1
SEP 2

- Explain to students that they will add pictures of local animals to their map of the lot. If possible, guide students to choose at least one insect, one reptile or amphibian, one bird, and one mammal. To do this, they will have to ask questions about what animals can live in your community. One source to ask is a local expert, such as a naturalist at a local nature center. Another source could be a librarian who can find suitable reference materials for students.
- A third way to find animals that live naturally in your area is to submit student questions to an online search engine. Have students submit questions such as “What insects are native to (name of your state)?” You will need to evaluate the search results and choose sites that you and your students can interpret. Using image searches will simplify your results.

Differentiation Language Arts Connection

SUPPORT—For English language learners, guide students to ask questions that can be searched online by providing them with sentence frames. This will allow students to focus on the content of your lesson rather than how to phrase their question in English. Sentence frames can be general (*What birds live in [name of your state]?*) or specific (*Can cardinals live in [name of state]?*). (See **Know the Standards.**)

NGSS Elements



DCI ESS3.A
CCC 4

- Have students choose a few animal images to cut out and tack down on the map, using an adhesive, like play putty, that can be lifted and repositioned later. Alternately, students can use the images as references and draw and label pictures of the native animals they would like to attract to their lot.
- Next, do research with the class to find out what at least two of the animals need to eat. If your research identifies specific plants or animals, have students add these to their map.
- **For each animal, ask the following:**
 - What is the name of this kind of animal?
 - » Answers will depend on the native animals the class chose.
 - What will it need to live and grow?
 - » It will need food, water, shelter, and air.

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: Using sentence frames supports Kindergarten students in meeting their Speaking and Listening standard CCSS.ELA-Literacy.SL.K.3 (*Ask and answer questions in order to seek help, get information, or clarify something that is not understood*).

- How do we know it can live in our community?
 - » We asked questions of an expert/a librarian/a search engine.

4. Check for understanding.

Ask students to think about their work today. Have students reflect on the entire lesson and return to the Lesson 2 Guiding Question—**What do animals need from their environments?**

- » We should find out what where they can live and what they need to stay alive.

Ask students clarifying questions as they look at their map:

- What does the map our class made show?
 - » It shows the outline of an area in our community. It also shows the kinds of plants and animals that can live there.
- How will we use the map when it is done?
 - » We will use it to show our community leaders how we can change an area into a habitat for living things.
- How have you provided for plants' and animals' needs for water in your lot?
 - » Sample: We added a pond and rain barrels.

Have students reflect on the entire lesson and return to the Lesson 2 Guiding Question.

- » We should find out what where they can live and what they need to stay alive.

NGSS Elements



3D Learning

Differentiation

- Each of the three lessons in this unit addresses the same two Performance Expectations (K-LS1-1 and K-ESS3-1). Lesson 1 focuses on the needs of plants, Lesson 2 focuses on the needs of nonhuman animals, and Lesson 3 focuses on human needs. As your students move on to Lesson 3, they will have several opportunities to integrate their understanding about plants and animals with new learning about the needs of one animal species in particular—humans.

EXTEND—Another need animals have is for space to live. Show students a video about animals' need for space. Discuss how much of that space is needed so that the animals can find enough food to eat. Point out that the amount of space animals need varies from species to species and with the type of environment they live in. For example, some animals need very small spaces, but lions and tigers that hunt for large animals need hundreds of square miles of space to survive. Discuss how many animals attracted to their community lot will need to be able to move around to other places in the community to survive.

Online Resources



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

www.coreknowledge.org/cksci-online-resources



Formative Assessment

Use the Unit Project Scoring Rubric (AP 1.5.1) you started in Lesson 1 for each student to evaluate student performance of the scoring elements marked for Lesson 2. Retain this rubric to use at the conclusion of Lesson 3, where it can be used as a summative assessment.

Call attention to the question board. Revisit the questions recorded there so far, and ask students if today's lesson may help to answer some of them. Allow students to suggest revisions or additions to the questions on the question board.

Tie to the Anchoring Phenomenon

Through model making and research, students will be able to explain how an area in their own community can become an environment for wildlife, like Mrs. Patel's class is doing.

LESSON 3

Humans, Their Needs, and Their Environments

OVERVIEW

Guiding Question: What do humans need and use from their environments?

Lesson 3 Segments	Segment Questions	Advance Preparation
3.1 Human Needs Students engage with the concept that humans are animals. They look for patterns in the foods humans eat while designing their own pizzas.	Do people need the same things as plants and other animals?	Cut out the cardboard circles for the “pizzas.” See Materials and Equipment.
3.2 Materials Humans Use Students find patterns in data about how much water humans need. Then they explore other natural resources human use.	What natural resources—things from nature—do humans need and use?	See Materials and Equipment.
3.3 Meeting Human Needs Students read along in and discuss student book Chapter 4 and represent the main ideas in a diagram.	How do humans meet their needs?	Read Chapter 4 in the Student Book. See Materials and Equipment.
3.4 Modeling a System for Living Things (2 days) Students add to their maps of a vacant lot ways to meet the needs of humans. Then they practice presenting their plan to community leaders.	What do humans need and use from their environments?	Get out the scoring rubric on Activity Page 1.5.1 and the large map begun in Lesson 1.5. See Materials and Equipment.

What's the Story?

Summary: In Lesson 3 (Segments 1–4), students engage with the idea that humans are animals, and students find patterns in data related to the foods humans eat and how much water they need (K-LS1-1). They identify various materials that come from natural resources. The last segment of this lesson culminates their exploration of living things and natural resources as they finalize their proposal to use a local area as an environment for wildlife and humans to enjoy (K-ESS3-1).

Learning Progression: Lesson 3 builds on student understandings of the Disciplinary Core Ideas LS1.C (*Organization for Matter and Energy Flow in Organisms*) and ESS3.A (*Natural Resources*), which were introduced in Lessons 1 and 2. Understandings about the human uses of natural resources are foundational for Grade 4 exploration of human needs for energy and fuels and renewable and nonrenewable resources. Concepts related to matter and energy flow in organisms will be further explored in Grade 5, when students learn how organisms use matter and energy for body repair, for growth, to move, and to maintain body warmth.

Guiding Phenomenon: Turning a local area into a habitat for wildlife can meet the needs of plants and animals, including humans.

Learning Objectives:

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

- Classify humans as animals.
- Identify humans as animals that eat both plants and animals.
- Organize and interpret data related to human needs for water.
- Identify relationships between humans and their environments.
- Model how a vacant lot in their local community can meet the needs of humans as well as other animals and plants.

NGSS Standards and Dimensions

Note: The following two Performance Expectations were partially met in Lessons 1 (plants) and 2 (animals) and are completed in this lesson on humans.

Performance Expectation: K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Performance Expectation: K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

<p>Science and Engineering Practices</p> <p>2 Developing and Using Models</p> <p>Use a model to represent relationships in the natural world.</p> <p>4 Analyzing and Interpreting Data</p> <p>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</p> <p>6 Constructing Explanations and Designing Solutions</p> <p>Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.</p> <p>7 Engaging in Argument from Evidence</p> <p>Construct an argument with evidence to support a claim.</p> <p>8 Obtaining, Evaluating, and Communicating Information</p> <p>Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).</p>	<p>Disciplinary Core Ideas</p> <p>LS1.C Organization for Matter and Energy Flow in Organisms</p> <p>All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p> <p>ESS3.A Natural Resources</p> <p>Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.</p>	<p>Crosscutting Concepts</p> <p>1 Patterns</p> <p>Patterns in the natural and human designed world can be observed and used as evidence.</p> <p>4 Systems and System Models</p> <p>Systems in the natural and designed world have parts that work together.</p> <p>Connection to Nature of Science:</p> <p>Scientific Knowledge Is Based on Empirical Evidence</p> <p>Scientists look for patterns and order when making observations about the world.</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

LESSON 3.1

Human Needs

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do humans need and use from their environments?

Today's Question: Do people need the same things as plants and other animals?

Tie to the Anchoring Phenomenon: By establishing that humans are living things, students are preparing to make decisions about meeting some animal needs in an area in their community.

AT A GLANCE

Learning Objectives

- ✓ Classify humans as animals.
- ✓ Identify patterns in foods humans eat.

Instructional Activity

- class discussion

NGSS References

Note: The following Performance Expectation was partially met in Lessons 1 (plants) and 2 (animals) and is completed in this lesson on humans.

Performance Expectation: K-LS1-1

Disciplinary Core Ideas: LS1.C Organization for Matter and Energy Flow in Organisms; ESS3.A Natural Resources

Science and Engineering Practices: 4 Analyzing and Interpreting Data; 6 Constructing Explanations

Crosscutting Concept: 1 Patterns

Connection to Nature of Science: Scientific Knowledge Is Based on Empirical Evidence

Students analyze data to find patterns in foods humans eat.

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

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.

human pattern

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.

classify

Instructional Resources

Activity Page



AP 3.1.1

Activity Page

Top Your Own Pizza (AP 3.1.1)

Materials and Equipment

- plate-sized round pieces of brown cardboard (1 per pair)
- scissors (1 per pair)
- glue or paste (1 per pair)
- question board

THE CORE LESSON 3.1

1. Introduce students to Lesson 3.

NGSS Elements



DCI ESS3.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 an area have so that living things can live there?**

Remind students that, in Lessons 1 and 2, they worked on making a map to show a plan for an area right in their own community. **Ask the following:**

- What kinds of living things did we find to live and grow in the lot?
 - » Answers will vary, but there should be three (or more) kinds of plants and animals.
- What needs of plants will be met in the area?
 - » their needs for light, water, air, and soil
- What needs of animals will be met in the area?
 - » their needs for food, water, shelter, and air

SUPPORT—If some English language learners are in the “silent period,” in which they are reluctant to speak in English, use the class map developed in Lessons 1 and 2 as a word wall, and allow students to point to words in response to each question.

Write the **Lesson 3 Guiding Question** where students can see it:

What do humans need and use from their environments?

Point out to students that they already have a plan for inviting plants and animals to their lot but that now they need to think about how people—humans—will use the lot. Explain that humans are living things that are animals. (See **Know the Science**.)

Tie to the Anchoring Phenomenon

Through discussion and designing their own pizza, students are gaining understanding that human needs and wants have to be accounted for in their plans for an area in their community.

2. Host a pizza-making party.

Activity Page



AP 3.1.1

- Give each student a plate-sized round piece of brown cardboard, and explain that it represents a pizza dough before it is baked.
- Next, hand out a copy of Top Your Own Pizza (AP 3.1.1) and markers to each student. Have students use the markers to add color to the pictures of foods.
- Then have them use scissors to cut out the foods they want to eat on their pizza before baking it and glue them in position on the pizza dough (round cardboard).
- Take a poll of the foods students chose. **Ask**, Who chose to eat broccoli? Count the number of raised hands aloud, and write that number on a chart next to the word *broccoli*.

Know the Science

TEACHER DEVELOPMENT

Are People Really Animals? Yes, we are! While nonscientific literature often describes humans as a separate group of living things, scientists classify humans as members of the animal kingdom. Members of the plant kingdom can make their own food, but animals cannot. Humans (*Homo sapiens*) are in a branch of the animal kingdom in the order *Primates* with lemurs, monkeys, and apes that are similar to humans in their body structures and functions.

- Poll students about the rest of the food choices, and record the numbers of students who chose to eat them on the chart as shown.

Food	Number of students
broccoli	
cheese	
tomato	
pepperoni	
onion	
olives	
mushrooms	
sausage	
pineapple	
bacon	
chicken	
spinach	

- Discuss with students how to classify these foods as coming from plants or animals. Explain that broccoli is the flower cluster of a leafy plant and tomato is the fruit of a vine-shaped plant. Point out that cheese is made from the milk of an animal and pepperoni and sausage are made from the meat of animals.

CHALLENGE—Remind students that people also eat the pizza dough once it has been baked and become bread. Have students explain what they know about what dough is made from. Then allow them to submit a question to an online search engine to learn more. Search results will provide an explanation that pizza and other bread doughs are mainly made from wheat seeds and that wheat is a grasslike plant.

- Have students look at the data in the chart, and **ask the following:**
 - Do the humans in our class eat foods from plants?
 - » yes
 - Do the humans in our class eat foods from other animals?
 - » yes

SUPPORT—If students need practice in counting, invite them to count aloud without you. If you hear students hesitating, have the students with raised hands arrange themselves in a line and then count “how many” again. (See **Know the Standards.**)

NGSS Elements



DCI LS1.C
CCC 1
SEP 4

Differentiation

Math Connection

Know the Standards

TEACHER DEVELOPMENT

Math Connection: Counting support by varying the arrangement of the objects being counted supports math instruction of CCSS.Math.Content.K.CC.B.5 (*Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.*)

Ask students, What pattern of eating do humans have—eating plants only, eating animals only, or eating both plants and animals?

» eating both plants and animals

Conclude by asking, What evidence supports your answer that humans eat both?

» We used evidence from the table about making and eating pizza.

3. Check for understanding.

NGSS Elements



SEP 6
DCI LS1.C
CCC 1

Formative Assessment

The Crosscutting Concept Patterns (*Patterns in the natural and human designed world can be observed and used as evidence*) is also developed in depth in Kindergarten Unit 4: Weather Patterns, when students meet Performance Expectation K-ESS2-1 (*Use and share observations of local weather conditions to describe patterns over time*).

Ask students to think about their science work today. **Then ask Today's Question—Do people need the same things as plants and other animals?**

Ask students clarifying questions:

Monitor Progress

- What does the word *human* mean?
 - » A human is a person.
- Are humans living things?
 - » yes
- What pattern did you find in the foods humans eat?
 - » Humans eat both plants and other animals.
- How did you discover these patterns today?
 - » We chose foods to eat on pizza.

Differentiation

EXTEND—Some students will enjoy exposing a common misconception by polling adults on the question, Are people animals? Have students take an index card and write the question on one side. On the reverse side they can have a chart to record tally marks under Yes or No. Allow students to report the results of their investigation to the rest of the class.

- Call attention to the question board. Revisit the questions recorded there so far, and ask students how thinking about humans as animals might answer or relate to some of those questions. Encourage students to suggest additional questions for the question board.

Tie to the Anchoring Phenomenon

Through discussion and collecting data, students develop understanding that humans are animals. In developing an area for wildlife, like Mrs. Patel's class, students can consider if the needs of humans can be met there as well as plants and other animals.

LESSON 3.2

Materials Humans Use

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do humans need and use from their environments?

Today's Question: What natural resources—things from nature—do humans need and use?

Tie to the Anchoring Phenomenon: Through observation and analyzing data about human needs, students are preparing to meet some needs of humans in their plan to transform an area for wildlife.

AT A GLANCE

Learning Objectives

- ✓ Explain how natural resources meet human needs.
- ✓ Identify patterns in human water use data.

Instructional Activities

- class discussion
- student investigation

NGSS References

Note: The following Performance Expectation will be completed and met at the conclusion of Lesson 3. In Lesson 1, students addressed the needs of plants; in Lesson 2, they addressed the needs of animals; and in Lesson 3, they will address the needs of humans.

Performance Expectation: K-LS1-1

Disciplinary Core Ideas: LS1.C Organization for Matter and Energy Flow in Organisms; ESS3.A Natural Resources

Science and Engineering Practices:
4 Analyzing and Interpreting Data; 6 Constructing Explanations

Crosscutting Concept: 1 Patterns

Students use observation to explain how parts of the school work together to meet human needs.

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

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.

nature

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.

natural resource

Instructional Resources

Activity Page



AP 3.2.1

Activity Page

Things Humans Use from Nature (AP 3.2.1)

Materials and Equipment

- clipboard or writing board (1 per student or group)
- one-gallon plastic jug
- question board

For the Challenge activity:

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

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 3.2

1. Focus student attention on Today's Question.

NGSS Elements



DCI LS1.C

DCI ESS3.A

What natural resources—things from nature—do humans need and use?

Have students think about a tree growing in a nearby park. **Ask**, What does a tree, or any other plant, need to live and grow?

» light, water, air, and soil

Then have students picture a bird in that tree making a nest in which to lay its eggs. **Ask**, What do birds, or any other animals, need to live, grow, and bring up their young?

» food, water, air, and shelter

Tell students that they will look for patterns in the needs of one kind of animal—humans! (See **Know the Science**.)

Tie to the Anchoring Phenomenon

Students' exploration of human needs and natural resources will support them when they consider how to make a place for native wildlife also inviting for humans.

2. Facilitate an outdoor experience.

Activity Page



AP 3.2.1

NGSS Elements



SEP 2

DCI ESS3.A

CCC 4

- Give each student a copy of Things Humans Use from Nature (AP 3.2.1). Have students point to the bubble in the center of the graphic organizer, and explain that here *nature* means things from our planet Earth, not things people make. **Ask students guiding questions as they point to each of the four bubbles connected to the bubble labeled “Nature”:**
 - What are four groups of things humans get from nature?
 - » water, other animals, rocks, and plants
 - Where in nature is water found?
 - » in lakes, rivers, rain, the ocean
 - How do humans use water?
 - » for drinking, for cooking, for brushing teeth, for washing
 - How do humans use other animals?
 - » for food (meat, chicken, eggs, milk) and clothing (leather, silk)
 - How do humans use rocks, soil, and other materials they dig out of the land?
 - » for making glass (sand), for making roads (crushed rocks), for building (granite), for gardening (soil)
 - How do humans use plants from nature?
 - » for food, for clothing (cotton), for building homes (trees), for furniture (trees)

Know the Science

TEACHER DEVELOPMENT

What Are Natural Resources, and How Do They Affect Humans? Natural resources are materials humans use that are found naturally on Earth. They include air, water, soil, minerals, fossil fuels, plants, and animals. Human survival depends on using natural resources to breathe, to drink, to grow food, and to make shelters. The enormous growth of Earth's human population has put pressure on natural resources. Some resources exist in limited quantities and can be used up. Others renew themselves but are subject to pollution that threatens human health. The fact that many natural resources are unevenly distributed around Earth affects where humans live and where they migrate.

- Have students attach their Activity Pages to a clipboard or other firm writing surface and get pencils. Then, guide students on a walk around your school to find at least one example of each of the four uses on the sheet. Have students write, draw, or label in each of the empty squares in the graphic organizer one example the class found.

Differentiation

SUPPORT—Allow students who are having trouble identifying examples on their own to ask questions of school staff as they walk around the school. For example, when you visit the main office, have one student ask, “Is there anything you use in here that comes from plants?”

Online Resources



CHALLENGE—Students may ask if Earth’s resources will ever be used up. Reassure them that there are actions people can take to make sure there are enough natural resources in the future. Introduce them to the idea of reducing, reusing, and recycling by playing a music video about caring for plant Earth. Afterward, challenge students to explain what each of the three words means when protecting natural resources.

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

www.coreknowledge.org/cksci-online-resources

3. Lead a discussion.

NGSS Elements

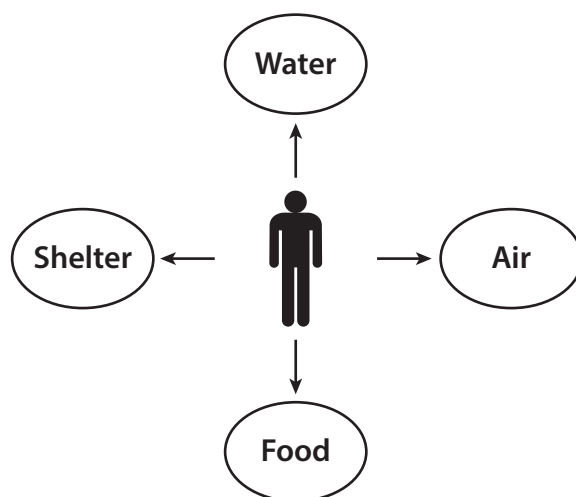


SEP 6
DCI LS1.C
DCI ESS3.A
CCC 4

Return to class to hold a discussion. Point out to students that humans are living things. **Ask students the following:**

- What kind of living thing is a human—plant or animal?
 - » animal
- What do animals—including humans—need to live and grow?
 - » They need food, water, air, and shelter.
- Which people in our school help us get the foods we need?
 - » The kitchen and cafeteria staff or parents who pack our lunches.
- Which objects in our school help us get the water we need?
 - » water fountains, water bottles, cups
- Which parts of our school bring in the air we need?
 - » the heating or air conditioning systems, windows that we can open
- Which parts of our school give us shelter from bad weather?
 - » the roof, walls, floors

SUPPORT—For English language learners who are reluctant to answer orally, create a graphic organizer (shown) with a human in the center with connecting bubbles for each animal (human) need. Have students point to parts of your room or objects in it to give an example of how each need is met in school. (See **Know the Standards.**)



4. Look for patterns.

Take students to the US Geological Survey's webpage called "How much is your daily indoor water use?" To avoid embarrassing students about their personal hygiene habits, use data about yourself, or have the class agree on what answers to give. Use the dropdown menus to enter the number of times you do certain activities each day. You can skip "face/leg shaving" and dish and clothes washing because these are not activities your students would do on their own. Then click "Submit your answers."

Online Resources



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

www.coreknowledge.org/cksci-online-resources

- The calculator will report your estimated daily home water use in gallons. The estimates are calculated to hundredths, so round them to a whole number for your students.
- Show students a one-gallon jug, and explain that they would have to refill the bottle X times to show the amount of water they use in a day.

NGSS Elements



DCI ESS3.A

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: Question-and-answer activities support English Language Arts standards CCSS.ELA-Literacy.SL.K.4 (*Describe familiar people, places, things, and events and, with prompting and support, provide additional detail*) and CCSS.ELA-Literacy.L.K.5.C (*Identify real-life connections between words and their use [e.g., note places at school that are colorful]*).



- Try the calculator a few times with students, varying the numbers submitted.
Have students look for patterns in data by asking, What makes the total number of gallons increase or decrease?

5. Check for understanding.

Formative Assessment



Return students' attention to **Today's Question: What natural resources—things from nature—do humans need and use?** Discuss with students evidence of the use of natural resources around their school. Point out that all of the parts of the school work together to make sure their needs are met.

EXTEND—If you want to use children's literature to have students think about how humans relate to planet Earth, read aloud a picture book called *The Earth and I*, written and illustrated by Frank Asch (HMH Books for Young Readers, 2008). In this story, Earth and a child make friends, and they play and listen to one another.



The idea of parts working together supports the Crosscutting Concept Systems and System Models. In this lesson, students consider nature as a system that has parts that support animal life but also their school as a system that supports human needs (K-ESS3-1). Later, in Kindergarten Unit 3, Changing Environments, systems and system models will also be addressed as students explore how living things change their environments (K-ESS2-2).

Call attention to the question board. Revisit the questions recorded there so far, and ask students how taking a natural resources walk around school might answer or relate to some of those questions. Encourage students to suggest additional questions for the question board.

Review student work on Things Humans Use from Nature (AP 3.2.1) to determine student understanding of the following concepts:

- Water, plants, animals, and rock materials come from nature (Earth).
- Humans use water for drinking, watering plants, and keeping fish.
- Humans use plants for food, to make paper, for clothing, and as decorative indoor plants.
- Humans use other animals for food and some clothing items.
- Humans use rocks and other Earth materials for building schools, sidewalks, and roads and for growing plants.

See the Activity Page Answer Key for sample student responses.

Tie to the Anchoring Phenomenon

Through firsthand observation and use of an online calculator, students develop understandings about how humans use natural materials, such as air, water, and plants, that they can apply to their proposal for using an area in the community as a place to enjoy wildlife.

LESSON 3.3

Meeting Human Needs

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do humans need and use from their environments?

Today's Question: How do humans meet their needs?

Tie to the Anchoring Phenomenon: Through video, reading, discussion, and concept mapping, students build understanding of how some human needs might be met at a nature preserve in their community.

AT A GLANCE

Learning Objectives

- ✓ Explain that humans and their land resources are parts of a system.
- ✓ Develop a graphic organizer to show relationships between people and the materials they use to meet their needs.

Instructional Activities

- teacher Read Aloud
- class discussion
- modeling

NGSS References

Disciplinary Core Idea: ESS3.A Natural Resources

Science and Engineering Practices:

2 Developing and Using Models; 6 Constructing Explanations; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concept: 4 Systems and System Models

Students obtain information about systems involved in providing humans with natural 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

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.

farm forest human market
nature

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.

survive

Instructional Resources

Student Book



Ch. 4

Activity Page



AP 3.3.1

Student Book, Chapter 4
“People and What They Need”

Activity Page
How Do People Meet Their Needs? (AP 3.3.1)

Materials and Equipment

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

For the Challenge activity:

- shallow pan of water (1 per class)

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

www.coreknowledge.org/cksci-online-resources

THE CORE LESSON 3.3

1. Focus student attention on Today’s Question.

NGSS Elements



DCI LS1.C

DCI ESS3.A

CCC 4

How do humans meet their needs? Remind students that they read in Chapter 3 how Mrs. Patel took her students to visit a city zoo. **Ask students the following:**

- What kinds of living things were in the city zoo?
 - » The following kinds of animals were featured in Student Book Chapter 3: giraffes, orangutans, sea lions, camels.
- What work do the zookeepers do to make sure the animals get what they need?
 - » They give the animals water, food, and shelter.
- If those animals were to live in nature, how would they meet their needs?
 - » They would have to find their own water, food, and shelter in the place where they live.

Online Resources



Show students a brief video comparing city and country life. Have students share their prior knowledge about how country and city people meet their needs. **Ask students the following, and accept all reasonable answers:**

- How do people get food in the country or the city?
 - » from a store, from a garden

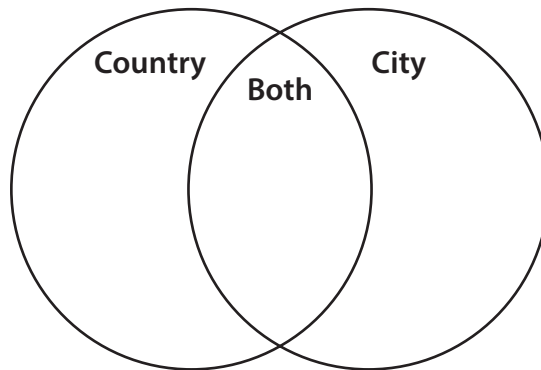
- In what kinds of shelters do people live in the country and the city?
» houses, apartments
- How do people travel from place to place in the country or the city?
» by car, bus, walking, subway
- What do children do for fun in the country and the city?
» play sports, swim, watch TV

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

www.coreknowledge.org/cksci-online-resources

Differentiation

SUPPORT—Provide visual cues for English language learners for answering each question by drawing and labeling a Venn diagram (shown in figure). Point to the left circle of the diagram when students describe the country. Point to the right side when they describe the city. If they answer the same for both the city and country, point to the place on the diagram where the circles overlap.



Tie to the Anchoring Phenomenon

Point out to students that when they plan a place for wildlife in their community, they should also think about how humans can enjoy the place, too.

2. Read together: “People and What They Need.”

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.

Ask students to turn to page 24 of the Student Book and look at the image as you read aloud. Remind them that the title of this chapter is “People and What They Need,” and tell them to pay special attention to how people in the city get the things they need as you read.



Ask students to look at the picture on pages 24–25 as you read aloud. Explain that it shows a school bus in front of a city hall. Point out that a city hall is where people who take care of the city work, and give a few examples. If someone wants to build a new apartment building, they must get permission at city hall. Some people get married at city hall. People who get parking tickets may have to pay them at city hall. The city leaders hold their meetings there, too.

LITERAL—Where has Mrs. Patel taken her class today?

» They went to their city hall.

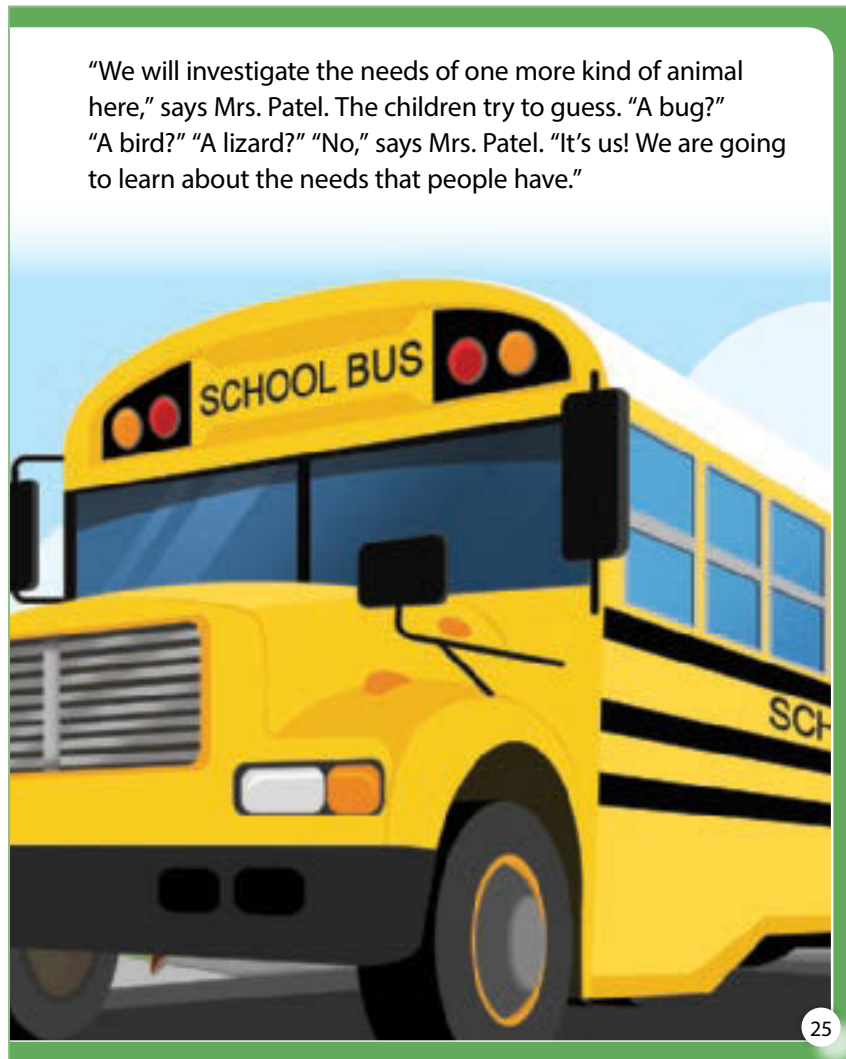
INFERENTIAL—Explain that every community has a building where its leaders meet. What might be different about how these city halls look?

- » Sample: Small towns might have smaller buildings. Some city halls may be made of different materials.

Invite students to share what they know about their own city/town hall.

Page 25

Ask students to continue to look at the picture on pages 24–25 as you read aloud.



LITERAL—What kind of animal will Mrs. Patel's class learn about at city hall?

- » people

INFERENTIAL—Why might Mrs. Patel's students be surprised at her answer?

- » They might not know that people are animals, too.

To reinforce the concept that people are animals, have students name as many kinds of animals as they can. At the end of their list add, "and people."

Another word for “people” is “humans.” Humans are a kind of animal. Humans need water, food, air, and shelter to live and grow. Workers at City Hall help meet human needs in a city.



26

NGSS Elements



SEP 8

DCI ESS3.A

CORE VOCABULARY—Remind students that **human** is another word for *person* and that humans are animals.

INFERENTIAL—What need are the people in the picture meeting?

» their need for food (and water)

If students have not mentioned meeting the need for air, point it out now. Explain that humans take in air they need to use through their noses and mouths when they breathe. Explain that the Greenville City Hall likely also has an office that makes sure the air is healthy to breathe.

Provide students with evidence that air exists by using a wand and soap bubble solution to make bubbles to float in the air around the students. Point out that the bubbles are filled with air, much like they would blow air into a balloon. (See **Know the Science.**)

INFERENTIAL—Where in a city can people have a picnic outdoors?

» They can picnic in their backyards or in a park.

Page 27

Ask students to look at the pictures on page 27 as you read aloud.

First, the children visit the water office.

Water comes from nearby lakes.



Water moves through pipes to the city.

The city makes sure the water is clean.



27

Know the Science

TEACHER DEVELOPMENT

What Is Air Made Of? Air is a mixture of gases and small solid particles such as dust and plant pollen. Nitrogen gas makes up 78 percent of air, and oxygen makes up 21 percent of air. The remaining one percent includes argon, carbon dioxide, neon, and hydrogen. In addition to these naturally occurring components, air also contains substances that are also released by human activities. Some of these—for example, carbon monoxide, lead, ozone, sulfur dioxide, and particles—are pollutants that directly affect human health. Others—for example, carbon dioxide and methane—are greenhouse gases that are an indirect threat to humans due to their ability to cause atmospheric warming.

LITERAL—What are the people at the water office in city hall in charge of?

- » making sure people drink clean water

INFERENTIAL—How does water get into the lake?

- » It gets in when rain falls over the lake.

Differentiation

CHALLENGE—Some students may want to know where the water that rains on the lake comes from and why rain never runs out. Place a shallow pan of water on a heat source, and tell students to check it once in a while. Eventually, despite the fact that no one has removed any water, the water level will be noticeably reduced in the pan. Explain that water moves into the air, where it is invisible. Water in the air eventually comes back to the land as rain. Point out that this is a cycle that takes place over and over again. (See **Know the Standards.**)

INFERENTIAL—What do water pipes connect?

- » They connect the lake to all the places you can get water in the city.

NGSS Elements



DCI ESS3.A
SEP 8

- Explain to students that the lake water may have materials in it that are not good to drink, such as soil or tiny living things that can make people sick. The water office makes sure that these materials are removed as the water passes through the pipes on the way to the city.

EVALUATIVE—How important are the people who work in the water office to everyone in the city?

- » They are very important because without clean water, the people cannot stay alive.

- If necessary, remind students that humans are living things and depend on water, food, air, and shelter for their survival.
- Give each student a copy of How Do People Meet Their Needs? (AP 3.3.1). Explain that the graphic organizer will help them picture how the city meets the needs of people who live there. Have students find the box labeled “Water” and write or draw something they learned about how people in the city get or use water.

Activity Page



AP 3.3.1

Know the Standards

TEACHER DEVELOPMENT

DCI ESS2.C The Roles of Water in Earth’s Surface Processes: At the Kindergarten level, it is only necessary to teach that water exists as a solid or liquid (*ESS2.C: The Roles of Water in Earth’s Surface Processes*). In Grade 5, students will explore how the hydrosphere and atmosphere interact (*ESS2.A: Earth Materials and Systems*) and that matter is made of very tiny particles. These concepts are a formal prerequisite knowledge to understanding the water cycle.

Next, the children visit the food office. In a city, humans get food at markets. The food comes from farms. The food office makes sure the food in markets is safe to eat.



28

LITERAL—What foods can people buy at this market?

» They can buy vegetables and fruits.

INFERENTIAL—What other plant foods do you think are at the market?

» Samples: beans, lettuce, broccoli, watermelon, zucchini, tomatoes

INFERENTIAL—How do the plant foods get from the farm where they grow to the city markets?

» People put them on trucks, trains, or planes, and they are delivered to the city.

Remind students that they learned by reading Chapter 2 that while some people in the city grow their own vegetables and fruits in community gardens, most people rely on shopping at markets.

Ask students, In what other places in the city, other than markets, can people get food to eat?

» restaurants, food trucks, food pantries

NGSS Elements



SEP 8

DCI ESS3.A

CCC 4

EVALUATIVE—How important are the people who work in the food office to everyone in the city?

» They are very important because without safe food, the people cannot stay alive.

Page 29

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

Humans eat foods from plants and other animals. Tomatoes, rice, and beans are parts of plants. Chili peppers are parts of plants, too.



Cheese, eggs, and fish come from animals. Milk also comes from animals.



29

LITERAL—What foods from plants do you see in the top picture?

» beans, rice, dried peppers

INFERENTIAL—What kind of animal do the milk, butter, and cheese come from?

» from cows

Point out that foods from animals come from farms or come from nature. For example, fish can come from lakes, rivers, the ocean, or fish farms.

On How Do People Meet Their Needs? (AP 3.3.1), have students write or draw something they learned about how people meet their need for food in the city.

NGSS Elements



SEP 2

SEP 8

DCI ESS3.A

CCC 4

Humans build shelters using things in nature. Many homes are made from wood. Wood comes from trees that grow in forests. Some schools are made of brick. Bricks are made from bits of rock and clay. A city's building office makes sure shelters for humans are safe.



30

CORE VOCABULARY—Remind students that **nature** is places, wild plants, and wild animals that are not affected by humans.

CORE VOCABULARY—Explain that **forests** are areas in nature that have many trees and plants.

LITERAL—What happen to the wood after the trees are cut down?

- » The round trees are cut into square or rectangular shapes that can be hammered together.

INFERENTIAL—If someone in the city wants to build a wood home, how would they get the wood?

- » Trucks or trains have to carry the wood from the forests to the city.

LITERAL—Where do the rocks and clay come from that people make into bricks?

- » They come from the ground.

NGSS Elements



SEP 2
DCI ESS3.A
CCC 4

INFERENTIAL—If someone in the city wants to build a brick home, how would they get the bricks?

- » Trucks or trains have to carry the bricks from the place they are made to the city.

On How Do People Meet Their Needs? (AP 3.3.1), have students write or draw something they learned about how people meet their need for shelter.

Page 31

Ask students to look at the picture on page 31 as you read aloud.

Mrs. Patel's students are almost ready to present their ideas about what to do with the old school property. She asks, "How could we also make the old school lot a nice place for people to visit?" People enjoy places to be in nature. The class thinks of ways to welcome humans. Finally, they talk to the city's parks office.



31

LITERAL—What is the job of the parks office?

- » to make sure the parks are a nice place for people to be in nature
- Ask students to share their ideas and experiences about enjoying nature. Remind students that they may experience nature even when they walk along a sidewalk in their community.

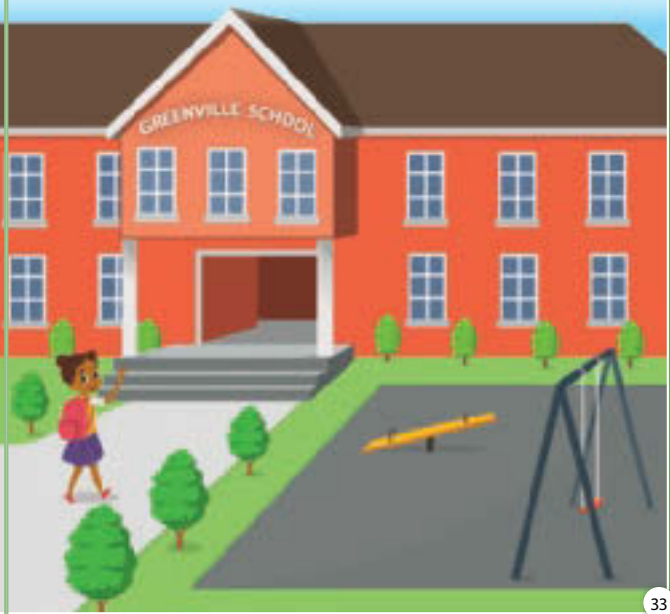
Directly summarize for students the essential understanding they should take away from the story—that living things need certain things, and they can only live in places that have those things.

Mrs. Patel's students have learned a lot about what plants, animals, and people need. They have a lot of information to share. They now know that making the old school lot into a nature area will take some work.



32

If animals are to live there, the natural area must have new plants so that animals can get what they need. The plants must be kinds that can get enough of the water and light they need to grow in the place where the school used to be. Mrs. Patel's students are ready to go to the city leaders and present their idea. They will be able to share how to make it happen!



33

3. Check for understanding.

Formative Assessment

NGSS Elements



SEP 2

SEP 6

DCI ESS3.A

CCC 4

Call attention to **Today's Question—How do humans meet their needs?** Remind students that some people live on farms and others live in cities, and **discuss each question:**

- Where did Mrs. Patel take her class to learn about the needs of people?
 - » to City Hall
- What are the needs of all humans?
 - » food, water, air, and shelter
- How do people in the city get water, food, and building materials?
 - » These things are brought into the city.

Differentiation

EXTEND—Choose a children's picture book about enjoying nature for your students to read aloud and to one another. *Hiking Day*, written by Anne Rockwell with illustrations by Lizzy Rockwell (Aladdin, 2020), tells the story of a family getting ready, traveling to a nature preserve, and following walking trails to climb a hill. Have students reflect on the story and explain how the family enjoyed nature.

Monitor Progress

Review student responses to How Do People Meet Their Needs? (AP 3.3.1) to determine student understanding of the following concepts:

- Humans need food, water, air, and shelter to live and grow.
- A city is part of a system that includes farms and nature.
- Graphic organizers can be used to model relationships between humans in cities and nature.
- The graphic organizer on Activity Page 3.3.1 complements the ones students completed in Lessons 1 and 2, modeling the needs of plants and animals (*Developing and Using Models: Use a model to represent relationships in the natural world*). In the next lesson segment, students will complete the model of how to change a vacant lot into a place for wildlife and humans (K-ESS3-1).
- Call attention to the question board. Revisit the questions recorded there so far, and ask students how reading the chapter might answer or relate to any of those questions.

Tie to the Anchoring Phenomenon

Through video, reading, discussion, and concept mapping, students built an understanding needed to address the needs of humans in an area in their own community.

LESSON 3.4

Lesson 3 Roundup: Modeling a System for Living Things

Big Question: What must an area have so that living things can live there?

Lesson Guiding Question: What do humans need and use from their environments?

Today's Question: What do humans need and use from their environments?

Tie to the Anchoring Phenomenon: Through mapping, students finalize their model for inviting wildlife and humans to an area in the community and then practice presenting their model to community leaders.

AT A GLANCE

Learning Objectives

- ✓ Use a map to model changes to a vacant lot.
- ✓ Ask questions about how to meet human needs outdoors.
- ✓ Represent ways to meet human needs on the map.
- ✓ Construct explanations about how the plan will work as a system to support wildlife and human needs.

Instructional Activities (2 Days)

- class discussion
- student investigation
- student presentation

NGSS References

Performance Expectation: K-ESS3-1

Disciplinary Core Ideas: ESS3.A Natural Resources; LS1.C Organization for Matter and Energy Flow in Organisms

Science and Engineering Practices: 1 Asking Questions; 2 Developing and Using Models; 7 Engaging in Argument from Evidence; 8 Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts: 1 Patterns; 4 Systems and System Models

Students engage in argument to make decisions about how to meet human needs or wants in a wildlife 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

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.

map nature

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.

model

Instructional Resources

Activity Pages



AP 1.5.1
AP 3.4.1
AP 3.4.2

Activity Pages

Unit Project Scoring Rubric
(AP 1.5.1)
Make a Welcome Sign
(AP 3.4.1)
Pictures for the Welcome Sign
(AP 3.4.2)

Materials and Equipment

- map that the class began in Lesson 1.5 (1 per class)
- scissors (1 per group)
- glue or paste (1 per group)
- reusable putty adhesive (1 per class)
- question board

THE CORE LESSON 3.4

1. Day 1: Focus student attention on Today's Question.

NGSS Elements



SEP 2
DCI ESS3.A

What do humans need and use from their environments?

- Remind students that they have been planning how to change an area in your community into a place for plants and animals.
- Get out the map students last worked on in Lesson 2.5, and review the information they have added so far. Explain that today they will work on planning how humans can visit the former lot to enjoy being in nature.

- **Ask students,** How do people enjoy nature? If students are not sure, ask about things people do when they go to a park, the beach, or a forest. (See **Know the Science.**)
 - » Samples: hiking, walking, bird watching, picnicking, swimming

Tie to the Anchoring Phenomenon

Students will use a model to answer Today's Question about what humans need and use from their environments.

2. Guide decision-making.

Activity Pages



AP 3.4.1

AP 3.4.2

NGSS Elements



SEP 7

DCI ESS3.A

DCI LS1.C

CCC 4

- Put students into small discussion groups of three or four students. Give each group a copy of Make a Welcome Sign (AP 3.4.1) and Pictures for the Welcome Sign (AP 3.4.2).

SUPPORT—If you have some readers in your class, put one in each discussion group. While the icons on Activity Page 3.4.2 should be self-explanatory, reading the labels will help students keep track of what each one represents.
- Explain that the welcome sign will be at the entrance to the place the class is planning for wildlife. Point out that the top half of the sign will show people pictures of things they can do there and that the lower half will show things they will be forbidden to do there.
- Tell students they must decide in their groups how to balance the needs of plants and animals with the needs and wants of humans. Then students will place each picture where they think it belongs on the sign.
- When all groups have completed their signs, ask one representative from each group to show their sign and explain how they made their decisions.

Know the Science

TEACHER DEVELOPMENT

What Evidence Is There That People Need to Experience Nature? With more and more humans living in urban settings and more and more children spending their free time in front of screens, some scientists are investigating the importance of access to nature for human health. By *health*, they mean the physical, social, and mental well-being of people. Research indicates that all three aspects of health are affected by access to, or lack of access to, nature. For these reasons, several organizations argue that access to the outdoors and nature is a basic human right.

3. Finalize the map to show human uses.

NGSS Elements



SEP 2

- Poll the small groups to reach a class consensus about which human activities will be allowed in their area. Represent these ideas on the large map using pictures with labels.
- Brainstorm names for the lot that will become a place for wildlife. Have students make arguments for the names that best represent what the lot will become. Have the class vote on the best name, and add that name to the map.

1. Day 2: Practice presenting to community leaders.

NGSS Elements



3D Learning

- Remind students that it is up to city leaders to decide how to use an area such as where a building was torn down.
- Have students sit in their small groups and gather around the large map. Explain that groups will take turns practicing a talk to city leaders.
- Demonstrate for students how, when someone makes a presentation, they should speak loudly and clearly and look at the people they are talking to.
- Display the map where all can see, and **have each group confer and then present answers to the following questions, using information on the map to support their claims:**
 - How can this lot be a place for plants to live?
 - How can this lot be a place for animals to visit?
 - How can the people of our community enjoy the plants and animals in this lot?

Differentiation

Language Arts
Connection

CHALLENGE—To inspire students to think about how kids can transform a vacant lot into a community garden, read aloud *City Green*, written and illustrated by DyAnne DiSalvo-Ryan (HarperCollins, 1994). The story has plenty of details about the steps that community members take, including getting permission from City Hall to develop the lot. As you read, invite students to discuss how the illustrations support and clarify the story. (See **Know the Standards.**)

NGSS Elements



SEP 7

- Explain that presenters should be ready to answer follow-up questions and give evidence for their claims. **As each group presents, ask at least one follow-up question, such as the following:**
 - How do you know that these plants can live in our community?
 - What makes you think humans will visit the lot?
 - What did you decide not to allow people to do in the lot?

Know the Standards

TEACHER DEVELOPMENT

Language Arts Connection: Students develop an understanding of how illustrations support the story in which the illustrations appear (ELA RL.K.7).

SUPPORT—Support English language learners by allowing students enough time to practice speaking within their small groups. Then, when you ask the guiding questions to the entire class, provide sentence starters for students to use when they speak.

2. Check for understanding.

NGSS Elements



SEP 2

CCC 4

DCI ESS3.A

DCI LS1.C

- Ask students to think about their work over the last two days. **Then ask Today's Question—What do humans need and use from their environments?** Have students reflect on any human needs they planned to meet in their lot, while making sure that plants and animals will not be disturbed.

EXTEND—Enlist the involvement of an art teacher to transform the two-dimensional model (the map) into a three-dimensional model. Use a sand table or large cardboard box top as the base. Have students represent each part of their map by using arts and crafts materials. Talk to students about scale—which parts are smaller or larger than others—as they make their model.

- Have students reflect on the entire lesson and return to the **Lesson 3 Guiding Question—What do humans need and use from their environments?**
 - » Humans need water, food, air, and shelter. They use materials from nature to meet their needs.
- Review student work on Make a Welcome Sign (AP 3.4.1) to determine student understanding of the following concepts:
 - Humans enjoy being in nature.
 - Some human needs and wants should be met in a wildlife area, but not all.
- Call attention to the question board. Review the questions that have been answered over the course of the unit, and identify those that remain unanswered. Discuss steps toward researching answers to the remaining questions.

Monitor Progress

Activity Page



AP 1.5.1

Summative Assessment

Use the Unit Project Scoring Rubric (AP 1.5.1) to evaluate student performance of the scoring elements marked for Lesson 3. Then look over the entire rubric to evaluate student performance in the unit.

Activity Page 1.5.1 is a guide to determining students' three-dimensional learning for two Performance Expectations. K-LS1-1 is addressed in the third and fifth scoring elements, and K-ESS3-1 is addressed in the second, fourth, and fifth elements. In addition, the last three scoring elements address language arts speaking and listening standards.

Tie to the Anchoring Phenomenon

Through engaging in argument, model making, and practicing public speaking, students make and support claims about how a vacant lot in their own community can become an environment for wildlife and enjoyed by humans.

Science in Action: Meeting an Ecologist

Tie to the Anchoring Phenomenon: Students join Mrs. Patel's class as they meet an ecologist and learn about what an ecologist does.

AT A GLANCE

Learning Objectives

- ✓ Read about what an ecologist does.
- ✓ Look at a sample of living things.

Instructional Activities (2 Days)

- teacher Read Aloud
- student investigation

NGSS References

Understandings About the Nature of Science: Scientific Investigations Use a Variety of Methods; Scientific Knowledge Is Based on Empirical Evidence; Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena; Science Is a Human Endeavor

Crosscutting Concept: 1 Patterns

Students read about ecologists and the work they do. Students then do their own survey of "organisms" in an area as an ecologist would.

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

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.

banning	chemical	count	data
ecologist	evidence	lawmaker	protect
sample	survive	table	

Instructional Resources

Student Book



Ch. 5

Activity Page



AP US.1

Student Book, Chapter 5

“Science in Action: Meeting an Ecologist”

Activity Page

Counting Samples (AP US.1)

Materials and Equipment

- tray (1 per group)
- combination of dirt and soil (to scatter around each tray)
- assorted animal figurines (5–6 per group)
- assorted plant figurines (2–3 per group)

Advance Preparation

Set up stations around the room for each group to go to for the activity. Each station should have the following:

- a tray filled with dirt/soil
- animal/plant figurines scattered around the tray

Distribute the plant and animal figurines to each tray such that each team has at least one pair of duplicate animals, such as two birds, two horses, or two dogs.

Fill out the first column in Activity Page US.1 to list the types of plant and animal figurines that are in the trays. Add or delete rows as needed. Then print Activity Page US.1, and make enough copies for each student.

1. Day 1: Introduce the topic.

Remind students that they read about Mrs. Patel’s class, which planned a new natural home for plants and animals. Explain that today students will read more about what Mrs. Patel’s class learns as they meet an ecologist.

2. Read together: “Science in Action: Meeting an Ecologist.”

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.

Ask students to turn to page 34 of the Student Book and look at the images as you read aloud. Remind them that the title of this chapter is “Science in Action: Meeting an Ecologist,” and tell them to pay special attention to the different things you can see in nature as you read.





CHAPTER
5

Science in Action

Meeting an Ecologist

Mrs. Patel is proud of her class. The students worked hard on their presentation for the Greenville City Council. They planned a new natural home for plants and animals.

Mrs. Patel’s students have learned a lot about what plants and animals need to survive. The students know that plants and animals get what they need from the places where they live.

34

NGSS Elements



CCC 1

Ask students to look at the pictures on page 34. Explain that the pictures show several living things filling a need that they have.

SUPPORT—Review with students what animals and plants need to survive, such as food, water, space, and shelter.

SUPPORT—Refer students to the pictures on the page. Talk about what each animal is doing and how that fills a need that the animals have.

LITERAL—Each animal is doing something different. But what do all of these actions have in common? (See **Know the Standards 1.**)

» They are things the animals do to survive.

Remind students that to **survive** means to stay alive.

Page 35

Ask students to look at the picture on page 35. Tell students that the word *ecology* comes from the Greek *oikos*, meaning “house,” and the Greek *-logia*, meaning “the study of.” Thus ecology is the study of the home or the study of where things live.

How do people find out about what living things need? Mrs. Patel knows someone who can help explain. She invites her friend Mr. Hissong to visit the class at school.

“I am an ecologist,” Mr. Hissong says. “An ecologist is a type of scientist. We ecologists study living things. We learn how living things relate to each other and to the places where they live.”



Know the Standards

TEACHER DEVELOPMENT

1. CCC 1 Patterns: Making observations about animals’ behaviors can lead scientists to understand that animals do things—such as eat, build homes, etc.—in order to survive.

INFERENTIAL—What do you think the man is doing?

» He is looking at plants. He is studying things. He is writing down notes.

Explain that an **ecologist** is someone who studies living things. This is a type of scientist.

LITERAL—What do ecologists learn?

» They learn how living things relate to each other and the places where they live.

INFERENTIAL—If an ecologist studies living things, then what kinds of things do you think they study?

» plants and animals

Page 36

NGSS Elements



Interdependence
of Science,
Engineering, and
Technology

Ask students to look at the three pictures on page 36. Explain that the first picture shows someone writing down notes or drawing something in a notebook. In the second picture, people are making an outline of a small area to study.

Mr. Hissong explains that one important thing he does is collect data. He tells the class that he counts the types of living things in an area. He organizes groups of volunteers to help.

It isn't possible to count every living thing in a whole forest. But the volunteers list and count what they find in a small space. The small space is a sample of the bigger area. Ecologists can use samples to form ideas about the bigger area.



36

Explain that **data** are things that are true, like facts and information.

LITERAL—What does Mr. Hissong do to collect data?

» He counts the types of living things in an area.

SUPPORT—Talk with students about what it means to count the types of living things in an area. Explain that a forest might have a lot of living things, like a lot of plants, a lot of insects, a lot of birds, etc. Demonstrate for students how an ecologist like Mr. Hissong would count each living thing. For instance, if he sees a ladybug, he would count it as one thing. If he sees a spider, he would count it as a second thing. If he sees a group of birds, he would count it as a third type of living thing. (See **Know the Science.**)

Explain that a **sample** is a small part of something. Give students an example that they can relate to. For instance, if you sample a potato that someone baked, it means you are only taking a small bite instead of eating the whole potato!

LITERAL—Why do ecologists use samples of small areas?

» to form ideas about bigger areas

Know the Science

TEACHER DEVELOPMENT

Counting, Ecological Surveys, and the Quadrat Method: Scientists frequently use the quadrat method to count organisms when doing surveys. In this method, a square frame of about two to three feet is randomly placed over an area within the larger area. The scientist then counts the organisms they are surveying for, such as types of plants, insects, or small animals. They can complete the tallies and then calculate the number of organisms in the larger area.

Ask students to look at the table on page 37. Talk about what students notice in the table.

Ecologists sometimes count the living things in one area at different times. This lets them see how the numbers and types of living things are changing. For example, if a place once had a lot of rabbits but later had no rabbits, something must have changed. Scientists can investigate further to find out what caused the change.

Carson Woods Animal Survey Date: June, 2020		Carson Woods Animal Survey Date: June, 2022	
Rabbits		Rabbits	
Squirrels		Squirrels	
Robins		Robins	
Woodpeckers		Woodpeckers	
Cardinals		Cardinals	
Chipmunks		Chipmunks	

37

NGSS Elements



Scientific
Investigations
Use a Variety of
Methods

Explain that a **table** is something people can use to organize data. (See **Know the Standards 2.**)

INFERENTIAL—Look closely at the table. The date on the left is from 2020. The date on the right is for 2022. These are different years. What do you think the table on the page is used for?

- » It is used for counting the number of animals and then comparing them between the two years.

Know the Standards

TEACHER DEVELOPMENT

2. Scientific Investigations Use a Variety of Methods: There are different ways for scientists to study nature. Ecologists often count the number of living things in an area at different times to compare the numbers and see whether things have changed, such as if there has been an increase or decrease in living things. This helps them answer questions about how living things are affected by various factors in their environment.

LITERAL—Why do ecologists count the living things in one area at different times?

» to see if any of the numbers changed

Page 38

Ask students to look at the picture on page 38. Explain that the picture shows a sign for a wildlife refuge. Tell students that a wildlife refuge is a safe place for animals and plants. It's a place where they cannot be harmed, hunted, or moved by human activity.

Places can change. When a place changes, the plants and animals that live there might not be able to get what they need anymore. That makes it important to protect the places from unwanted changes.

Mr. Hissong tells the students that he became an ecologist to learn about wildlife areas so he can help protect them. He learned this was important because of another scientist named Rachel Carson.

A wildlife area in Maine was named after Rachel Carson.



LITERAL—What can happen if places change?

» Animals and plants might not be able to get what they need.

Explain that to **protect** something means to keep it safe. Plants, animals, and areas in the environment can be protected.

LITERAL—Why did Mr. Hissong want to become an ecologist?

» so he can help protect things

Ask students to look at the two pictures on page 39. Explain that they show Dr. Rachel Carson.

Rachel Carson

Rachel Carson was a scientist who studied how certain chemicals affect plants and animals. She observed certain areas for a long time. She collected data about the living things. She wrote a book called *Silent Spring*. She wondered, what would spring be like if no birds were singing? Rachel Carson's data provided evidence that the chemicals were harmful to living things. She explained the evidence to lawmakers. Because of Rachel Carson's work, some dangerous chemicals were banned. Living things and their environments were protected from future harm.



39

NGSS Elements



Science Is a
Human Endeavor
Science
Models, Laws,
Mechanisms,
and Theories
Explain Natural
Phenomena

Explain that a **chemical** is a substance that occurs in nature or is made by humans. For instance, chemicals can be used for cleaning your house, washing your hair, or getting rid of bugs in the garden. Some chemicals are not harmful, but others can be dangerous.

LITERAL—What did Rachel Carson discover? (See **Know the Standards 3.**)

- » She discovered that certain chemicals used by humans were harmful to living things.

Know the Standards

TEACHER DEVELOPMENT

3. Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena: Dr. Carson is an example of a scientist who studied cause-and-effect relationships in nature to discover the effect that chemicals were having on plants and animals in an area.

SUPPORT—Explain that in this case “Dr.” does not refer to the person who takes care of you when you are sick. “Doctor” is a title that goes in front of a person’s name when they have studied in college a long enough time to become an expert at what they do.

Explain that **evidence** is proof that you have.

Explain that a **lawmaker** is someone who makes laws that we follow.

Explain that **banning** something means to place limits on something.

INFERENTIAL—What do you think would have happened if Rachel Carson had not talked to the lawmakers about her findings?

» The living things would not have been protected.

1. Day 2: Facilitate the activity.

Activity Page



AP US.1

- Remind students that they previously read about how scientists called ecologists study living things in nature. Tell students that today they will work on an activity where they get to act like a scientist! (See **Know the Standards 4.**)
- Have students form small groups. Explain that each group will act as a team of ecologists studying a small sample of things.

NGSS Elements



Scientific
Knowledge
Is Based on
Empirical
Evidence

- Direct each team to go to their own station, where the materials are already set up. Go over the materials with students, and warn them to work carefully with the dirt so they do not spill it or get too dirty.
- Distribute Counting Samples (AP US.1) to each student. Explain that students will use the table on Activity Page US.1 to record the type of animal and plant they see. Students should check the box if they see the plant/animal there, and how many of each animal/plant they see, just like an ecologist does out in nature.
- Circulate around the room as students work on their activity. Prompt students to make sure they account for all of the animals and plants in their tray. Help students as needed with counting the living things and working with the table.

NGSS Elements



Differentiation

SUPPORT—Some students may find it difficult to use tables. Instead, limit the number of figurines in these students’ trays, and offer these students the opportunity to draw pictures of what animals and plants they see instead of using a table to record the data.

Know the Standards

TEACHER DEVELOPMENT

4. Scientific Knowledge Is Based on Empirical Evidence: Students get to make observations about a replica of the natural world, similar to how ecologists would study plants and animals in the wilderness. Here, students record the types of living things they see and how many of each type in an effort to practice collecting data that can later be used to look for patterns.

CHALLENGE—Challenge students to add up all the plants and all the animals they found in their tray.

EXTEND—Have students repeat this activity on a different day. On the second day, change the number of figurines present in the tray. Have students make a comparison between the data on the first day and the data on the second day. Ask them whether they see the same number of animals and plants on the second day.

2. Check for understanding.

Review the tables on Activity Page US.1. Check that students identified the living things correctly and counted each one accurately.

Teacher Resources

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Name _____

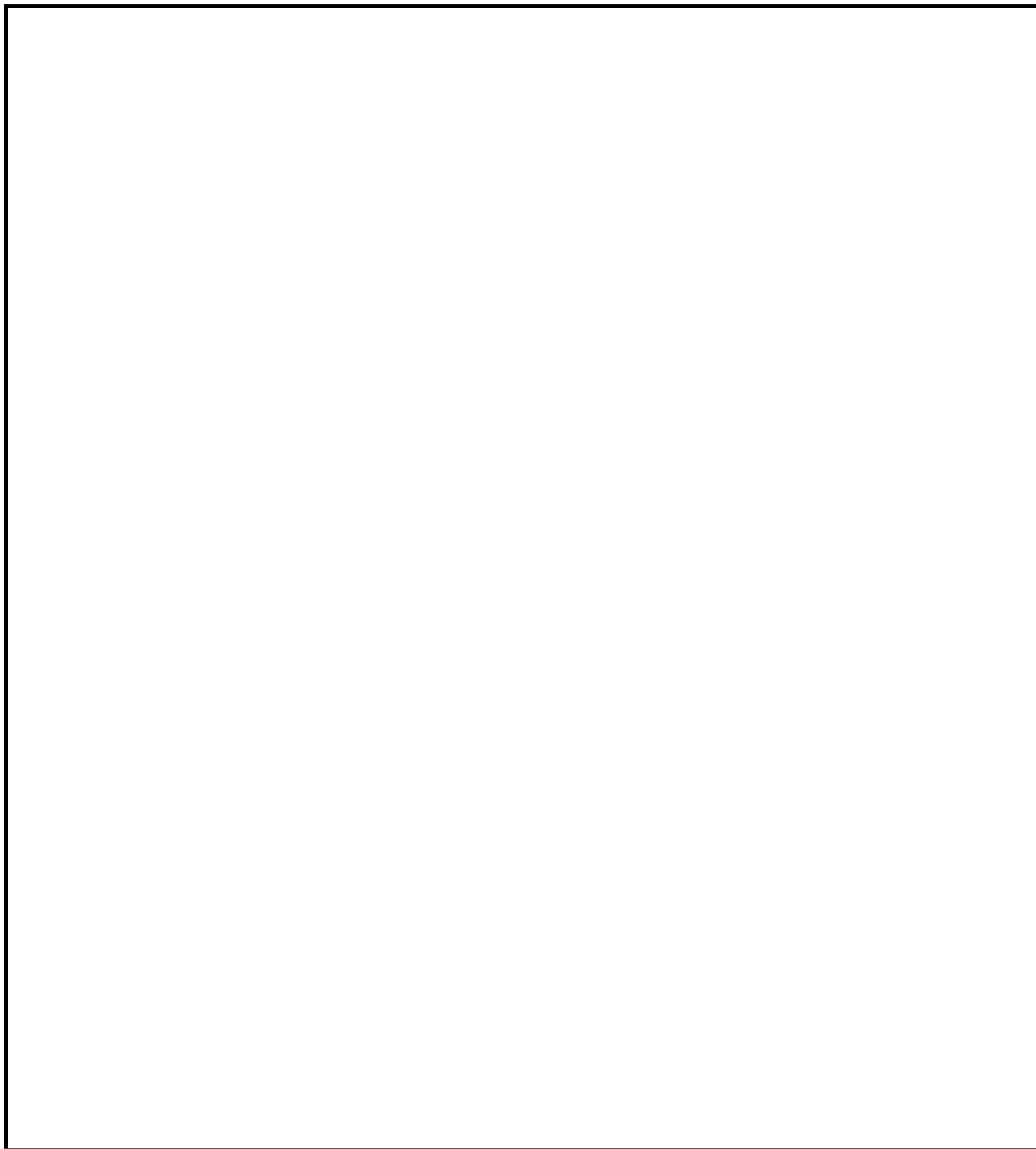
Date _____

Activity Page UO.1

Use with Unit Opener

A Place for Living Things

Draw your ideas for changing the empty lot into a place for living things.

A large, empty rectangular box with a black border, intended for a student to draw their ideas for changing an empty lot into a place for living things.

Name _____

Date _____

Activity Page 1.1.1

Use with Lesson 1.1

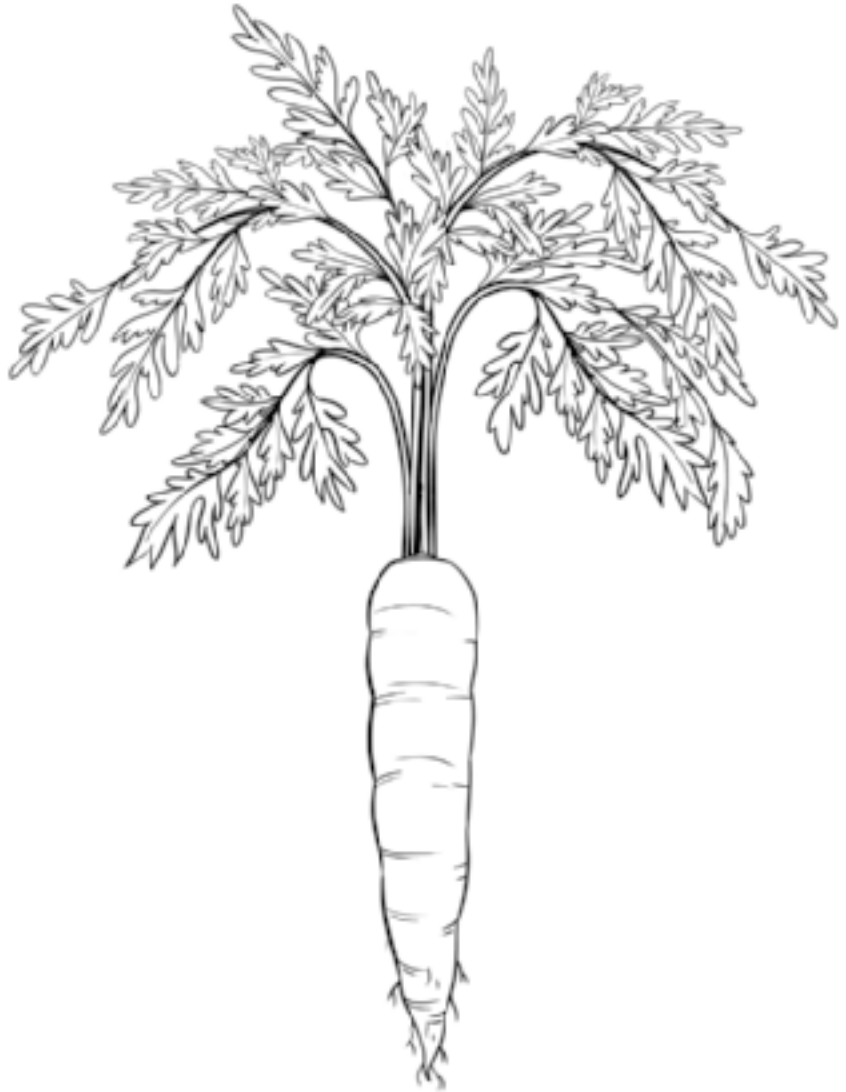
A Carrot Is a Plant

1. Color the parts of the carrot plant.
2. Draw lines from the labels to the correct parts.
3. Then place brown paper to show the ground. Tape the top of the brown paper.

root

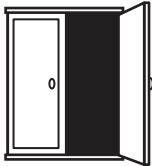
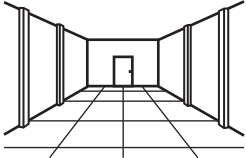


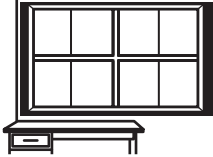

leaf

stem



Where Plants Live

Make a tally mark for each living plant you find. Count to find the totals.

Living Plants We Found Around Our School		
Place	Tallies	Total
Inside a closet 		
In a hallway without windows 		
Under a rock 		
Next to a sidewalk 		
Next to a window 		
Next to a playground 		

Name _____

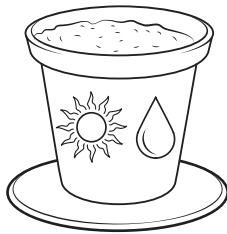
Date _____

Activity Page 1.2.1

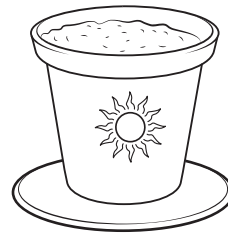
Use with Lesson 1.2

How Our Plants Look as We Begin

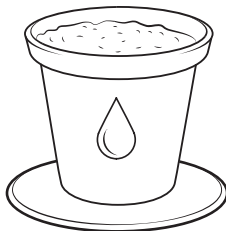
Draw how the plants look at the start of your investigation.



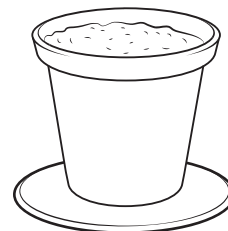
**Light and
water**



**Light but
no water**



**Water but
no light**



**No light and
no water**

Name _____

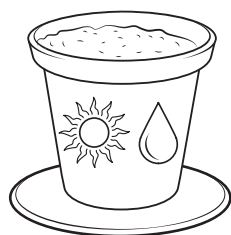
Date _____

Activity Page 1.2.2

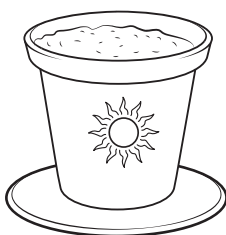
Use with Lesson 1.2

I Predict

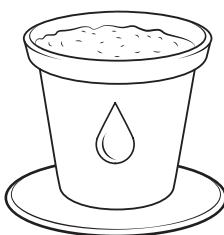
Draw how you think the plants in each pot will look at the end of your investigation.



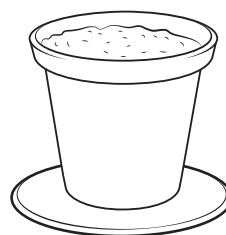
Light and
water



Light but
no water



Water but
no light



No light and
no water

Name _____

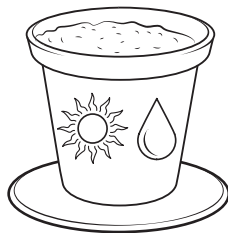
Date _____

Activity Page 1.2.3

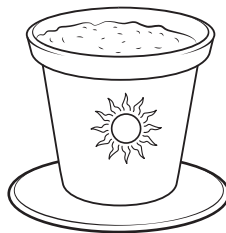
Use with Lesson 1.2

My Observations

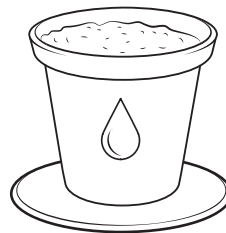
Draw how you think the plants in each pot will look at the end of your investigation.



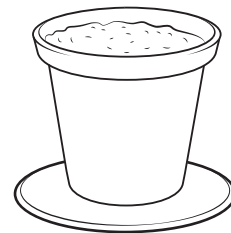
**Light and
water**



**Light but
no water**



**Water but
no light**

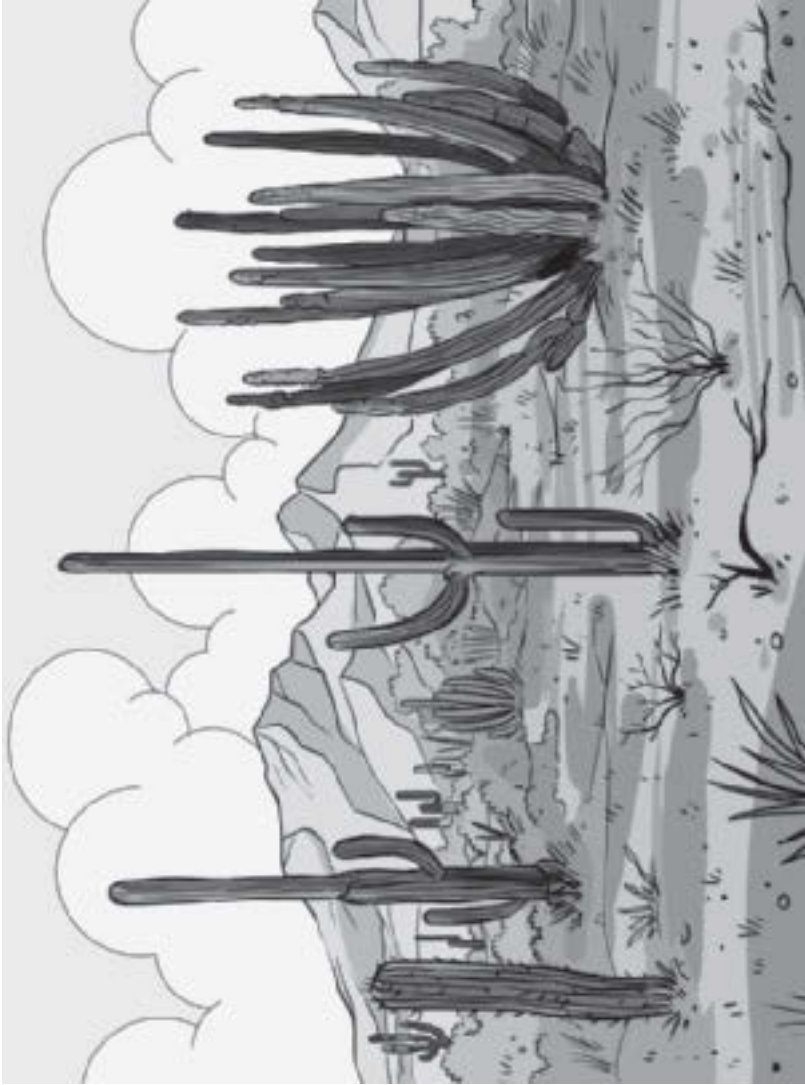


**No light and
no water**

My Trip: The Sonoran Desert

Paste this into your My Trip journal.

The Sonoran Desert



Name _____

Date _____

Activity Page 1.3.2

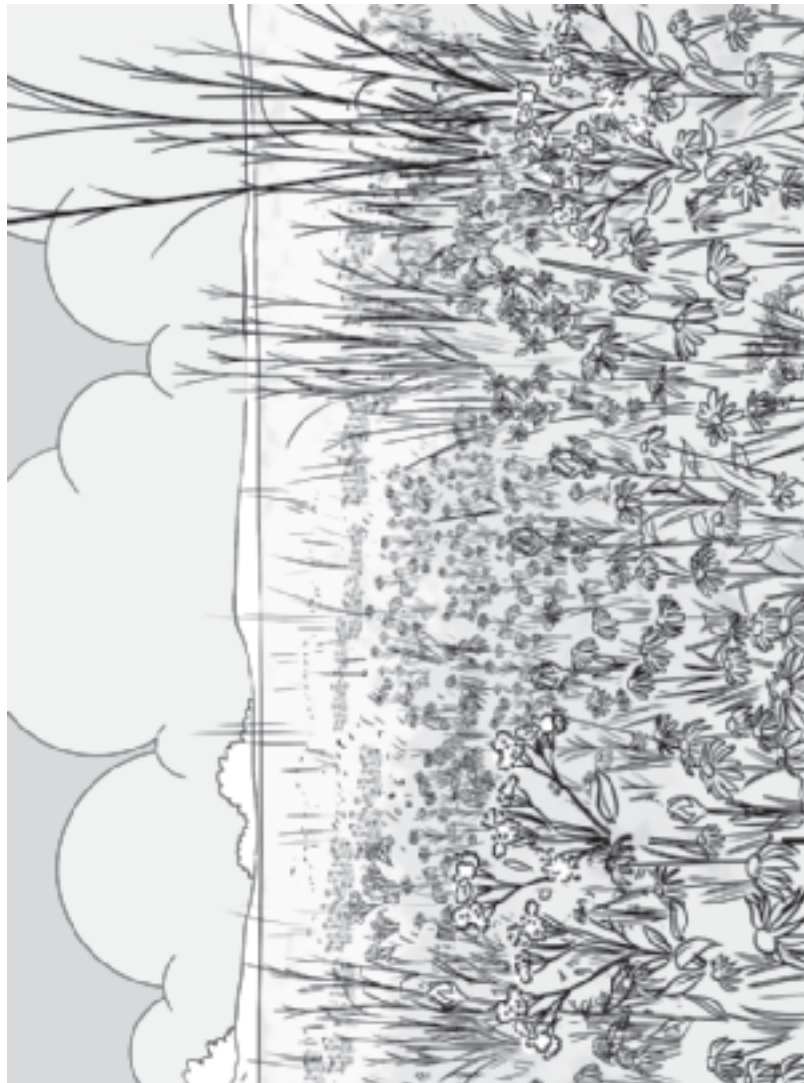
Use with Lesson 1.3

My Trip: The Tallgrass Prairie

Paste this into your My Trip journal.



The Tallgrass Prairie



Name _____

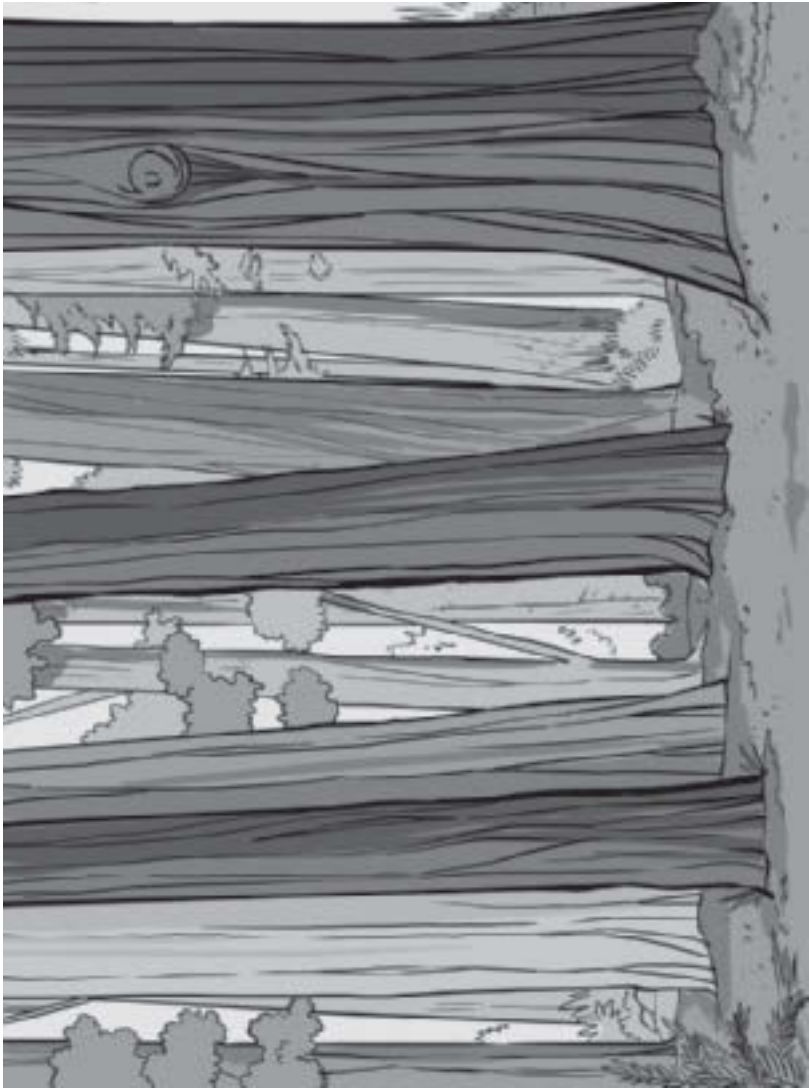
Date _____

My Trip: The Redwood Forest

Paste this into your My Trip journal.



The Redwood Forest



Name _____

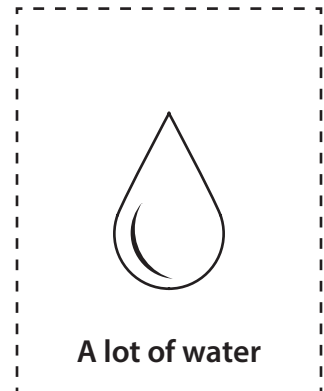
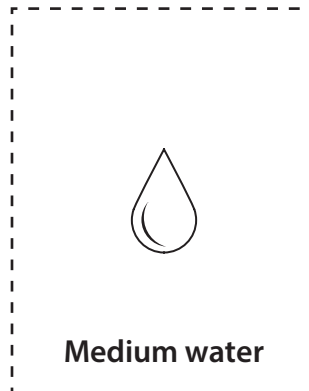
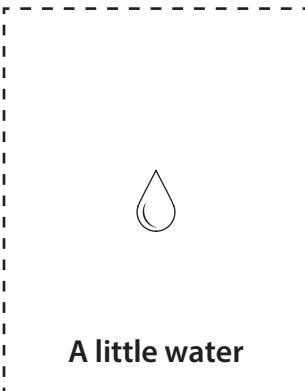
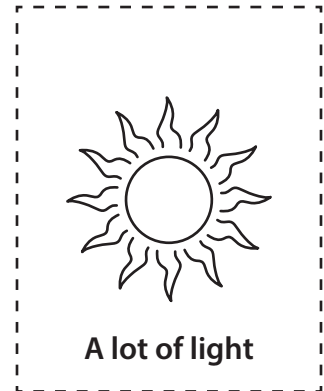
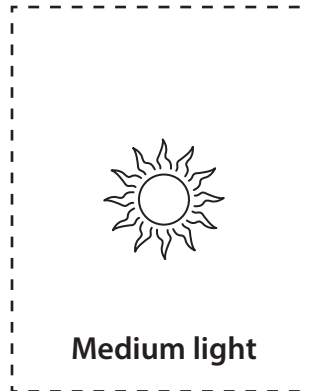
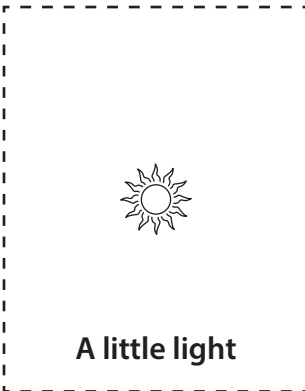
Date _____

Activity Page 1.3.4

Use with Lesson 1.3

My Trip: Cut and Paste

Talk with your class about the three places plants live. Cut and paste to show what plants there need.

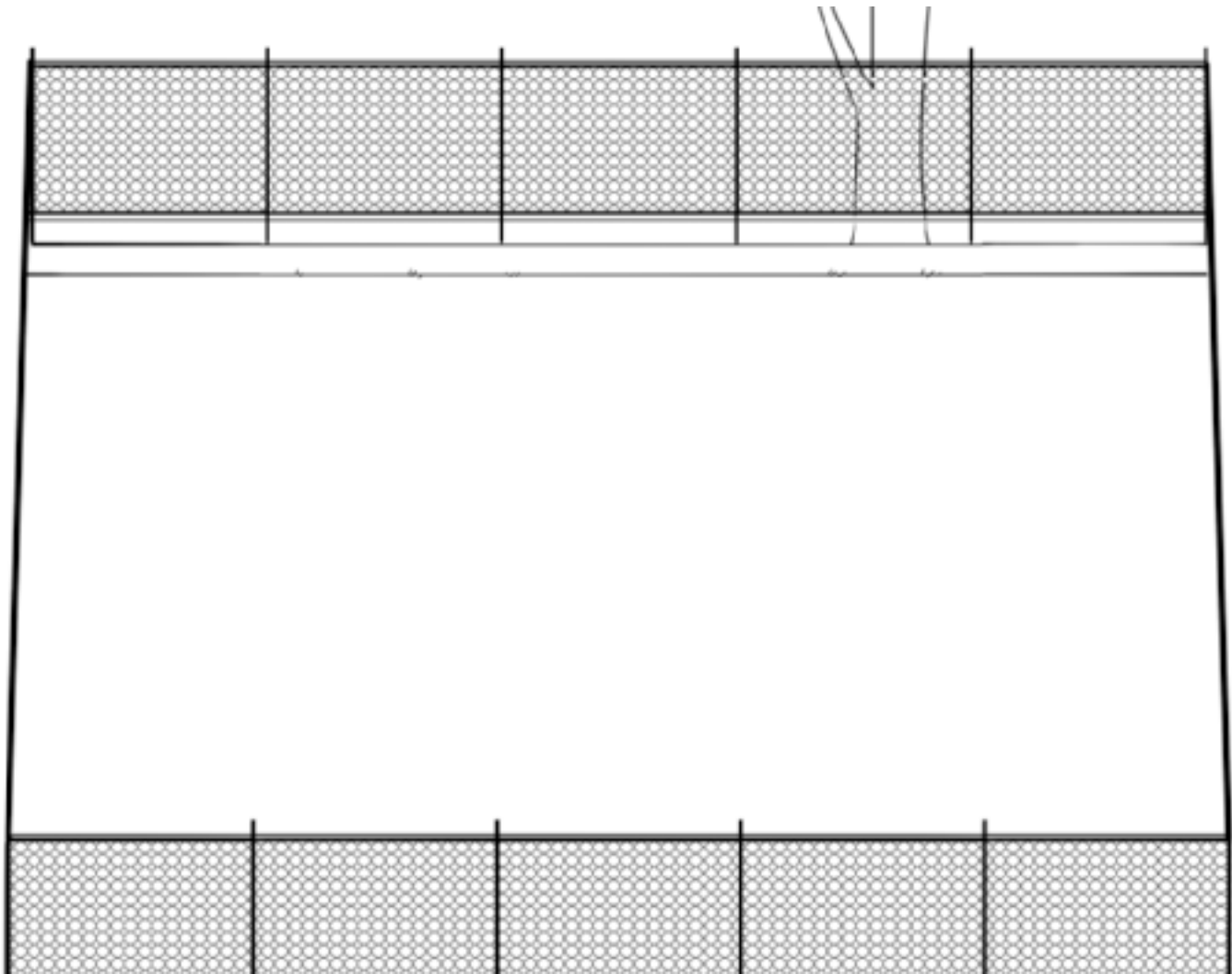


Name _____

Date _____

What Plants Are in a Community Garden?

Draw what you would plant inside a community garden. Show what the plants need.



Name _____

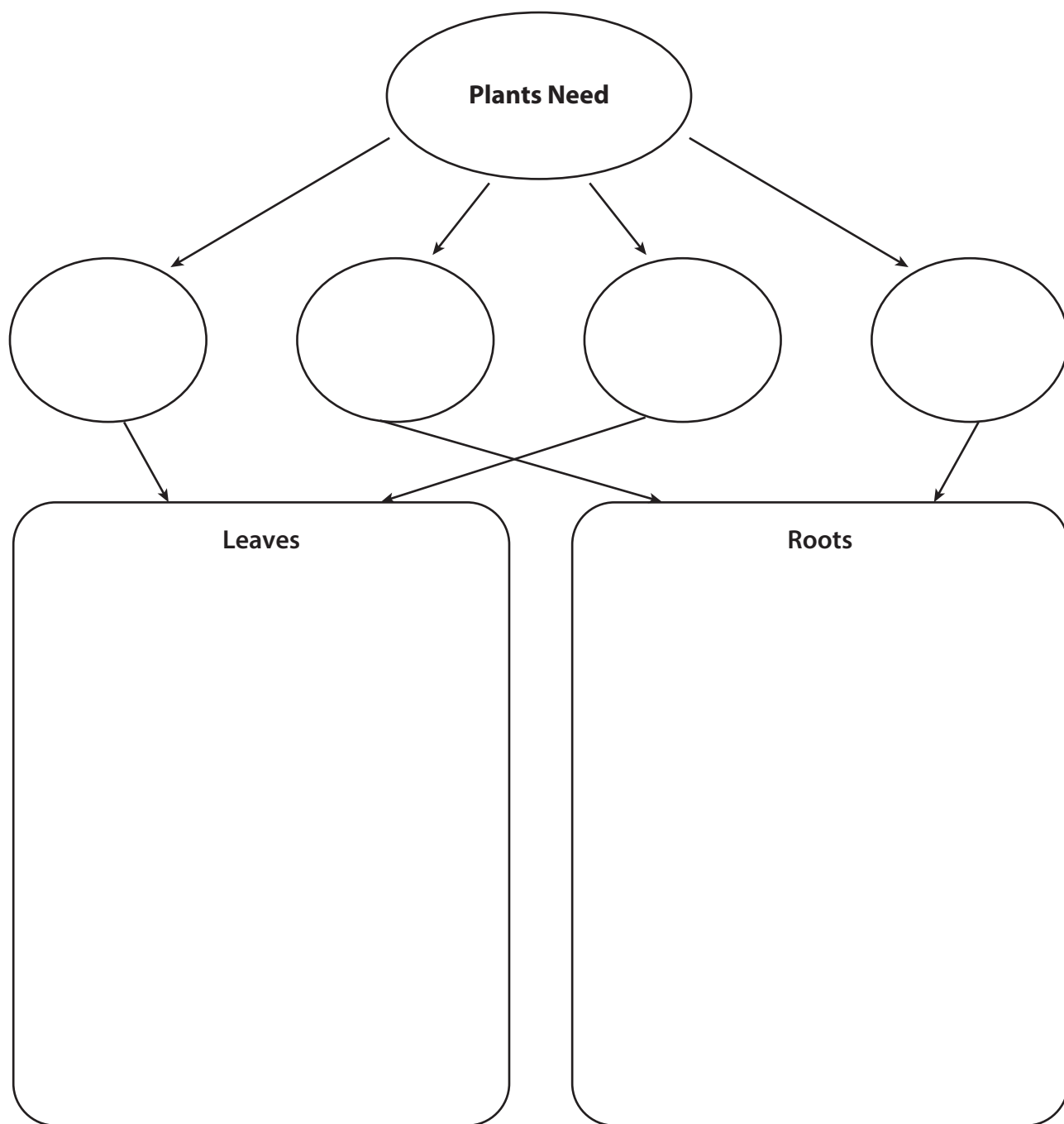
Date _____

Activity Page 1.4.2

Use with Lesson 1.4

What Plants Need

Write things plants need in the round bubbles. Draw plant parts in the boxes. Trace over the arrows that connect the plant parts to the plant needs.



Name _____

Date _____

Activity Page 1.5.1

Use with Lessons 1.5, 2.5, and 3.4

Unit Project Scoring Rubric

Scoring Element	Complete (3)	Partial (2)	Incomplete (1)
Explains the purpose of the class map (model). (L1)	Explains that the map shows a picture from above of the outline of the lot and will show a plan for how to use the lot for native wildlife.	Explains that the map is a picture of an empty lot or shows a plan for how to use the lot for native wildlife.	Cannot explain what the map shows or the purpose of making the map.
Uses the results of class research to identify three kinds of plants that can survive locally. (L1)	Names three kinds of native plants chosen for the lot and placed on the map.	Names one or two kinds of native plants chosen for the lot and placed on the map.	Cannot identify any native plants chosen for the lot and placed on the map.
Explains patterns in how all plants will meet their needs. (L1)	Explains that native plants will get light, water, and air from the lot where they will live.	Can name one or two resources plants need and explain they will come from the lot.	Cannot identify resources the native plants will get from the lot.
Uses the results of class research to identify three kinds of animals that can survive locally. (L2)	Names three kinds of native animals chosen for the lot and placed on the map.	Names one or two kinds of native animals chosen for the lot and placed on the map.	Cannot identify any native animals chosen for the lot and placed on the map.
Uses a map to explain patterns in how all animals will meet their needs. (L2)	Explains that native animals will get food, water, and air from the lot where they will live.	Can name one or two resources native animals need and explain they will come from the lot.	Cannot identify resources the native animals need or does not know they will come from the lot.
Uses a map to explain three human uses of the lot that will support wildlife while meeting human needs. (L3)	Describes at least three ways humans can use the lot and meet human needs.	Describes one or two ways humans can use the lot and meet human needs.	Cannot describe a way humans can use the lot and meet human needs.
Practices a presentation to city leaders by speaking loudly and clearly and looking at their audience. (L3)	Speaks loudly and clearly and looks at their audience.	Speaks loudly and clearly or looks at their audience.	Does not speak loudly and clearly; does not look at their audience.
Refers to the map when speaking. (L3)	Always	Sometimes	Never
Answers questions from the audience clearly. (L3)	Always	Sometimes	Never

Name _____

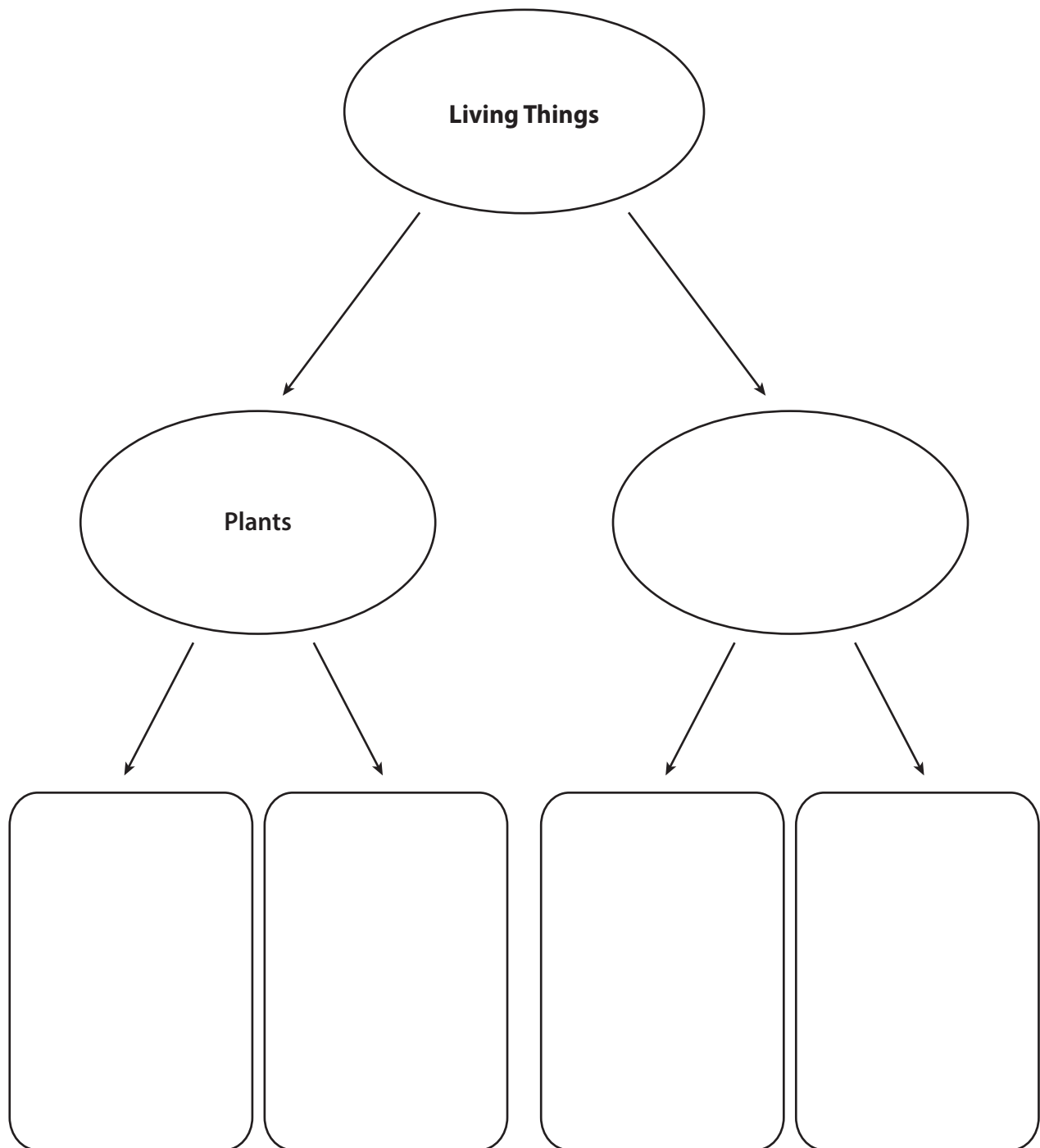
Date _____

Activity Page 2.1.1

Use with Lesson 2.1

Living Things

Complete the diagram.



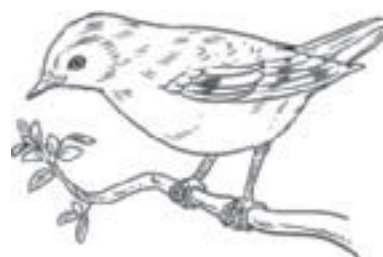
Name _____

Date _____

Activity Page 2.1.2

Use with Lesson 2.1

Animal Classification Cards



Name _____

Date _____

Activity Page 2.2.1a

Use with Lesson 2.2

What Do Animals Eat #1?

Cut out the animal cards. Flip them over to find what the animal eats.



Raccoon



Bald eagle



Monarch butterfly



Desert tortoise

Name _____

Date _____

Activity Page 2.2.1b

Use with Lesson 2.2

What Do Animals Eat #1?

Raccoon	Bald eagle
<p>Where It Lives</p> <p>In places that have trees and near ponds or streams</p> <p>Foods</p> <ul style="list-style-type: none">• berries• acorns and nuts• crayfish• fish• frogs• mice	<p>Where It Lives</p> <p>In places that have tall dead trees near lakes, rivers, or the ocean</p> <p>Foods</p> <ul style="list-style-type: none">• fish• ducks• mice• turtles• dead animals
Monarch butterfly	Desert tortoise
<p>Where It Lives</p> <p>In grassy or wildflower fields and roadsides</p> <p>Foods</p> <ul style="list-style-type: none">• milkweed plants	<p>Where It Lives</p> <p>In the desert</p> <p>Foods</p> <ul style="list-style-type: none">• grasses• flowers• fruit• cactuses

Name _____

Date _____

Activity Page 2.2.2a

Use with Lesson 2.2

What Do Animals Eat #2?



Eastern gray squirrel



Garter snake



American robin



Praying mantis

Name _____

Date _____

Activity Page 2.2.2b

Use with Lesson 2.2

What Do Animals Eat #2?

<p>Eastern gray squirrel</p> <p>Where It Lives</p> <p>In parks, backyards, and forests</p> <p>Foods</p> <ul style="list-style-type: none">• nuts and seeds• acorns• berries• tree buds and flowers• tree bark• insects• frogs	<p>Garter snake</p> <p>Where It Lives</p> <p>In forests, woods, or grasslands and near water</p> <p>Foods</p> <ul style="list-style-type: none">• earthworms• lizards• frogs• fish• mice
<p>American robin</p> <p>Where It Lives</p> <p>In woods, forests, farmlands, city parks</p> <p>Foods</p> <ul style="list-style-type: none">• earthworms• grasshoppers• caterpillars• berries• cherries• grapes	<p>Praying mantis</p> <p>Where It Lives</p> <p>In forests, woods, or grasslands and near water</p> <p>Foods</p> <ul style="list-style-type: none">• grasshoppers• crickets• spiders• frogs• lizards

Date _____

Use with Lesson 2.2

Color a box in the chart for each gallon.

How Much Water Does It Drink?

[illegible]

My Trip to Yellowstone: Forest

Paste this into your My Trip journal.

Gets

Gets

Gets

Great Horned Owl



Lives in: Yellowstone forest

My Trip to Yellowstone: Grassy Valley


Paste this into your My Trip journal.

Gets

Gets

Gets

Bison



Lives in: Yellowstone grassy valleys,
near rivers and forests

My Trip to Yellowstone: Grassy Valley and Forests


Paste this into your My Trip journal.

Gets

Gets

Gets

Black Bear



Lives in: Yellowstone grassy valleys and forests

Name _____

Date _____

Activity Page 2.4.1

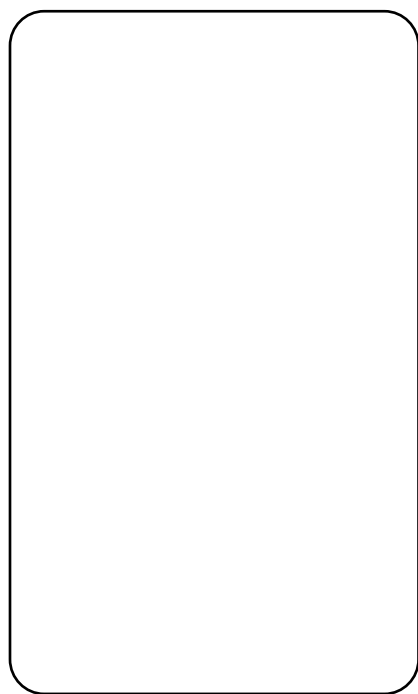
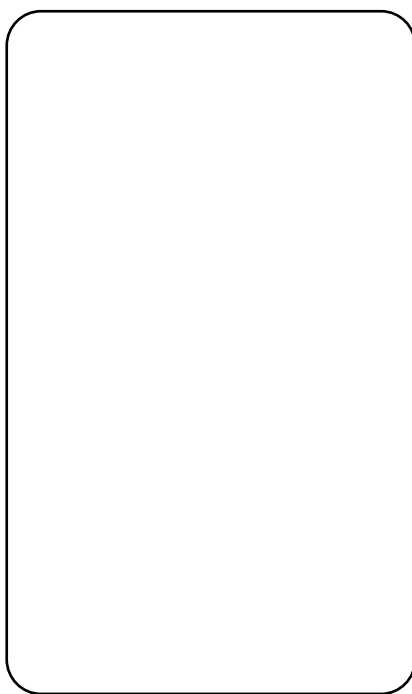
Use with Lesson 2.4

Help Wanted: Zookeeper

Draw what a zookeeper does to give animals what they need.

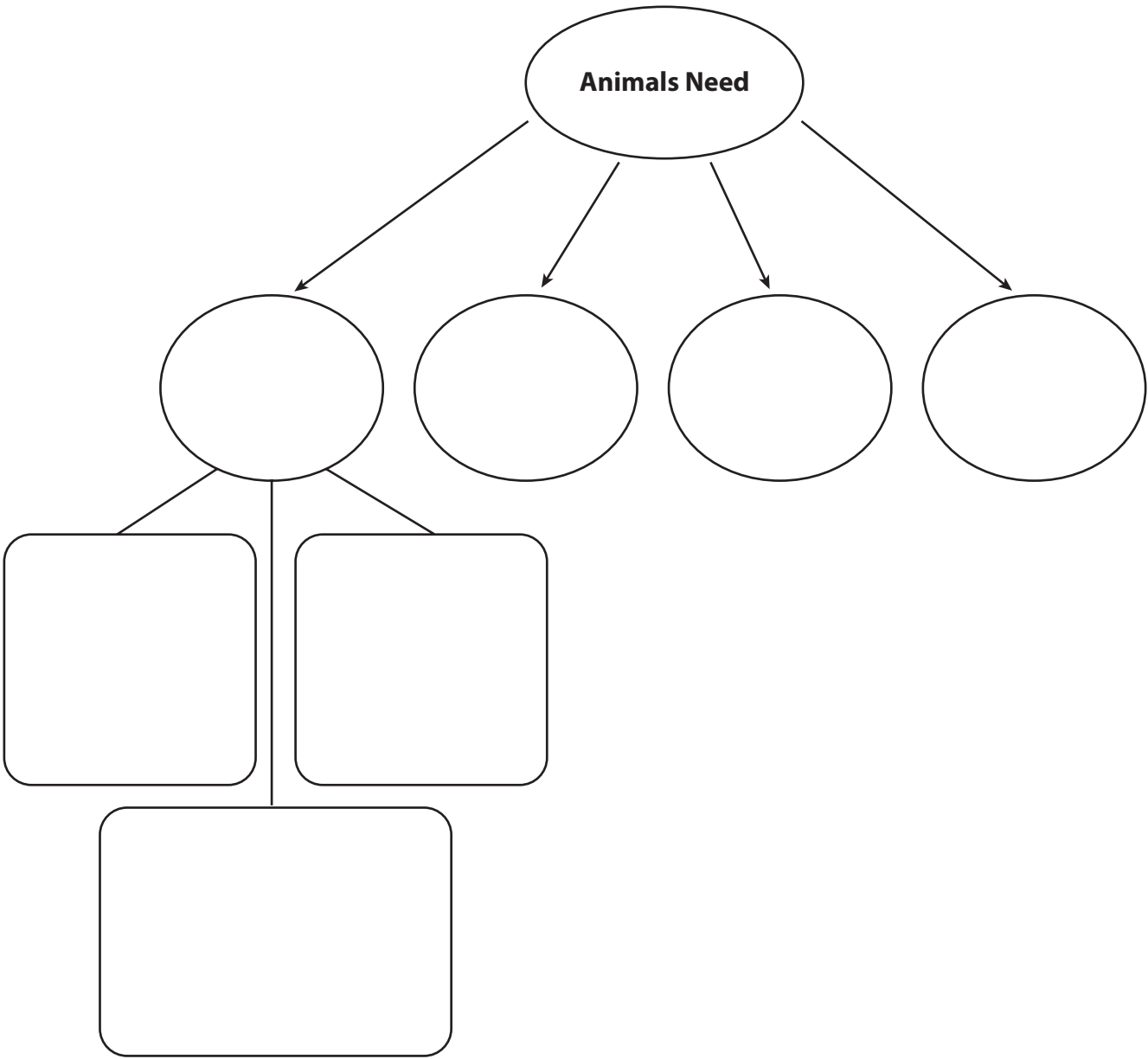


Zookeepers Needed

A large, empty rectangular box with rounded corners, intended for drawing.A large, empty rectangular box with rounded corners, intended for drawing.A large, empty rectangular box with rounded corners, intended for drawing.

What Animals Need

Write things animals need in the round bubbles. Draw food animals eat in the boxes.



Name _____

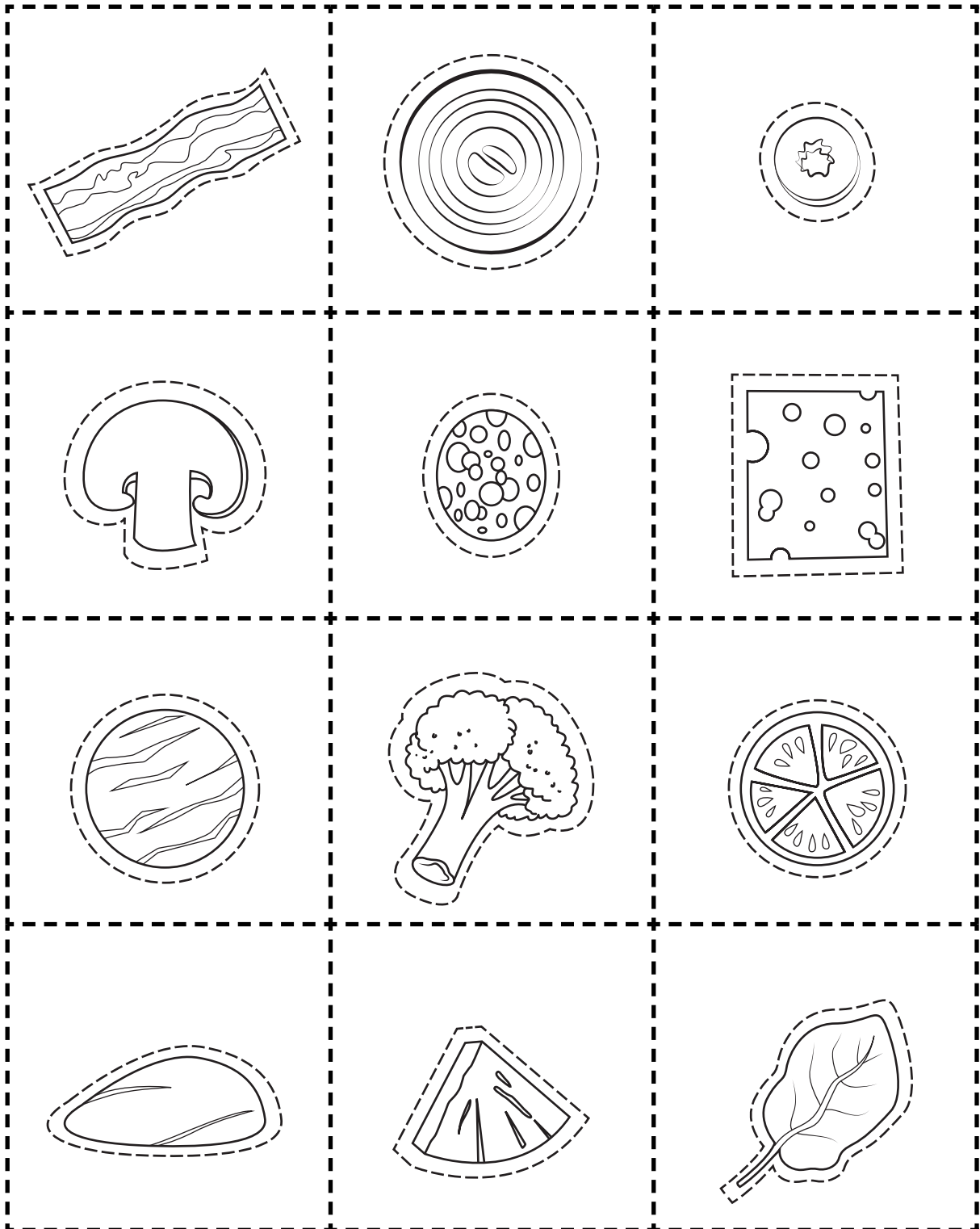
Date _____

Activity Page 3.1.1

Use with Lesson 3.1

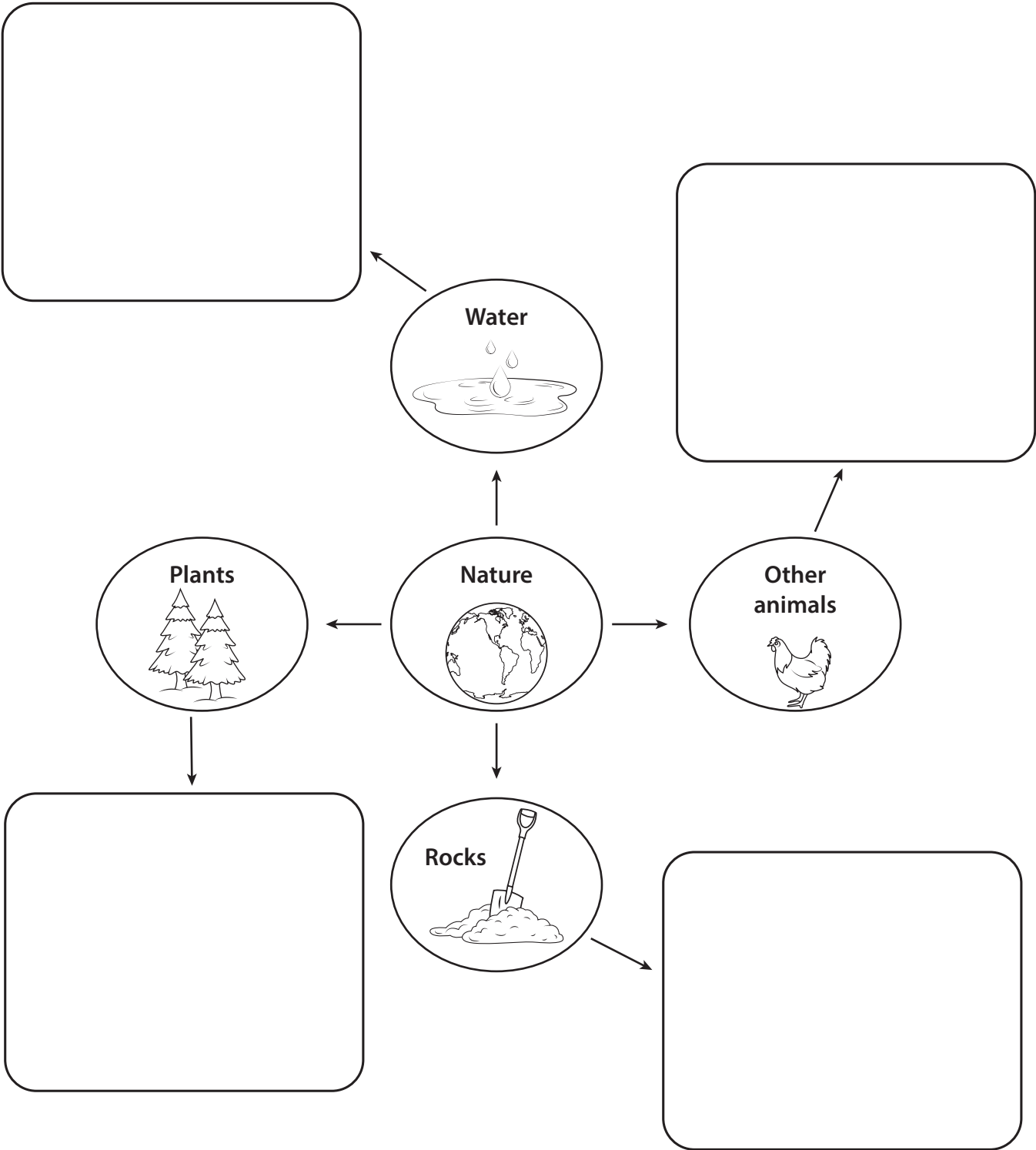
Top Your Own Pizza

Cut out the foods. Put the ones you want on your pizza.



Things Humans Use from Nature

Look around school. Draw or write things that are natural resources or come from nature.



Name _____

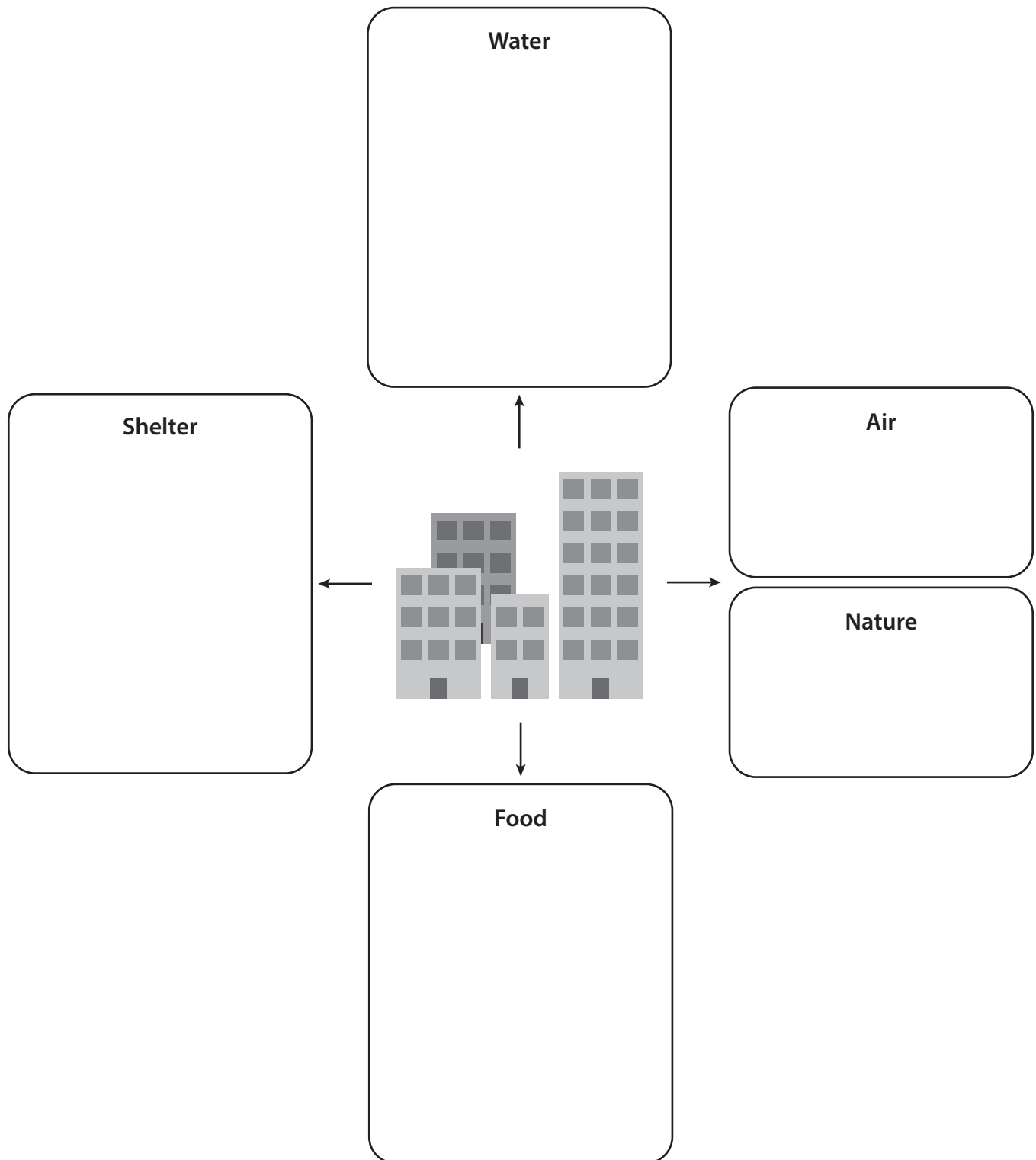
Date _____

Activity Page 3.3.1

Use with Lesson 3.3

How Do People Meet Their Needs?

Draw or write your ideas in the boxes.



Name _____

Date _____

Activity Page 3.4.1

Use with Lesson 3.4

Make a Welcome Sign

Make a welcome sign for humans. Paste pictures of things they can do. Paste pictures of things they cannot do.

Welcome!

You may!

No way!

Name _____

Date _____

Activity Page 3.4.2

Use with Lesson 3.4

Pictures for the Welcome Sign

Cut out the pictures. Paste them on your welcome sign.



Watch birds



Play ball



Camp overnight



Picnic



Hike



Make campfires



Pick berries



Sit



Skateboard



Use wheelchairs



Use fireworks



Take photos



Use a water fountain



Leave trash

Name _____

Date _____

Counting Samples

What animals and plants do you see? Count them.

Living Thing (List plants or animals here; see the top two rows for an example.)	Is this in the tray?	How many do you see?
Horse	X	1
Flower	X	2

Activity Pages Answer Key: Needs of Plants and Animals

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.

A Place for Living Things (AP UO.1) (page 164)

Accept all labeled drawings. Look for evidence that students recognize that people will have to make changes to the empty lot to attract plants and animals.

A Carrot Is a Plant (AP 1.1.1) (page 165)

Students should correctly label the leaves, stem, and root of the carrot.

Where Plants Live (AP 1.1.2) (page 166)

Students should note that plants cannot grow well in closets, in hallways without windows, and under rocks. They should also note that plants can be found growing near windows and outside.

How Our Plants Look as We Begin (AP 1.2.1) (page 167)

Student drawings should show that all four plants are close in size, are the same bright green color, and have erect stems and leaves.

I Predict (AP 1.2.2) (page 168)

Accept all answers to establish students' prior knowledge about the needs of plants. Look for evidence that students realize restricting light or water may affect the survival of a plant.

My Observations (AP 1.2.3) (page 169)

Student drawings should show that the plant that received light and water looks similar to when the investigation began but might have grown a bit larger. The plants that did not receive light should have yellowed in color. The plants that did not receive water should have drooped, shriveled, or dried up.

My Trip: Cut and Paste (AP 1.3.4) (page 173)

Students should paste the largest sun and smallest water drop "stamps" into the two boxes on the Sonoran Desert page of their My Trip journal. The two stamps for medium sun and water should be pasted into the Tallgrass Prairie page. The stamps with the smallest sun and largest water drop should be pasted into the Redwood Forest page.

What Plants Are in a Community Garden? (AP 1.4.1) (page 174)

Accept all student responses that show plants. At this point, the main purpose should be to elicit prior knowledge of students' understanding that there are different kinds of plants, plants need water, and plants need sunlight.

What Plants Need (AP 1.4.2) (page 175)

Students should put the terms *light*, *water*, *air*, and *soil* in the round bubbles as things plants need. Students should draw leaves and roots in the appropriate boxes.

Living Things (AP 2.1.1) (page 177)

Students should add "Animals" to the diagram and draw two examples of plants and two examples of animals.

How Much Water Does it Drink? (AP 2.2.3) (page 183)

Student bar graphs should show the cow and horse drink the most water, the donkey drinks less than those two animals, then the llama drinks a little less than the donkey, and finally the goat and pig drink the least water.

My Trip to Yellowstone (AP 2.3.1–2.3.3) (pages 184–186)

Forest

Student drawings should show the great horned owl: gets energy from eating other animals uses water; and shelters in nests in tall trees.

Grassy Valley

Student drawings should show the bison: gets energy from eating plants; uses water; and shelters under trees.

Grassy Valley and Forest

Student drawings should show the black bear: gets energy from eating plants and animals; uses water; and sleeps in a den.

Help Wanted: Zookeeper (AP 2.4.1) (page 187)

Accept all student responses. At this point, the main purpose should be to elicit prior knowledge of students' understanding that zookeepers have to provide food, water, and shelter for the animals kept in a zoo.

What Animals Need (AP 2.4.2) (page 188)

Students should put the terms *food*, *water*, *air*, and *shelter* in the round bubbles. Students should draw plants and animals in the boxes.

Things Humans Use from Nature (AP 3.2.1) (page 190)

Students should draw or write examples such as the following:

Water—water fountain, water bottle, watering can, outdoor hose, aquarium

Other Animals—eggs, milk, meat, leather shoes or belts, down jackets

Rocks—pebbles in an aquarium, concrete sidewalk, glass windows, brick walls, stone flooring, potting soil

Plants—salad or other vegetables in the school kitchen, paper towels, indoor potted plants, cotton shirt, wood furniture

How Do People Meet Their Needs? (AP 3.3.1) (page 191)

Students should draw or write examples such as the following:

Water—lakes, pipes, drinking water from taps and fountains

Air and Nature—breathing, a park, soap bubbles, playing outside, flowers

Food—farms, fish markets, trucks, markets, eating, home cooking, restaurants

Shelter—trees for wood, bricks from sand and rocks, trucks, digging

Make a Welcome Sign (AP 3.4.1) (page 192)

Accept all student designs.

Counting Samples (AP US.1) (page 193)

Student counts should match the tray setups done before class.

Glossary

Green 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.

A

air, n. a mix of invisible gases that are all around us and that animals and plants breathe in

animal, n. a living thing that eats plants or other animals and can move around

B

banning, v. prohibiting something

C

chemical, n. a substance obtained by a chemical process or which produces a chemical effect

classify, v. to arrange things in a group based on shared qualities

count, v. to tally the number of units

D

data, n. information that is observed or measured and recorded

den, n. a hard-to-find place where a wild animal gets shelter

desert, n. an area with dry land and warm climate

E

ecologist, n. an expert or student who studies the relations of organisms to one another and the environment

environment, n. the place and conditions that surround a living thing

evidence, n. a detail that supports a claim or helps prove an idea is true

F

farm, n. the land and structures used to raise animals and grow plants

feature, n. a certain part or quality of something

forest, n. an area with many trees and other plants

G

grassland, n. an area covered primarily with grass

H

human, n. another word for person

I

investigate, v. to observe and study something to collect information

L

lawmaker, n. a person who makes laws

leaf, n. the plant part that is attached to the stem and carries out photosynthesis

light, n. the type of energy that makes vision possible (also v. to brighten)

living, adj. alive; able to process energy for survival

living thing, n. something that is alive or that was once alive; an organism

M

map, n. a flat representation of an area that shows where things are

market, n. an area where people gather to buy and sell food items and other products

model, n. a representation of something that can help people learn about the real thing

N

native, n. a plant or animal that originally comes from a place and did not come from somewhere else

natural resource, n. something that occurs in nature that people use

nature, n. places, wild plants, and wild animals that are not affected by humans

nest, n. a place that birds build where they lay eggs and care for their young

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)

P

pattern, n. a reliable system of traits or a set of repeating details

plant, n. a living thing that needs light, water, and air to grow

prairie, n. a large, flat area of grassland

predict, v. to say that something is expected to happen

protect, v. to cover or prevent injury or damage

R

related, adj. connected in some way (relationship, n. the connection between two or more things)

resource, n. something that comes from a living thing's environment that it uses

root, n. the plant part that takes up water and minerals, typically underground

S

sample, v. to use a portion of the whole to represent the whole

shelter, n. a place to get protection from bad weather or from danger

survive, v. to stay alive, especially when faced with hardship

T

table, n. an arrangement of data in rows and columns for reference

U

underground, adj. below Earth's surface

W

water, n. a clear, tasteless, odorless fluid that covers most of Earth's surface and on which living organisms depend

Classroom Safety for Activities and Demonstrations

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

Student Safety Contract

When doing science activities, I will do the following:

- 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

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

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, do the following:

- 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, do the following:

- 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, do the following:

- 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

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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rdonar/Alamy Stock Photo: 138b
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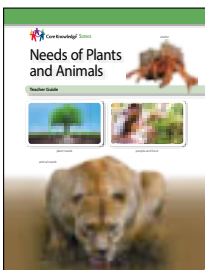
Needs of Plants and Animals

Core Knowledge Science K



What is the Core Knowledge Sequence?

The *Core Knowledge Sequence* is a detailed guide to specific content and skills to be taught in Grades K–8 in language arts, history, geography, mathematics, science, and the fine arts. In the domains of science, including Earth and space, physical, and life sciences, the *Core Knowledge Sequence* outlines topics that build systematically grade by grade to support student learning progressions coherently and comprehensively over time.



For which grade levels is this book intended?

In general, the content and presentation are appropriate for students in the early elementary grades. For teachers and schools following the *Core Knowledge Sequence*, this book is intended for Grade K and is part of a series of **Core Knowledge SCIENCE** units of study.

For a complete listing of resources in the
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