

# Ecology

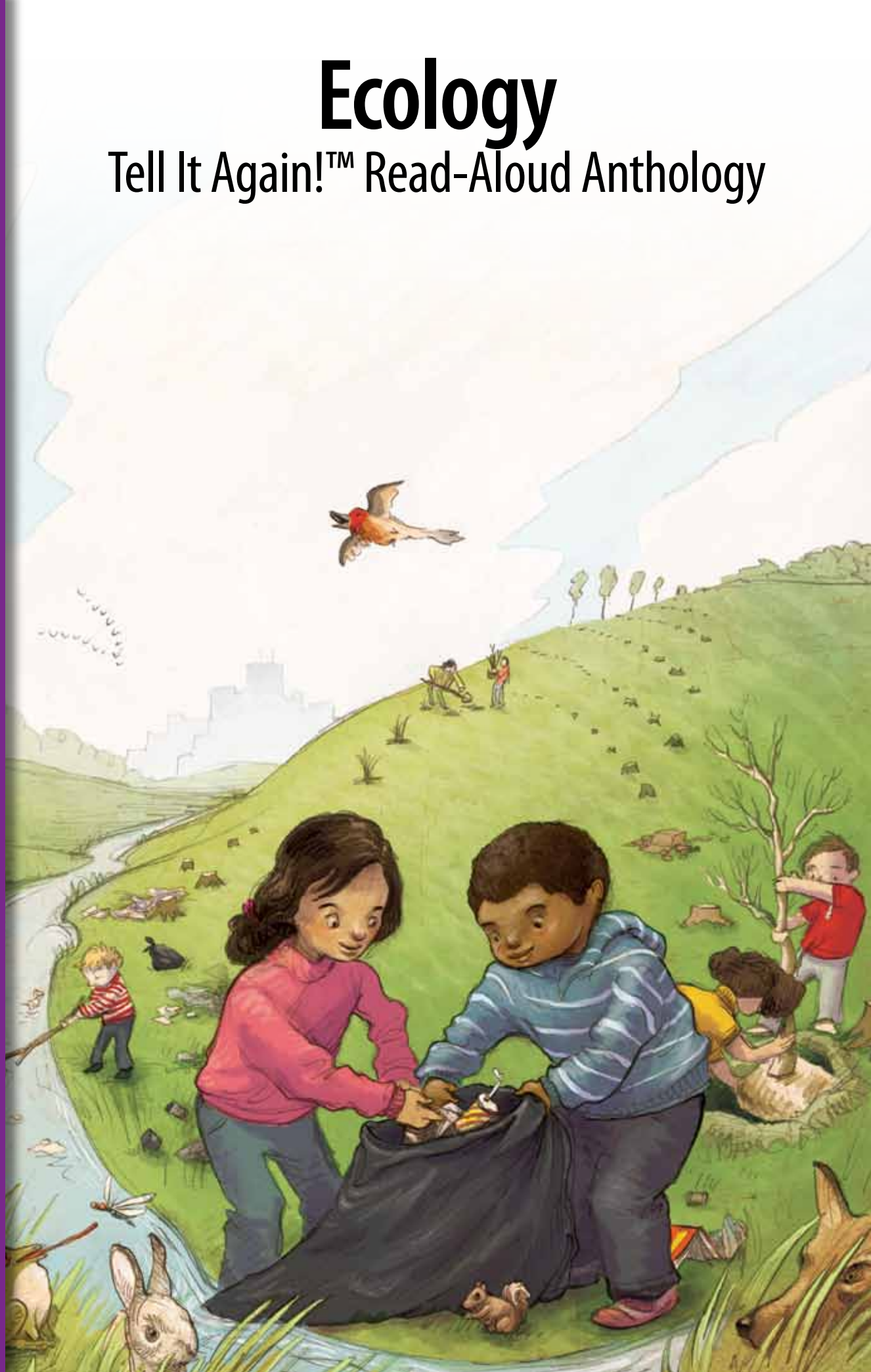
Tell It Again!™ Read-Aloud Anthology

Core Knowledge Language Arts® • Listening & Learning™ Strand

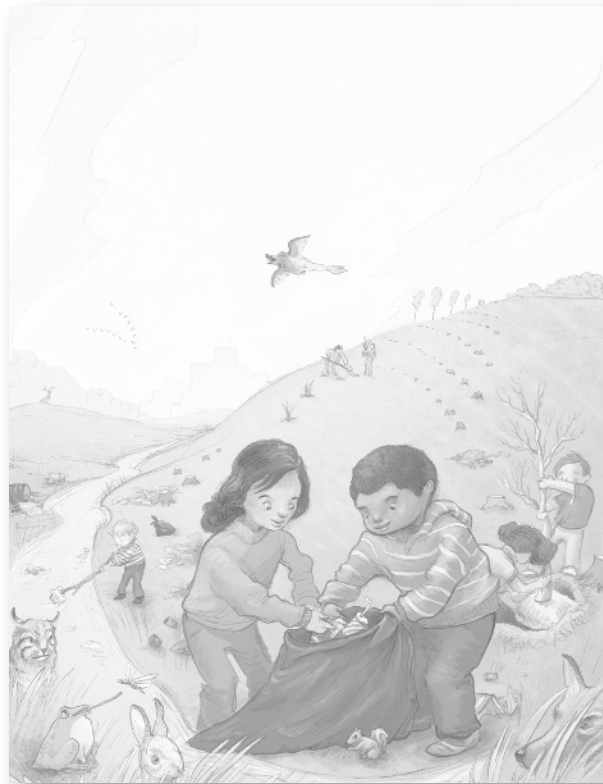


Core Knowledge®

GRADE 3







# Ecology

## Tell It Again!™ Read-Aloud Anthology

Listening & Learning™ Strand

GRADE 3

Core Knowledge Language Arts®



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# Alignment Chart for Ecology

The following chart contains core content objectives addressed in this domain. It also demonstrates alignment between the Common Core State Standards and corresponding Core Knowledge Language Arts (CKLA) goals.

## Alignment Chart for Ecology

Core Content Objectives	Lesson						
	1	2	3	4	5	6	7
Describe ecology as the study of relationships between living things and their environment	✓						
Describe and provide an example of a habitat	✓	✓	✓				
Explain why certain organisms live in certain habitats and how they adapt to those habitats	✓		✓				
Describe and provide an example of an ecosystem	✓		✓				
Describe how organisms in an ecosystem depend on each other and their environment		✓	✓				
Describe what happens in a food chain		✓	✓				
Identify the three essential parts of a food chain: producers, consumers, and decomposers		✓					
Sequence a food chain of two or more trophic levels		✓					
Classify members of a food chain as producers, consumers, or decomposers		✓	✓				
Provide an example of a food chain in a given food web			✓	✓			
Explain why nature and ecosystems are not static but are constantly changing				✓	✓		
Describe the balance of nature in an ecosystem				✓	✓		
Explain how changes in an ecosystem are caused by natural events and by humans				✓	✓		
Explain why sometimes animals must leave their habitats when the natural balance is lost					✓	✓	
Explain how ecosystems are affected by changes in the environment					✓		
Explain how humans affect ecosystems and the environment						✓	✓
Describe and identify human-made threats to the environment						✓	✓

## Alignment Chart for Ecology

### Lesson

	1	2	3	4	5	6	7
Identify different types of resources including renewable and nonrenewable							✓
Explain the importance of conservation and recycling to the health of the environment							✓
Identify different ways to protect and restore the environment							✓

## Reading Standards for Informational Text: Grade 3



### Key Ideas and Details

<b>STD RI.3.1</b>	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.							
<b>CKLA Goal(s)</b>	Ask and answer questions (e.g., <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , <i>how</i> ), orally or in writing, requiring literal recall and understanding of the details and/or facts of a nonfiction/informational read-aloud			✓				
	Ask and answer questions, orally or in writing, that require making interpretations, judgments, or giving opinions about what is heard in a nonfiction/informational read-aloud, including asking and answering <i>why</i> questions that require recognizing or inferring cause/effect relationships			✓				
<b>STD RI.3.2</b>	Determine the main idea of a text; recount the key details and explain how they support the main idea.							
<b>CKLA Goal(s)</b>	Determine the main idea of a nonfiction/informational read-aloud; recount the key details and explain how they support the main idea	✓						
<b>STD RI.3.3</b>	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.							
<b>CKLA Goal(s)</b>	Sequence four to six pictures or sentences illustrating/describing events from a nonfiction/informational read-aloud		✓	✓				✓
	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a nonfiction/informational read-aloud, using language that pertains to time, sequence, and cause/effect		✓	✓	✓	✓	✓	✓
	Distinguish nonfiction/informational read-alouds that describe events that happened long ago from those that describe contemporary or current events					✓	✓	



## Alignment Chart for Ecology

### Lesson

		1	2	3	4	5	6	7
<b>Craft and Structure</b>								
<b>STD RI.3.4</b>	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a Grade 3 topic or subject area.							
<b>CKLA Goal(s)</b>	Determine the literal and nonliteral meanings of and appropriately use common sayings and phrases					✓	✓	
	Determine the meaning of general academic and domain-specific words and phrases in a nonfiction/informational read-aloud relevant to a Grade 3 topic or subject area							
<b>STD RI.3.6</b>	Distinguish their own point of view from that of the author of a text.							
<b>CKLA Goal(s)</b>	Distinguish their own point of view from that of the author of a text							✓
<b>Integration of Knowledge and Ideas</b>								
<b>STD RI.3.7</b>	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).							
<b>CKLA Goal(s)</b>	Describe images, orally or in writing, and how they contribute to what is conveyed by the words in a nonfiction/informational read-aloud (e.g., where, when, why, and how key events occur)	✓	✓	✓	✓		✓	
	Use images (e.g., maps, photographs) accompanying a nonfiction/informational read-aloud to check and support understanding							
	Interpret information from diagrams, charts, graphs, and/or graphic organizers		✓	✓			✓	✓
<b>STD RI.3.8</b>	Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).							
<b>CKLA Goal(s)</b>	Describe the logical connection between particular sentences and paragraphs in a nonfiction/informational read-aloud (e.g., comparison, cause/effect, first/second/third in a sequence)						✓	
<b>STD RI.3.9</b>	Compare and contrast the most important points and key details presented in two texts on the same topic.							
<b>CKLA Goal(s)</b>	Compare and contrast the most important points and key details presented in two nonfiction/informational read-alouds on the same topic	✓	✓		✓			✓

## Alignment Chart for Ecology

### Lesson

		1	2	3	4	5	6	7
<b>Writing Standards: Grade 3</b>								
<b>Production and Distribution of Writing</b>								
<b>STD W.3.4</b>	With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in Standards 1–3 above.)							
<b>CKLA Goal(s)</b>	With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose, i.e., ideas and paragraphs presented clearly and in a logical order							
<b>STD W.3.6</b>	With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.							
<b>CKLA Goal(s)</b>	Share writing with others							
<b>Research to Build and Present Knowledge</b>								
<b>STD W.3.7</b>	Conduct short research projects that build knowledge about a topic.							
<b>CKLA Goal(s)</b>	Conduct short research projects that build knowledge about a topic							
<b>STD W.3.8</b>	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.							
<b>CKLA Goal(s)</b>	Make personal connections (orally or in writing) to events or experiences in a fiction or nonfiction/informational read-aloud, and/or make connections among several read-alouds							
	Gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories							
	Categorize and organize facts and information within a given domain							
<b>STD W.3.10</b>	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.							
<b>CKLA Goal(s)</b>	Write responses to fiction and nonfiction/informational read-alouds that demonstrate understanding of the text and/or express/support opinion, using examples from a text and distinguishing own point of view from that of the author, narrator, or characters (short time frame)							
	Write sentences to represent the main idea and details from a fiction or nonfiction/informational read-aloud (short time frame)							

## Alignment Chart for Ecology

### Lesson

		1	2	3	4	5	6	7
<b>Speaking and Listening Standards: Grade 3</b>								
<b>Comprehension and Collaboration</b>								
<b>STD SL.3.1</b>	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 3 topics and texts, building on others' ideas and expressing their own clearly.							
<b>STD SL.3.1a</b>	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.							
<b>CKLA Goal(s)</b>	Carry on and participate in a conversation with an adult or peer for at least six turns, staying on topic, building on others' ideas, and expressing their own ideas clearly				✓			
	Demonstrate preparedness for a discussion, having read or studied required material, explicitly drawing on preparation and other information known about the topic to explore content under discussion				✓			
	Prior to listening to a read-aloud, identify (orally or in writing) what they know and have learned that may be related to the specific read-aloud or topic				✓			
	Make predictions (orally or in writing) prior to and during a read-aloud, based on the title, images, and/or text heard thus far, and then compare the actual outcomes to predictions	✓	✓		✓		✓	✓
<b>STD SL.3.1b</b>	Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).							
<b>CKLA Goal(s)</b>	Use agreed-upon rules for group discussions, i.e., look at and listen to the speaker, raise hand to speak, take turns, say "excuse me" or "please," etc.				✓			
<b>STD SL.3.1c</b>	Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.							
<b>CKLA Goal(s)</b>	Interpret information presented, and then ask questions to clarify information or the topic in a fiction or nonfiction/informational read-aloud				✓			
<b>STD SL.3.1d</b>	Explain their own ideas and understanding in light of the discussion.							
<b>CKLA Goal(s)</b>	During a discussion, explain ideas and understanding in relation to the topic				✓			
<b>STD SL.3.3</b>	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.							
<b>CKLA Goal(s)</b>	Ask and answer questions to clarify directions, exercises, and/or classroom routines and/or what a speaker says about a topic to gather additional information or deepen understanding of a topic or issue				✓			

## Alignment Chart for Ecology

### Lesson

		1	2	3	4	5	6	7
<b>Presentation of Knowledge and Ideas</b>								
<b>STD SL.3.4</b>	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.							
<b>CKLA Goal(s)</b>	Give oral presentations with appropriate facts and relevant descriptive details (using visual displays when appropriate), speaking fluently about personal experiences, topics of interest, and/or stories using appropriate volume and clear enunciation at an understandable pace					✓		✓
	Summarize (orally or in writing) read-aloud content and/or oral information presented by others		✓	✓		✓		
	Retell (orally or in writing) important facts and information from a fiction or nonfiction/informational read-aloud	✓						
<b>STD SL.3.6</b>	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See Grade 3 Language Standards 1 and 3 on pages 28 and 29 for specific expectations.)							
<b>CKLA Goal(s)</b>	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification	✓						
<b>Language Standards: Grade 3</b>								
<b>Vocabulary Acquisition and Use</b>								
<b>STD L.3.4</b>	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on Grade 3 reading and content, choosing flexibly from a range of strategies.							
<b>STD L.3.4a</b>	Use sentence-level context as a clue to the meaning of a word or phrase.							
<b>CKLA Goal(s)</b>	Use sentence-level context as a clue to the meaning of a word or phrase	✓						
<b>STD L.3.4b</b>	Determine the meaning of the new word formed when a known affix is added to a known word (e.g., <i>agreeable/disagreeable</i> , <i>comfortable/uncomfortable</i> , <i>care/careless</i> , <i>heat/preheat</i> ).							
<b>CKLA Goal(s)</b>	Determine the meaning of the new word formed when a known affix is added to a known word (e.g., <i>agreeable/disagreeable</i> , <i>comfortable/uncomfortable</i> , <i>care/careless</i> , <i>heat/preheat</i> )			✓	✓			✓
<b>STD L.3.4c</b>	Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., <i>company</i> , <i>companion</i> ).							
<b>CKLA Goal(s)</b>	Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., <i>company</i> , <i>companion</i> )					✓		

## Alignment Chart for Ecology

		Lesson						
		1	2	3	4	5	6	7
<b>STD L.3.5</b>	Demonstrate understanding of word relationships and nuances in word meanings.							
<b>STD L.3.5a</b>	Distinguish the literal and nonliteral meanings of words and phrases in context.							
<b>CKLA Goal(s)</b>	Determine the literal and nonliteral meanings of and appropriately use common sayings and phrases					✓	✓	
	Distinguish literal language from figurative language as used in a fiction or nonfiction/informational read-aloud					✓	✓	
<b>STD L.3.5b</b>	Identify real-life connections between words and their use (e.g., describe people who are <i>friendly</i> or <i>helpful</i> ).							
<b>CKLA Goal(s)</b>	Provide and/or use synonyms and antonyms					✓	✓	
	Identify real-life connections between words and their use (e.g., describe people who are <i>friendly</i> or <i>helpful</i> )	✓						
<b>STD L.3.6</b>	Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships (e.g., <i>After dinner that night we went looking for them</i> ).							
<b>CKLA Goal(s)</b>	Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships		✓	✓		✓		
<b>Additional CKLA Goals</b>								
<b>CKLA Goal(s)</b>	Listen to and understand a variety of texts, including informational texts and poems	✓						
	Draw illustrations, diagrams, charts, and/or graphic organizers to represent the main idea and/or details from a fiction or informative/explanatory read-aloud, to depict a vocabulary word, or to enhance a piece of writing		✓					



These goals are addressed in all lessons in this domain. Rather than repeat these goals as lesson objectives throughout the domain, they are designated here as frequently occurring goals.





# Introduction to Ecology

This introduction includes the necessary background information to be used in teaching the *Ecology* domain. The *Tell It Again! Read-Aloud Anthology for Ecology* contains seven daily lessons, each of which is composed of two distinct parts—the Read-Aloud and the Extension—so that the lessons may be divided into smaller chunks of time and presented at different intervals during the day. Each entire lesson will require a total of seventy minutes.

In addition to these lessons, there are two Pausing Points in this domain: one after Lesson 4, and another after Lesson 7. The Pausing Points are designed to allow two total days for reviewing, reinforcing, or extending the material taught up to that point. One day is included for the Domain Assessment. **You should spend no more than ten days total on this domain.**

## Domain Overview

Here is an overview of the domain schedule for *Ecology*. Please see the Unit 11 Teacher Guide for the corresponding Skills schedule.

Week One					
Min.	Day 1	Day 2	Day 3	Day 4	Day 5
50	Lesson 1: “Animals and Their Habitats”	Lesson 2: “Food Chains, Part I”	Lesson 3: “Food Chains, Part II”	Lesson 4: “Balance of Nature”	Pausing Point 1 (one day only)
20	Lesson 1B: Extensions	Lesson 2B: Extensions	Lesson 3B: Extensions	Lesson 4B: Extensions	

Week Two					
Min.	Day 6	Day 7	Day 8	Day 9	Day 10
50	Lesson 5: “Natural Changes to the Environment”	Lesson 6: “Human Changes to the Environment”	Lesson 7: “Protecting the Environment”	Pausing Point 2 (one day only)	Domain Assessment
20	Lesson 5B: Extensions	Lesson 6B: Extensions	Lesson 7B: Extensions		

⑩ Lessons include Student Performance Task Assessments

# Lessons require advanced preparation and/or additional materials; please plan ahead

## ***Domain Components***

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Along with this anthology, you will need:

- *Tell It Again! Media Disk* or the *Tell It Again! Flip Book for Ecology*
- *Tell It Again! Image Cards for Ecology*

You may wish to have one notebook/folder readily available for each student to be used for note-taking and/or other writing opportunities, including “domain dictionaries” and writing prompts in the comprehension questions.

You will find the Instructional Objectives and Core Vocabulary for this domain below. The lessons that include Image Cards, Instructional Masters, Assessments, and Writing Opportunities are also listed in the information below.

## ***Why Ecology Is Important***

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This domain reviews what students have already learned about animals’ habitats and food chains as well as how to take care of the earth. Students will learn more about the feeding patterns among animals, including food webs, and how all living species in an ecosystem are interdependent and interconnected with each other. Furthermore, students will learn about changes to the environment, due to natural occurrences and the actions of people. Students will also learn the idiom “on its last legs” and will discover ways they can help conserve resources and protect the environment.

The content students learn in this unit will serve as the basis for more in-depth study in the later grades about ecosystems and other organisms.

### **What Students Have Already Learned in Core Knowledge Language Arts During Kindergarten, Grade 1, and Grade 2**

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The following domains—and the specific core content that was targeted in those domains—are particularly relevant to the read-alouds students will hear in *Ecology*. This background knowledge will greatly enhance your students’ understanding of the read-alouds they are about to enjoy:

#### ***Plants (Kindergarten)***

- Explain that there are many different kinds and sizes of plants
- Explain that different kinds of plants grow in different environments
- Explain that plants are living things



- Describe what plants need to live and grow: food, water, air, and sunlight
- Explain that the plant makes its food in the leaves
- Explain that seeds are the beginning of new plants
- Describe how bees collect nectar and pollen
- Describe how bees make and use honey
- Describe the important role bees play in plant pollination
- Explain that some plants produce fruit to hold seeds
- Compare and contrast fruits and seeds of different plants
- Explain the basic life cycle of plants
- Identify things that plants provide us: oxygen, food, and important products

#### ***Farms (Kindergarten)***

- Explain what a farm is
- Explain why farmers raise animals and grow crops
- Identify crops as plants grown on farms for use as food
- Describe how farmers protect crops from drought, weeds, and pests
- Sequence the seasonal rhythm of planting, growing, and harvesting
- Describe how some food comes from farms as crops
- Describe how farming has changed through the years

#### ***Taking Care of the Earth (Kindergarten)***

- Explain that Earth is composed of land, water, and air
- Explain that humans, plants, and animals depend on Earth's land, water, and air to live
- Explain why people have a special responsibility to take care of the earth
- Explain that humans generate large amounts of garbage, which must be disposed of
- Explain that natural resources are things found in nature that are valuable and of great importance to people
- Identify key natural resources and describe how people use them

- Recognize the phrase “reduce, reuse, recycle,” and explain how doing these three things can help conserve natural resources
- Identify the recycling symbol and explain that recycled materials are made from reused garbage
- Identify common recyclable materials, including glass, plastic, aluminum, cardboard, and paper
- Explain that composting is a type of recycling in which discarded food scraps decay in an outdoor pile or bin for that purpose and eventually become garden soil
- Identify garbage as being a problem and various means of garbage disposal in terms of a solution
- Explain that land, air, and water all suffer from different types of pollution, and most types of pollution are caused by human activities
- Explain that if people are careful and creative, they can help reduce pollution
- Explain that air pollution from one location can make even the air that is far away in other places around the world dirty
- Identify sources of air pollution, including cars and electricity produced by coal-fired power plants
- Explain the effect of air pollution on human health
- Explain how to reduce air pollution by conserving natural resources
- Compare and contrast fresh water, salt water, and waste water
- Explain that many living things, including humans, need fresh water to survive, and that there is a limited supply of fresh water on Earth
- Identify sources of water pollution, including factory waste and garbage
- Explain that a water treatment plant can remove unhealthy chemicals and pollutants from water to make it usable again
- Identify possible solutions for the problems of garbage, litter, pollution, and conserving natural resources discussed throughout the domain

### ***The History of the Earth (Grade 1)***

- Explain that much of our knowledge of the earth and its history is the result of the work of many scientists
- Identify the layers of the earth: crust, mantle, core (outer and inner)
- Describe the crust
- Describe each of the layers inside the earth
- Describe volcanoes and geysers
- Identify common minerals in the earth
- Explain how minerals are used by people
- Describe how heat, pressure, and time cause many changes inside the earth
- Describe how rocks and minerals are taken from the earth
- Describe fossils
- Explain how fossils provide information about the history of the earth

### ***Animals and Habitats (Grade 1)***

- Describe what a habitat is
- Explain why living things live in habitats to which they are particularly suited
- Classify water habitats as either freshwater or saltwater habitats
- Explain why and how habitat destruction can cause extinction

### ***Cycles in Nature (Grade 2)***

- Recognize that most of Earth's surface is covered by water
- Identify the three states of matter in which water exists: solid, liquid, and gas
- Define the term *water cycle*
- Explain that there is a limited amount of water on Earth
- Identify groundwater as a water resource for humans


### ***Insects (Grade 2)***

- Cite ways in which insects may be helpful and/or harmful

# Core Vocabulary for Ecology

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The following list contains all of the core vocabulary words in Ecology in the forms in which they appear in the text. The vocabulary words used in the Word Work activities are boldfaced. The multiple-meaning vocabulary words that are used as activities in the Pausing Points are marked with a + sign. The inclusion of the words on this list *does not* mean that students are immediately expected to be able to use all of these words on their own. However, through repeated exposure throughout the lessons, they should acquire a good understanding of most of these words and begin to use some of them in conversation.

 **Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also choose to have students write these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

## Lesson 1

algae  
ecology\*  
ecosystems\*  
environment\*  
habitat  
organisms\*  
**tolerant**

## Lesson 2

consumers\*  
decomposers\*  
food chain\*  
food webs  
interdependent  
photosynthesis\*  
**producers\***

## Lesson 3

canopy  
diverse  
energy pyramid  
**tier**  
wetland

## Lesson 4

disruptions  
equilibrium  
gradual  
overpopulation  
stable+  
**static**

## Lesson 5

devastating  
drought  
monsoons  
natural disaster\*  
overgrazing  
**periodic**  
tsunamis

## Lesson 6

agricultural  
endangered\*  
groundwater  
invasive species  
leach+  
pesticides  
smog  
**toxic**

## Lesson 7

conserve\*  
finite  
**irreversible**  
nonrenewable  
recycling\*  
renewable  
stewards  
sustainable

\*The words or variations of the words marked with an asterisk are included in the Skills Reader and Vocabulary Cards.

## Comprehension Questions

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In the *Tell It Again! Read-Aloud Anthology for Ecology*, there are three types of comprehension questions: literal questions to assess students' recall of the core content; inferential questions to guide students to infer information from the text and think critically; and evaluative questions to guide students to build upon what they have learned from the text to use their creative, analytical, and application skills. Many of these questions are also labeled as writing prompts and are discussed in more detail in the Writing Opportunities section in this introduction.



The last comprehension question in each lesson prompts students to ask, answer, and/or research any remaining questions they may have about the content; this question may also be expanded upon as an “Above and Beyond” research and/or writing activity. Many of these comprehension questions may also serve as meaningful take-home topics to discuss with family members.

It is highly recommended that students answer all comprehension questions in complete sentences—whether orally or in writing—using domain-related vocabulary whenever possible. You may wish to have students collect written responses in a notebook or folder.

## Writing Opportunities

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Everyday writing opportunities are included in the Comprehension Questions and Extensions in Lessons 1–7, as well as in both Pausing Points.

In the Comprehension Questions, shorter writing prompts that assess students' literal recall of the core content and provide practice for the short-answer writing section of the Domain Assessment are indicated by this icon: . Longer writing prompts that encourage students to think critically and expand creatively upon the content are indicated by this icon: . Some of these prompts may serve both purposes and may also be collected in a notebook or folder to provide source information for students to reference moving forward.

For these writing sessions, it is highly recommended that students take 5–10 minutes of Discussing the Read-Aloud time to write a half to a full page in response to one or more of the prompts, during which time you are encouraged to circulate and provide over-the-shoulder conferencing for a group of students each day. During these daily writing sessions,

you may also choose to reinforce what students are learning in the Skills strand by having them practice these skills in their writing. The goal of these extended writing sessions is to provide students with daily “low-stakes” writing practice and to have them receive immediate feedback on the content, featured skill(s), and clarity and depth of their written expression. You may also choose to publish sentence strips—one or two sentences—of student writing which exemplify a particular concept or skill. It is highly recommended that students share their writing on a daily basis as time permits.

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## ***Student Choice and Domain-Related Trade Book Extensions***

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In the *Tell It Again! Read-Aloud Anthology for Ecology*, Student Choice and Domain-Related Trade Book activities are suggested in both Pausing Points. A list of recommended titles is included at the end of this introduction, or you may select another title of your choice.

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## ***Ecology Image Cards***

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There are thirty-two Image Cards in the Ecology domain. These Image Cards include depictions of ecosystems, habitats, living organisms of food chains and food webs, and other domain-related concepts. *In the Tell It Again! Read-Aloud Anthology for Ecology*, Image Cards are referenced in both Pausing Points and in all lessons.

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## ***Instructional Masters and Family Take-Home Letters***

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Blackline Instructional Masters and Family Take-Home Letters are included at the back of the *ell It Again! Read-Aloud Anthology for Ecology*. Instructional Masters are referenced in the Domain Assessment and in Lessons 2 and 4–6. The Family Letters are referenced in Lessons 1B and 4B.

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## ***Above and Beyond Opportunities***

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In the *Tell It Again! Read-Aloud Anthology for Ecology*, there are numerous opportunities in the lessons and Pausing Points to challenge students who are ready to attempt activities that are above grade-level. These activities are identified with this icon: ↗.


These opportunities may be found in the following: Comprehension Questions, Extensions, Pausing Point activities, research activities, and writing exercises.

You may also wish to assign some of these and other activities as homework for students who are ready for a challenge outside of the classroom. Many of the comprehension questions also serve as meaningful take-home questions to discuss with family members.

Additionally, you may choose to coordinate with your school's science and/or social studies teacher(s) to further reinforce the content covered in this language arts block.

## ***Student Performance Task Assessments***

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In the *Tell It Again! Read-Aloud Anthology for Ecology*, there are numerous opportunities to assess students' learning. These assessment opportunities range from informal observation opportunities to more formal written assessments and are indicated by this icon: . Extension Activities, along with their corresponding Instructional Masters 2B-1 and 3B-1, along with both Pausing Points, provide these assessment opportunities. There is also a cumulative Domain Assessment. Instructional Masters DA-1, DA-2, and DA-3 are used for this purpose. The correct answers and corresponding statements have been provided on the back of the Answer Keys for Part I of the Domain Assessment. You may wish to make a copy of the Answer Keys to send home to family members. Use the Tens Conversion Chart located in the Appendix to convert a raw score on each assessment into a Tens score. On the same page, you will also find the rubric for recording observational Tens scores.

## Recommended Resources for Ecology

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### Trade Book List

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It is highly recommended that students spend a minimum of twenty minutes each night reading independently or aloud to family members, or listening as family members read to them. You may suggest that they choose titles from this trade book list. These titles may also be put into the classroom book tub for various reading levels.

### Ecology and Conservation

1. *Air Pollution (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2002) ISBN 0516259989
2. *Aliens from Earth: When Animals and Plants Invade Other Ecosystems*, by Mary Batten (Peachtree, 2008) ISBN 1561454508
3. *Buried in Garbage*, by Bobbie Kalman and Janine Schaub (Crabtree, 1991) ISBN 9780865054547
4. *The Green Alphabet: A First Look at Ecology*, by Donna L. Hurst and Allison Wagner Taylor (Eloquent Books, 2010) ISBN 9781609116422
5. *John Muir: America's Naturalist*, by Thomas Locker (Fulcrum Publishing, 2003) ISBN 9781555917050
6. *The Lorax*, by Dr. Seuss (Random House Books for Young Readers, 1971) ISBN 9780394823379
7. *Oil Spill!*, by Melvin Berger (HarperCollins Publishers, 1994) ISBN 0064451216
8. *Recycling (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2001) ISBN 0516273566
9. *A River Ran Wild*, by Lynne Cherry (First Voyager Books, 2002) ISBN 9780152163723
10. *Trash!*, by Charlotte Wilcox (Carolrhoda Books, 1988) ISBN 0876143117
11. *Water Pollution (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2001) ISBN 0516273574
12. *What if There Were No Bees?: A Book about the Grassland Ecosystem*, by Suzanne Slade (Picture Window Books, 2011) ISBN 9781404863941



13. *What if There Were No Gray Wolves?: A Book about the Temperate Forest Ecosystem*, by Suzanne Slade (Picture Window Books, 2011) ISBN 9781404863958
14. *What if There Were No Lemmings?: A Book about the Tundra Ecosystem*, by Suzanne Slade (Picture Window Books, 2011) ISBN 9781404863965
15. *What if There Were No Sea Otters?: A Book about the Ocean Ecosystem*, by Suzanne Slade (Picture Window Books, 2011) ISBN 9781404863972
16. *Why Should I Protect Nature?*, by Jen Green (Barron's, 2005) ISBN 0764131540
17. *Why Should I Recycle?*, by Jen Green (Barron's, 2005) ISBN 0764131559
18. *Why Should I Save Energy?*, by Jen Green (Barron's, 2005) ISBN 0764131567
19. *Why Should I Save Water?*, by Jen Green (Barron's, 2005) ISBN 0764131575

### ***Ecology and Ecosystems***

20. *Arctic Tundra (Habitats)*, by Michael H. Forman (Children's Press, 1997) ISBN 051620372X
21. *Backyard Bear*, by Anne Rockwell and illustrated by Megan Halsey (Walker & Company, 2006) ISBN 0802795730
22. *The Beauty of the Beast: Poems from the Animal Kingdom*, by Jack Prelutsky (Alfred A. Knopf, Inc., 1997) ISBN 0679970584
23. *Changes in Animal Habitats*, by Steve Parker (QEB Publishing, Inc., 2009) ISBN 9781595667731
24. *City Park (Habitats)*, by Wendy Davis (Children's Press, 1997) ISBN 0516203703
25. *Coral Reef (Habitats)*, by Gary W. Davis (Children's Press, 1997) ISBN 0516203754
26. *Desert Food Chains*, by Bobbie Kalman and Kelley MacAulay (Crabtree Publishing Company, 2005) ISBN 0778719901
27. *Food Chain Frenzy (The Magic School Bus Chapter Book)*, by Anne Capeci (Scholastic Inc., 2003) ISBN 0439560500

28. *Food Chains*, by Peter Riley (Franklin Watts, 1998) ISBN 0531153673
29. *Joyful Noise: Poems for Two Voices*, by Paul Fleischman (HarperCollins Publishers Inc., 1988) 0060218525
30. *Life in the Rainforests: Animals, People, Plants*, by Lucy Baker (Scholastic Inc., 1990) ISBN 0590461311
31. *A Log's Life*, by Wendy Pfeffer (Aladdin Paperbacks, 2007) ISBN 1416934839
32. *The Magic School Bus Gets Eaten: A Book About Food Chains*, by Patricia Relf (Scholastic Inc., 1996) ISBN 0590484141
33. *One Small Place in a Tree*, by Barbara Brenner (HarperCollins Publishers, 2004) ISBN 068817180X
34. *A Place for Butterflies*, by Melissa Stewart (Scholastic Inc., 2006) ISBN 0439024846
35. *Rainforest Food Chains*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2007) ISBN 9780778719977
36. *Savanna Food Chains*, by Bobbie Kalman and Hadley Dyer (Crabtree Publishing Company, 2007) ISBN 9780778719984
37. *Wetland Food Chains*, by Bobbie Kalman and Kylie Burns (Crabtree Publishing Company, 2007) ISBN 9780778719991
38. *What are Food Chains and Webs?*, by Bobbie Kalman and Jacqueline Langille (Crabtree Publishing Company, 2005) ISBN 0865058881
39. *Who Eats What?: Food Chains and Food Webs*, by Patricia Lauber (HarperCollins Publishers, 1995) ISBN 0064451305

### Teacher/Family Resources

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1. Dr. Seuss' *The Lorax* (DVD) (Universal, 2012) ASIN: B005LAIH4A
2. How-To Guide for Schoolyard Habitats  
<http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife/Schoolyard-Habitats/Create/How-To-Guide.aspx>
3. Nature Explore Family Club  
<http://www.arborday.org/explore/families/FamiliesClub.cfm>
4. Project Wild, by the Western Regional Environmental Education Council (1983)

## Websites

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1. **Animal Diet Game: Herbivores, Omnivores, and Carnivores**  
<http://www.sheppardsoftware.com/content/animals/kidscorner/games/animaldietgame.htm>
2. **Arbor Day Foundation**  
<http://www.arborday.org/>
3. **EcoKids**  
<http://www.ecokids.ca/pub/index.cfm>
4. **Ecology Kids**  
<http://www.ecology.com/ecology-kids/water-water-everywhere>
5. **Endangered Animals**  
[http://www.sheppardsoftware.com/content/animals/kidscorner/endangered\\_animals/endangeredanimals\\_1.htm](http://www.sheppardsoftware.com/content/animals/kidscorner/endangered_animals/endangeredanimals_1.htm)
6. **Food Chain Game**  
<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>
7. **Kids Do Ecology**  
<http://kids.nceas.ucsb.edu/index.html>
8. **Kid's Ecology Corps**  
<http://www.kidsecologycorps.org>
9. **The Magic School Bus Gets Eaten, Part 1**  
<http://www.youtube.com/watch?v=KM-xOzIL27o>
10. **The Magic School Bus Gets Eaten, Part 2**  
<http://www.youtube.com/watch?v=wrZUKcKhq30>
11. **National Wildlife Federation Kids' Page**  
<http://www.nwf.org/Kids.aspx>
12. **Project Learning Tree**  
<http://www.plt.org/-connecting-kids-to-nature>
13. **Recycling Video**  
<http://www.youtube.com/watch?v=jrIO8y6xe-o>
14. **Tip Tank Water Conservation Game**  
<http://www.wateruseitwisely.com/kids/tip-tank-game.php>
15. **Trash Smash: Clean Up and Recycle Game**  
[http://games.noaa.gov/trash\\_smash](http://games.noaa.gov/trash_smash)



# Animals and Their Habitats

# 1

## ✔ **Lesson Objectives**

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### **Core Content Objectives**

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Students will:

- ✓ Describe ecology as the study of relationships between living things and their environment
- ✓ Describe and provide an example of a habitat
- ✓ Explain why certain organisms live in certain habitats and how they adapt to those habitats
- ✓ Describe and provide an example of an ecosystem

### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Determine the main ideas of “Animals and Their Habitats”; recount the key details pertaining to animals, habitats, and ecosystems and explain how they support the main ideas of ecology and interconnected environments (RI.3.2)
- ✓ Describe an image that shows many species of living things in various ecosystems and how the image contributes to what is conveyed by the words in “Animals and Their Habitats” (RI.3.7)
- ✓ Compare and contrast the key details presented in “Animals and Their Habitats” about ecosystems and habitats (RI.3.9)
- ✓ Categorize and organize images of animals into their appropriate ecosystems (W.3.8)

- ✓ Make predictions prior to and after “Animals and Their Habitats” about how a person is connected to an ant or bee based on the text heard thus far, and prepare to compare the actual outcomes to predictions in the next read-aloud (SL.3.1a)

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**algae, n.** Very small plants without leaves, stems, or normal roots that grow in and/or near water

*Example:* Algae produce much of Earth’s oxygen, and many animals, such as whales and fish, depend on them for food.

*Variation(s):* alga

**ecology, n.** The scientific study of the relationship between living things and their environment

*Example:* Justin had always enjoyed observing animals in their habitats, so deciding to study ecology at college was an easy decision.

*Variation(s):* ecologies

**ecosystems, n.** Communities of living and nonliving things that interact in particular environments

*Example:* Whether in a lake, puddle, forest, or dead log, on a mountaintop, or beneath a glacier, all ecosystems contain living things and nonliving things that interact together.

*Variation(s):* ecosystem

**environment, n.** The air, water, minerals, organisms, and all other living and nonliving factors that surround and affect an organism

*Example:* The polar bear is designed to exist and thrive in a cold environment.

*Variation(s):* environments

**habitat, n.** The place where an animal or plant normally lives and grows

*Example:* The ocean is the shark’s natural habitat.


*Variation(s):* habitats

**organisms, n.** Living things

*Example:* After turning over a log from an old, fallen tree, Diana discovered many organisms living there, such as earthworms and millipedes.

*Variation(s):* organism

**tolerant, *adj.*** Able to endure something without being harmed  
*Example:* Melissa planted the pepper plants in the sunniest spot in the garden because they were highly tolerant of light and heat.  
*Variation(s):* none

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>Domain Introduction</b>		10
	<b>Essential Background Information or Terms</b>		
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Animals and Their Habitats</b>	Image Cards 1–5 (optional); chart paper, chalkboard, or whiteboard; map of North America	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Tolerant</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>Which Ecosystem Am I?</b>	Image Cards 1–5	20
	<b>Where Do I Belong?</b>	Image Cards 1–27	
<b><i>Take-Home Material</i></b>	<b>Family Letter</b>	Instructional Masters 1B-1 and 1B-2	



# Animals and Their Habitats

1A

## Introducing the Read-Aloud

10 minutes

### Domain Introduction

**Note:** Students who have participated in the Core Knowledge Language Arts program have learned about many of the concepts in this domain in the Kindergarten *Taking Care of the Earth* domain and in the Grade 1 *Animals and Habitats* domain, including information about recycling, conservation, and the different types of animals and habitats. If you have taught Grade 3 *Classification of Animals*, students will be familiar with many different kinds of ecosystems and the ways in which animals are adapted to their habitats.

Tell students to think about the ocean, and ask, “Are there living things in the sea? What are a few examples of living things?” Next, ask students to think about their neighborhood, and ask them, “Are there living things in your neighborhood? What are a few examples of living things that exist in your neighborhood?” Follow this pattern to discuss living things in the school and in the classroom. Encourage students to think of other living things in addition to animals and humans, such as plants and fungi.



#### ← Show image 1A-5: Ecosystems of species

Ask students to describe what they see in the image. Guide them to discuss all of the living things they can see. Tell students that all over the world, from areas as wide as the ocean to areas as small as a puddle on the sidewalk, life exists. Explain that some forms of life are easy to see—for example, humans or flowers—whereas other forms of life can only be viewed by using a microscope—for example, bacteria or some types of plankton. Tell students that each life form is suited to live in a certain place. For example, fish have gills that allow them to breathe and live in water. Ask students, “Who remembers the name for the place where an animal or plant is specially suited to live and grow?” (habitat) Tell students that they are going to learn more about the different types of habitats.

Tell students that for the next several days, they will hear about the different places where both living and nonliving things exist and how they

interact with one another. Share with students that they will also learn more about the feeding relationships between living organisms, and how humans can take better care of the earth.

### **Essential Background Information or Terms**

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Tell students that they will learn about something called “the balance of nature.” Ask students, “If something is balanced, what does that mean?” (It is in harmony; all parts have an equal amount.) Ask students to recall the groups of people they learned about recently who tried to live in “long-term” balance with nature. (the Native Americans)

Tell students that at times, the balance of nature is thrown off by different events. Ask students to think about what types of things might throw off the balance of nature. Remind students that the titles of stories can often give us clues as to what the content is about. Read students the titles of Read-Alouds 5 and 6—“Natural Changes to the Environment,” and “Human Changes to the Environment”—and tell students that both nature and humans are responsible at times for throwing off the balance of nature.

### **Purpose for Listening**

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Tell students to listen carefully to learn more about animals and their homes. Tell students to listen for the main ideas, or the most important points, of this read-aloud, and let them know you will ask them to summarize these main ideas after they hear the read-aloud.





**Animals and Their Habitats**

← **Show image 1A-1: Animals in their habitats; Zeke**

How can squirrels live in cities? Why do bears live in forests, and why do whales live in oceans? Do you ever wonder about such things? Plenty of people do.

Hi, my name is Zeke, and I am one of those people who never stops wondering and asking questions. When I was your age, I asked, “What do worms eat? Why do some animals migrate from place to place? Where do mosquitoes live? How do flowers live in the desert? Who can survive on glaciers?” When I grew up, I decided to become a scientist to try and find the answers to my growing number of questions.



← **Show image 1A-2: Zeke showing the word ecology**

The science that I studied in college is called **ecology**. Its name comes from the Greek language: the word *oikos* [oy-kos], meaning “house” or “household,” spelled ‘eco’ in English; and the suffix – *ology*, meaning “the study of.” Ecology is the study of households—the households of living things such as plants and animals, that is. Plants and animals do not live alone. They are part of a system of households, communities called **ecosystems**.



← **Show image 1A-3: Zeke meeting Rattenborough**

As an ecologist, I study ecosystems all over the world.<sup>1</sup> I learn about plant and animal relationships, and how they interact with one another and with their **environment**. I love my job because I help others understand how everything on Earth is connected.

On my travels a few years back, I met a friend of yours—Rattenborough.<sup>2</sup> He and I made a great team because he is able to squeeze into tight spaces, and can poke around in nooks and crannies that I can barely get my big toe inside! Rattenborough told me what quick learners you are and asked if I would come talk to you about ecosystems. I can hardly wait. So, let’s begin!

- 1 [Write *ecology*, *ecosystem*, and *ecologist* on the board.] What prefix do these words share? (*eco*–) Based on the context, what do you think this prefix means or relates to? (Earth’s environments)
- 2 Do you remember Rattenborough? He is the rat who helped you learn about how we classify animals.



← **Show image 1A-4: Humans and varying species of animals**

Ecosystems exist on plains and in deserts, forests, lakes, rivers, and oceans. They may be as small as a puddle or as large as a rainforest. They may occupy water or land. No matter their size or location, ecosystems always include living **organisms**.

Organisms are sorted by species.<sup>3</sup> For example, you are a member of the human species. You may look quite different from the person sitting next to you, but you are similar enough so that nobody will mistakenly think that you may be a member of the cat or dog species.<sup>4</sup> Ants belong to their own species, quite different from humans. Jellyfish and elephants each have their own separate species, too. Each species is unique and has characteristics or traits unlike any other species.<sup>5</sup>

- 3 Species are groups of living things that share similar characteristics.
- 4 What similarities do humans share with one another? (multiple body systems such as skeletal, muscular, nervous, etc.)
- 5 What trait would you say makes humans a unique species? (Answers may vary.)



← **Show image 1A-5: Ecosystems of species**

An ecosystem is home to a variety of species, groups of living plant and animal organisms. But an ecosystem includes lots more than just living things, and many parts of an ecosystem are hidden from view. Sunlight, water, air, sand, rocks, and soil are all important parts of an ecosystem. These nonliving parts help determine what kinds of plants and animals are able to live in each different ecosystem.<sup>6</sup> For example, plants needing shade and plenty of water would not be very **tolerant** of, or able to endure, hot desert climates. Each species has its own **habitat**, or special home, within the ecosystem.

- 6 Who can point to some nonliving things in this image?

I know that Rattenborough has taught you so much about animals this year. He may have also introduced you to animal habitats, or homes, when you were in the first grade. Do you remember the names of any of those habitats?<sup>7</sup> Forests, deserts, savannas, the tundra, saltwater oceans, and freshwater lakes, rivers, ponds, and streams—all of these are home to a number of animals and plants. Sometimes you will hear people call these large areas habitats, and at other times you may hear them called ecosystems. Both are correct. *Biome* is another name you might hear for a large-scale ecosystem, but ecologists do not all agree on precisely how to

- 7 [Pause for answers. You may choose to show Image Cards 1–5 of these habitats now, or wait until the extension. Image Card 2 (Sonoran Desert) provides a great opportunity to review plateaus, mesas, and buttes [byooitz] from the *Native Americans* domain.]



define what a biome is or how to classify the number of biomes that exist on earth. You may learn more about biomes in later grades. For now we will stick with the terms *habitats* and *ecosystems*.

← **Show image 1A-6: Rainforest animals in their habitat**

The word *habitat* can also refer to a smaller area that is part of an ecosystem. In other words, a habitat refers to the preferred home of a plant or animal. An ecosystem, then, would be a collection of habitats. But don't get the idea that an ecosystem is *just* a group of homes for animals and plants to live in by themselves! In every ecosystem, perhaps the most important feature is the *interaction* between living and nonliving things.

To understand the difference between ecosystems and habitats, let's look at rainforests. A rainforest is an ecosystem, a community of living and nonliving things.<sup>8</sup> Within the rainforest ecosystem, there are many different species of plants and animals, such as trees, worms, snails, butterflies, frogs, snakes, jaguars, monkeys, turtles, as well as some humans living in dwellings.

Each one of these species lives in its own special area—a “just-right” habitat where it can thrive within the rainforest ecosystem. Worms live beneath the soil. Some monkeys scamper along the forest floor, whereas others swing from the high tree branches far above the ground. Jaguars rest on low-lying branches. All living things occupy habitats to which they are particularly suited—butterflies flit amongst the ferns and the snail propels itself along a leaf. More than one species may share the same habitat, as you can see the turtle and frog do, but they interact in a way that helps shape the whole community, or ecosystem.

← **Show image 1A-7: Beaver with food, water, shelter, and space**

Physical factors of the environment affect and allow certain organisms to live in certain habitats. A habitat supplies all of an organism's needs for survival—food, water, shelter, and space. Organisms have adapted to their changing environments over time, allowing them to survive. Let's look at a few of these plant and animal adaptations in different habitats and ecosystems around the world.



8 What are some things you would expect to find in a rainforest? [Have students identify any plants or animals in the image they may know.]



← **Show image 1A-8: Different forests and animals**

I mentioned the rainforest and its many habitats. Rainforests are just one type of forest. Forests vary widely, depending upon climate and soil differences. The trees of some forests are deciduous, which means they drop their leaves every year, whereas others are coniferous, which means they are cone-bearing evergreens.<sup>9</sup> Different types of forests support different types of plant and animal life. What forest animals can you name?<sup>10</sup> Some, like jaguars, have the balance needed to lie on the low-lying branches of trees. Bears have adapted to their habitat by growing claws needed for climbing trees to find food. Others, like monkeys, have long tails for gripping tree branches as they climb higher and higher. The beaks of some birds are well designed for breaking open seeds, whereas others are designed for sipping nectar from flowers.

9 [Point to the two types of trees in the first photo and explain that sometimes deciduous and coniferous trees grow in the same place.]

10 [Pause for answers.]



← **Show image 1A-9: Different desert plants and animals**

Deserts are arid regions, marked by little rainfall.<sup>11</sup> Succulents—plants with spiny, waxy leaves—are often found in the desert. These special plants, such as cacti, are able to store water in their stems.<sup>12</sup> Some desert plants have long root systems, enabling them to suck up water at a distance. And most desert plants are spaced wide apart, avoiding competition for water. Some desert insects, such as certain types of beetles, have waxy bodies that help them reduce water loss. Other animals, like the famous camels, are able to survive for long periods of time without drinking water because they store water in their bodies and have adapted to be able to tolerate high body temperatures.

11 Arid places are places that are very dry. [If you taught the *Native Americans* domain, you may wish to ask students which groups of Native Americans lived in the arid desert. (Ancestral Pueblo, Hopi, Zuni, etc.)]

12 The word *succulent* can also be used to describe things that are juicy, or full of moisture.



← **Show image 1A-10: Different grasslands and animals**

Savannas, or grasslands, usually have few trees or shrubs.<sup>13</sup> Rainfall varies, with some grasslands being wetter than others. The types of grasses vary, too, depending upon temperatures and the amount of rainfall in the region. Sometimes grasses are seasonal, growing only in winter or spring. Where this is the case, animals often adapt their habits to match the growth of plants in their ecosystem. For example, when little grass is available, antelopes migrate, and some small rodents hibernate.<sup>14</sup> Because there are

13 Who can name a place where there is a savanna? (Africa)

14 Who can share what it means to migrate? (to move to a new place to find food and/or a warmer climate) What does it mean to hibernate? (to spend winter in a dormant or inactive state)

few places to hide from enemies in the open grasslands, antelopes display another adaptation for survival. Known for their speed, they run at rates greater than fifty miles per hour.



← **Show image 1A-11: Arctic fox and caribou in the tundra**

Arctic lands are called the tundra. These treeless areas near the North Pole are cold for most of the year. The arctic tundra is dark all winter long, and there is permanently frozen water beneath the ground. During brief summers of constant sunlight, a few plants grow, but there is very little vegetation. One animal that is well adapted to the arctic tundra is the arctic fox.<sup>15</sup> He has a short, round body with lots of fur and little skin exposed to the cold. Lemmings, small rodents of the tundra, burrow under the snow to conserve heat, whereas many other animals, like the caribou in this image, migrate to warmer areas for the winter.

15 Who remembers where the Arctic and Subarctic regions are and which Native American group lived in these areas? (Inuit) [Have a volunteer point to the regions on a map of North America.]



← **Show image 1A-12: Aquatic ecosystem**

Ecosystems are not limited to land areas. You know that living organisms also live in aquatic, or watery, habitats.<sup>16</sup> Freshwater ecosystems—those with little salt—include lakes and ponds, as well as rapidly running streams and rivers. In still waters, **algae** will float on the surface of the water, but in running streams, algae clings to rocks, preventing the currents from washing it away. The physical adaptations of water insects, such as long, claw-footed legs, enable them to hold onto rocks and avoid being swept away by the currents. How is it that fish are able to breathe underwater?<sup>17</sup> Yes, fish breathe through gills, which allows them to breathe underwater without having to come to the surface.

16 Who can name different types of aquatic habitats? (freshwater, saltwater, lakes, ponds, oceans, rivers, streams, etc.)

17 [Pause for students to share.]



← **Show image 1A-13: Saltwater ecosystem**

Saltwater ecosystems support a wide variety of plant and animal life. The organisms that call Earth's oceans home cannot survive without the salty content of its waters. Like smaller creatures on land that are eaten by bigger creatures, ocean creatures have adapted in many different ways, including camouflage and poisonous spines. Many fish have special ways of lighting up to either attract prey or ward off danger.<sup>18</sup>

18 Can you find the octopus camouflaged in its saltwater habitat?



← **Show image 1A-14: Zeke showing interconnected organisms in ecosystem and saying goodbye**

Together, we will explore plant and animal life in ecosystems around the world, remembering that everything on Earth is interconnected. Next time, we'll look at some of the links that make these connections. How do you think you are connected to an ant or a bee? You'll soon find out if you are right!

## ***Discussing the Read-Aloud***




**20** minutes

### **Comprehension Questions**



15 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses. **It is highly recommended that students answer at least one question in writing and that some students share their writing as time allows.** You may wish to have students collect their written responses in a notebook or folder to reference throughout the domain as source material for longer writing pieces and as preparation for written responses in the Domain Assessment.

1. *Literal* If someone studies the field of science called ecology, what do they examine? (the relationships between living things and their environment) What is this person called? (an ecologist)
2. *Literal* What is a habitat? (the special home of a certain species) What are some examples of habitats that you heard in the read-aloud? (soil, low-lying branches, trees, etc.)
3. *Literal* What makes up an ecosystem? (animals' habitats, including living and nonliving things) What are some examples of ecosystems that you heard in the read-aloud? (tundra, forests, oceans, streams, ponds, lakes, savannas, deserts, etc.)

4.  *Evaluative* Compare and contrast ecosystems and habitats. (They are alike because they are both homes for living things; they are different because a habitat is the preferred, usually smaller, home of a plant or animal, but an ecosystem includes an entire community, usually larger, of both living organisms and nonliving things. Interactions between living and nonliving things are the important part in an ecosystem, rather than just a place that provides a home.)
5.  *Inferential* We know that organisms become tolerant of their habitats through adaptation. One example of this is algae clinging to rocks so it won't wash away. Name other examples of these kinds of adaptations you heard about in the read-aloud. (Answers may vary, but may include succulents storing water in their stems, allowing them to live in the arid desert; the arctic fox having a short, round body and lots of fur, allowing it to survive in extreme cold; the antelope migrating and running very fast, allowing it to survive in the grassland.)
6.  *Evaluative* How would you summarize the main ideas of today's read-aloud? (Ecology is the study of the environments of living things. Animals have adapted in ways that make them well-suited to live in certain habitats. Habitats are homes which make up ecosystems; ecosystems include living and nonliving things. All living and nonliving things in habitats and ecosystems are interconnected.)

I am going to ask you a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7.  *Evaluative Think Pair Share:* Today you heard that both living and nonliving things are part of an ecosystem. Can you think of a way in which nonliving things, such as rocks or sand, help animals survive? (Answers may vary, but may include that rocks provide shade, the sand is a place an animal could burrow in to hide, etc.)
  8. After hearing today's read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Tolerant

5 minutes

1. In the read-aloud, you heard, “Plants needing shade and plenty of water would not be very *tolerant* of, or able to endure, hot desert climates.”
2. Say the word *tolerant* with me.
3. *Tolerant* means able to endure something without being harmed.
4. Chantelle explained to her father that because she had eaten peanut butter and jelly sandwiches for lunch for so many years, she was no longer tolerant of them.
5. What is something that you have observed that is tolerant of something else? What is something that you are tolerant of? Be sure to use the word *tolerant* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to be complete sentences: “Our older dog is tolerant of . . .” or “I am tolerant of . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *tolerant*?

Use a *Making Choices* activity for follow-up. Directions: People have different thoughts and reactions to different situations. For example, some people have a hard time on roller coasters and are not tolerant of them. But other people might like roller coasters very much and may be quite tolerant of them. I am going to name something. If you can tolerate it, say, “I am tolerant of \_\_\_\_\_.” If you cannot tolerate it, say, “I am not tolerant of \_\_\_\_\_.” Explain your reasons for being tolerant or not. (Answers may vary for all.)

1. a messy room
2. bad manners
3. loud music
4. raw vegetables
5. video games
6. having a pet



**Complete Remainder of the Lesson Later in the Day**





# Animals and Their Habitats

1B

## Extensions

20 minutes

### Which Ecosystem Am I?

Explain to students that you will read clues to them about the ecosystems they have heard about today. Once they have listened to the clues, ask students to predict which ecosystem you are describing. After students have made their predictions, show them the relevant images below. Have them explain how the clues you have read described this ecosystem. Encourage students to share other adaptations of plants and animals in each.

1. This ecosystem can vary greatly according to where it is located in the world.

It may receive a lot of rain, it may have trees with pine cones, or it may have deciduous trees that drop their leaves.

Animals living here may have characteristics or adaptations that allow them to balance on or climb trees, such as having claws; birds may have beaks that are well designed for opening seeds or sipping nectar.

What is the name of this ecosystem? (forest)



- ← **Show image 1A-8 and Image Card 1 (Temperate Deciduous and Tropical Rainforest)**

2. This ecosystem is arid and receives very little rainfall. In North America, it includes plateaus, mesas, and buttes.

Plants have adapted in various ways, such as storing water in their stems, having long root systems to get water from a distance, and being spaced apart to avoid competing for water.

Some animals have adapted to the arid climate by having waxy bodies, whereas others can store water, enabling them to go without it for relatively long periods of time.

What is the name of this ecosystem? (desert)



← **Show image 1A-9 and Image Card 2 (Sonoran Desert)**

3. In this ecosystem, there are few trees.

The amount of rainfall and the types of grasses vary.

There are few places for animals to hide from their enemies, so some animals have adapted by being able to run very quickly.

This ecosystem can also be referred to as grasslands.

What is the name of this ecosystem? (savanna)



← **Show image 1A-10 and Image Card 3 (East African Savanna)**

4. This ecosystem has shrubs but does not have trees.

It is located near the North Pole, and it is cold for most of the year.

During the winter, it is dark all the time, and very little vegetation exists.

One animal that is well adapted for this ecosystem is the arctic fox; it has thick fur, and little skin is exposed to the cold. The caribou migrates from this region in the winter.

What is the name of this ecosystem? (tundra)



← **Show image 1A-11 and Image Card 4 (Arctic Tundra)**

5. This ecosystem may have fresh water, or it may have salt water.

It can cover a huge amount of space, or take up a very little amount of space.

One characteristic of animals living here is the presence of gills to breathe under water.

What is the name of this ecosystem? (Several different answers are acceptable, including freshwater, saltwater, oceans, lakes, ponds, rivers, streams, aquatic, etc.)



← **Show image 1A-12 and Image Card 5 (Freshwater and Saltwater Habitats)**

### Where Do I Belong?

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Display Image Cards 1–5 in columns on the wall or spread them out on a table. Guide students in placing Image Cards 6–27 under the correct ecosystem. Some animals, such as the insects and millipedes, will apply to more than one ecosystem and may be placed in their own column.

There may be some animals that students do not recognize yet; you may wish to set these images aside until they are reviewed later. Also, encourage students to look for clues in the images that may indicate which ecosystem is depicted. As students categorize the animals, encourage them to use domain-related vocabulary.

## ***Take-Home Material***

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### **Family Letter**

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Send home Instructional Masters 1B-1 and 1B-2.



# Food Chains, Part I

## 2

### ☑ **Lesson Objectives**

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#### **Core Content Objectives**

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Students will:

- ✓ Describe and provide an example of a habitat
- ✓ Describe how organisms in an ecosystem depend on each other and their environment
- ✓ Describe what happens in a food chain
- ✓ Identify the three essential parts of a food chain: producers, consumers, and decomposers
- ✓ Sequence a food chain of two or more trophic levels
- ✓ Classify members of a food chain as producers, consumers, or decomposers

#### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Sequence three to four trophic levels of a food chain illustrating the cycle of producers, consumers, and decomposers from “Food Chains, Part I” (RI.3.3)
- ✓ Describe the relationship of producers, consumers, and decomposers in a food chain, using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Describe an image of a rainforest ecosystem comprised of animals and habitats and how the image contributes to what is conveyed by the words in “Food Chains, Part I” (RI.3.7)
- ✓ Interpret information from diagrams of food chains and food webs (RI.3.7)

- ✓ Compare and contrast the key details presented in “Food Chains, Part I” about herbivores, carnivores, and omnivores, and about different types of networks, such as food chains, food webs, human body systems, and road systems (RI.3.9)
- ✓ Make personal connections to food chains in “Food Chains, Part I” by exploring one’s own neighborhood and observing connections in nature (W.3.8)
- ✓ Categorize and organize images of organisms into producers, consumers, and decomposers (W.3.8)
- ✓ Make a prediction prior to “Food Chains, Part I” about how a person is connected to an ant or bee based on the text heard thus far, and compare the actual outcomes to predictions (SL.3.1a)
- ✓ Summarize in writing, read-aloud content pertaining to the relationship of producers, consumers, and decomposers in the cycle of a food chain (SL.3.4)
- ✓ Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships to describe the steps of a food chain, such as *first*, *next*, *then*, and *finally* (L.3.6)
- ✓ Draw a diagram of a food chain cycle with at least one producer, consumer, and decomposer, and include arrows between each to represent the main ideas and key details from “Food Chains, Part I”

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**consumers, n.** Animals or other living organisms in a food chain that eat other living things

*Example:* Rabbits and squirrels are consumers of plants, and hawks are consumers of both rabbits and squirrels.

*Variation(s):* consumer

**decomposers, n.** Types of consumers, such as bacteria, fungi, and worms, that break down dead animals and plants; the final link in a food chain

*Example:* Fungi are essential decomposers, helping to break down dead organisms on which they grow.

*Variation(s):* decomposer

**food chain, n.** A relationship of living things as food sources for other living things

*Example:* Jeremy drew a food chain of a seed, a mouse, and an owl.

*Variation(s):* food chains

**food webs, n.** Interconnected food chains

*Example:* The food chains of the different types of species living in the ocean often interconnect, creating various food webs.

*Variation(s):* food web

**interdependent, adj.** Describes people or things that rely on each other

*Example:* The different systems in the human body are not only interconnected, but also interdependent, because they all need to function properly to work together as a whole.

*Variation(s):* none

**photosynthesis, n.** The process in green plants that uses light to turn water and carbon dioxide into food


*Example:* During photosynthesis, water, nutrients, and light come together in a green plant’s leaves; this is how plants make food for themselves and for the organisms that consume them.

*Variation(s):* none

**producers, n.** Organisms that make their own energy and provide their own nutrients

*Example:* Green plants are important producers in an ecosystem and are the first link in a food chain.

*Variation(s):* producer

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Have We Already Learned?</b>	Image Cards 1–5	
	<b>What Do We Know?</b>	chart paper, chalkboard, or whiteboard	
	<b>Making Predictions About the Read-Aloud</b>		
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Food Chains, Part I</b>	Image Cards 27–29; chart paper, chalkboard, or whiteboard	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Producers</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>Producer, Consumer, Decomposer Sort</b>	Image Cards 6–29; Instructional Master 2B-1	20
	<b>Food Chain Graphic Organizer</b>	Image Cards 6–29	



# Food Chains, Part I

2<sub>A</sub>

## Introducing the Read-Aloud

10 minutes

### What Have We Already Learned?

Review with students what was learned in the previous read-aloud. You may wish to ask the following questions:

- What do we call the field of science that studies the households of animals and plants? (ecology) What is an ecologist? (a person who studies ecology)
- What is a habitat? (an animal's home that provides food, water, shelter, and space)
- What is an ecosystem? (a community of living and nonliving things interacting and living in multiple habitats)
- [Show Image Cards 1–5 and review the types of ecosystems.] What are some habitats within these ecosystems? What types of animals are well adapted to live in these ecosystems?

### What Do We Know?

Tell students that the title of today's read-aloud is "Food Chains, Part I." Ask students, "Who can share what a food chain is?" (a relationship of living things as food sources for other living things) Draw a simple food chain on chart paper, a chalkboard, or a whiteboard, such as wheat > mouse > cat. Explain that first the wheat is a food source for the mouse, and then the mouse is a food source for the cat. Ask students to provide one or two of their own simple food chains.

### Making Predictions About the Read-Aloud

Remind students that at the end of the last read-aloud, Zeke the ecologist asked them to think about how they are connected to an ant or a bee. Tell students that they will find out whether their predictions are correct after the read-aloud.

### Purpose for Listening

Tell students to listen carefully to find out more about food chains and whether their predictions are correct.





## Food Chains, Part I

### ← Show image 2A-1: Zeke showing interdependent organisms

Last time we met, I talked about ecosystems that cover different parts of the earth. What is an ecosystem? <sup>1</sup> An ecosystem is a community of both living organisms and nonliving things that interact with one another and their physical environment. Living and nonliving things work together in an ecosystem. They are interconnected and depend on one another. They are, in other words, **interdependent**.

1 [Pause for students to share.]



### ← Show image 2A-2: Organisms and habitats in ecosystem

Different habitats, or homes, exist within a particular ecosystem. <sup>2</sup> Remember, habitats are where plant and animal species normally live and grow. Species are groups of living organisms that share the same characteristics. Because they also share the same needs, they live in a shared habitat where all of their needs can be met.

2 Who can tell me what type of ecosystem this is? (rainforest) What kinds of habitats and animals do you see? (trees/monkeys, water/turtles, ground/worm, etc.)

What do organisms need to survive, or continue to live? All organisms within a habitat, and all habitats within an ecosystem, are connected by a common need: food. Food provides nutrients and energy, or fuel, which organisms need in order to grow, breathe, and move around. Where does this energy come from? <sup>3</sup> Yes, the sun's energy is transferred in different ways as fuel for different organisms, but the source of nearly all our energy comes from the same place—the sun!

3 [Pause for students to answer.] (the sun)



### ← Show image 2A-3: Energy and food sources

Almost all the energy needed for life on Earth comes from sunlight. Ecosystems—from deserts to rainforests—may look very different from one another, but they all depend on the sun for energy. <sup>4</sup> Energy flows through the ecosystem, passing from sunlight to plants, animals, and humans. This energy then also passes through plants to animals and humans. All living things within an ecosystem are interdependent on one another. They need one another in order to survive.

4 [Point out the paths from the sun to the living organisms as you read the following sections.]



← **Show image 2A-4: Child linked to apple tree**

Plants, animals, and humans are linked by the transfer of this energy in the food they eat. For example, when you eat an apple, you are part of a link in a chain. Where did that apple come from? A tree. And where did the tree get its energy, or food, needed to grow the apple? From sunlight. The sun's energy passed from the tree's fruit to you. You and the tree are both links in the same chain—the **food chain**. That's a rather simple example, with only two links—you and the tree. These links, or connecting steps in the food chain, are called trophic [TRAW-fik] levels.<sup>5</sup>

- 5 Say the word *trophic* with me. You will hear the word *trophic* throughout the rest of these read-alouds when discussing the connecting steps in a food chain. Listen carefully to learn about trophic levels.

Because every living organism needs to eat, every organism belongs to at least one food chain. Every food chain has at least two feeding, or trophic, levels. Trophic levels show who eats what within an ecosystem. There are many, many food chains in nature, and every one of them has three essential, or necessary parts: producers, consumers, and decomposers. Let's take a look at each part.

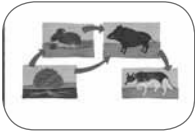


← **Show image 2A-5: Producers absorbing sunlight and water**

All food chains begin with living things that produce their own food. On land, green plants are the main **producers**. Plants are the only living things that make their own food. How do they do that?<sup>6</sup> That's right, they depend on the sun. The sun's energy enters the plants' leaves. Plants absorb water through their underground roots, and take in carbon dioxide, a gas, from the air.<sup>7</sup> With the help of the sun's energy, plants change water and carbon dioxide into the food they need to grow. This is called **photosynthesis**.

- 6 [Pause for answers.]
- 7 Carbon dioxide is a gas produced when humans and animals breathe out, or when carbon-based fuel is burned.
- 8 [Show Image Card 28 (Algae, Grass and Berries, Lichen, and Moss) and point to each image as you read.] Lichens are plant-like organisms that are formed when fungi and algae live together and grow on hard surfaces. They are a favorite food of the caribou.

Producers include algae, lichens, and mosses, in addition to plants like trees and grasses.<sup>8</sup> Plants are the first feeding step, or trophic level, of every food chain. All animals depend on plants to live, even if they do not eat plants themselves. Producers, at the bottom of every food chain, perform another very important job in an ecosystem. As they take in water, sunlight, and carbon dioxide, they also release oxygen into the air. Oxygen is a gas that is essential for all organisms to live. There are producers in every ecosystem. Without them, there would be no life on Earth.



← **Show image 2A-6: Producers linked to consumers**

The next trophic level is composed of **consumers**. Animals cannot make their own food. Even though animals and humans receive some energy directly from the sun, they also must consume, or eat, food to get the energy and nutrients they need to survive.<sup>9</sup> Sometimes this trophic level is broken into more than one level, or feeding step, because there are several different types of consumers, or eaters. The consumers in this image are the mouse, the boar, and the wolf. Some consumers eat only plants, some eat only animals, and others eat both plants and animals.

9 Who can share what nutrients are? (substances that provide nourishment for survival)

These three types of consumers have specific names. Who remembers what we call animal consumers who consume only plants?<sup>10</sup> Yes, plant-eaters are called herbivores. Herbivores may be as small as squirrels or as large as elephants. Can you name some other herbivores, consumers who eat only producers?<sup>11</sup>

10 [Pause for answers.]

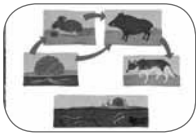
11 [Pause for answers.]

The second type of consumers belongs to the group called carnivores. Who knows what carnivores eat?<sup>12</sup> That's right. Carnivores are primarily meat-eaters. Carnivores usually do not eat producers, but instead eat other consumers. Examples of carnivorous animals include lions, polar bears, and sharks.

12 [Pause for answers.]

Omnivores are the third type of consumers. They eat both producers and other consumers. Rats, raccoons, skunks, and pigs are all omnivores. Many humans are omnivores, too, eating both plants and animals. Do you eat both plants and animals? Then, you are an omnivore. Raise your hand if you are an omnivore.<sup>13</sup>

13 [Pause for a show of hands.]

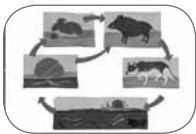


← **Show image 2A-7: Producers, consumers, and decomposers**

When plants and animals die, they sometimes become food for other animals. Have you ever seen a vulture or a crow eating dead animals by the roadside? These consumers are animals called scavengers.<sup>14</sup> But scavengers rarely finish the job. For that, nature relies upon another essential part of the food chain. Who remembers the name of the organisms that work together with the producers and the consumers? They are the **decomposers**.<sup>15</sup> Decomposers are a special type of consumer that continues the work of scavengers if parts are left behind. Decomposers decompose, or break down, dead plants and animals and their wastes. By doing so, they feed themselves while returning valuable nutrients back into the soil to be reused by other organisms in the food chain. Just as with scavengers, some decomposers also eat living plants and animals. Decomposers—worms, slugs, snails, beetles and other insects, microscopic bacteria, and fungi—are some of Earth’s greatest recyclers. They are very important to an ecosystem. Without decomposers, plants would not get the nutrients they need, and Earth would be crowded with the dead remains of plants and animals.

14 [Show Image Card 27 (Vulture).] A scavenger will eat animals that have already died, or will consume items from the garbage. Some scavengers, such as crows, also eat living plants and animals.

15 [Show Image Card 29 (Fungi, Earthworm, Ground Beetle, and Microorganisms).] Scavengers are always animals, whereas decomposers can be animals, fungi, or microorganisms such as bacteria.



← **Show image 2A-8: Full cycle completed**

Producers, consumers, and decomposers—the three essential parts to every food chain—create a cycle of energy. Energy is transferred in a circular fashion from one organism to another and back again into the soil to help new producers grow.<sup>16</sup> If there were no producers, there would be nothing for consumers to consume, so there would be no consumers. Without consumers, there would be nothing to decompose, so there would be no need for decomposers. Producers, consumers, and decomposers are equally dependent upon one another. They are interdependent links in all food chains, passing stored energy from one organism to another. The ongoing, regular completion of this energy cycle in food chains determines an ecosystem’s ability to survive.

16 What word part do you recognize in *circular*? What do you think *circular* means?



← **Show image 2A-9: Caterpillar food chain**

Let's look at an example of another rather simple food chain. First, a leaf creates its own food. Next, a caterpillar eats the leaf. Then, a small bird eats the caterpillar. Then, a large bird of prey swoops down and eats the small bird. Energy has passed from the leaf to the caterpillar to the small bird to the bird of prey. How many trophic levels are represented?<sup>17</sup> Who was the producer? The leaf. Who were the consumers? There were three. Can you name them? First, the caterpillar consumed the leaf. Next, a small bird consumed the caterpillar. Then, the large bird consumed the small bird. But that is not the end of the cycle, is it? What is the final step?<sup>18</sup> That's right. Finally, the large bird dies and the decomposers begin their important work of breaking down the animal's body into the soil and helping new producers to grow. This simple food chain can be drawn with arrows onto a piece of paper.<sup>19</sup>

17 [Pause for answers.] (four)

18 [Pause for answers.]

19 [Draw the food chain on chart paper or on the board in a circle with arrows:  
leaf>caterpillar>small  
bird>large  
bird>decomposers>leaf.]



← **Show image 2A-10: Food web**

But nature is rarely that simple. Think about what else could happen to change the simple pattern of these circular arrows. Who else might eat the caterpillar?<sup>20</sup> Perhaps a lizard or a frog would find the caterpillar tasty. And who else might eat the small bird?<sup>21</sup> Perhaps a cat or snake would make a meal of it. Lizards and frogs and cats and snakes are members of other food chains as well. When an animal from one food chain eats a member of another food chain, two food chains connect, and the chains begin to look far more complicated with many arrows going many different ways. When food chains overlap like this, the complicated patterns that they form are called **food webs**. Many different plants and animals can be included in food webs.

20 [Pause for answers and point to the caterpillar in the image.]

21 [Pause for answers.]




← **Show image 2A-11: Zeke at the park saying goodbye**

Before we get together again, go for a walk around your neighborhood to see how many connections you can find in nature around you. What different parts of food chains can you identify? Who eats the berries, flowers, seeds, and nuts that plants produce? Who eats the bark of trees and the blades of grass? We'll talk more about food chains and food webs next time. See you soon!

## Comprehension Questions


15 minutes



If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses. **It is highly recommended that students answer at least one question in writing and that some students share their writing as time allows.** You may wish to have students collect their written responses in a notebook or folder to reference throughout the domain as source material for longer writing pieces and as preparation for the Domain Assessment.

1. *Evaluative* Were your predictions about how you might be connected to an ant or a bee correct? Why or why not? (Answers may vary; guide students in providing simple food chains demonstrating how they could be connected to these two insects, e.g., plant>ant>fish>human; flower>nectar>bee>bird>human; flower>nectar>bee>honey>human)
2.  *Evaluative* Today you heard that organisms in an ecosystem are interdependent. What does it mean for things to be interdependent? (They depend on each other for their survival.) What things might a mouse be dependent on in its ecosystem? (grains, nuts, etc.) What animal might be dependent on mice for food? (owls, wild cats, etc.)





### ← Show image 2A-9: Caterpillar food chain

3.  *Evaluative* How would you describe this illustration? (It's an ecosystem in which a food chain has formed among the leaf, the caterpillar, the small bird, the large bird, and the decomposers.) What is a food chain? (a relationship of living things as food sources for other living things)
4. *Evaluative* What are trophic levels? (connecting steps in a food chain) What is the smallest number of trophic levels in a food chain? (two) What is an example of a food chain with at least three living things? (Answers may vary.)

5.  *Evaluative* What are three essential parts of a food chain? What does each of these parts do? (Producers make their own food and nutrients through photosynthesis; consumers eat other plants and animals for food and nutrients; decomposers break down dead plants and animals.) Why do we say producers, consumers, and decomposers operate in a circular fashion? (First, energy is transferred from a producer to a consumer, then to another consumer, and finally back again to the soil where the decomposers break it down and help new producers grow.)
6.  *Literal* What is a food web? (complex, interconnected network of food chains)
7. *Evaluative* How are food chains, food webs, human body systems, and road systems similar? What two words can be used to describe them? (They are all *interconnected networks*.)
8. *Inferential* Algae is one example of a producer; what are two more examples? (moss, trees, plants, lichen, grasses, etc.) What is an example of a consumer, and a decomposer? (Answers may vary, but may include examples from the read-aloud such as a mouse, boar, and wolf for consumer and worms, slugs, snails, beetles, other insects, fungi, and microscopic bacteria for decomposers.)
9. What are the three types of consumers? (herbivores, carnivores, and omnivores) Compare and contrast these three types of consumers. (compare—living organisms, animals, need food to live, etc.; contrast—herbivores mainly eat producers, whereas carnivores and omnivores eat other consumers; etc.)

I am going to ask you a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

10.  *Evaluative* *Think Pair Share:* Are you a producer, consumer, or decomposer? How do you know? (We are consumers; humans cannot make our own food through photosynthesis as plants do; we eat plants and/or animals for food.)
  11. After hearing today's read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Producers

5 minutes

1. In the read-aloud, you heard, “On land, green plants are the main *producers*.”
2. Say the word *producers* with me.
3. Producers are living things that make their own energy and provide their own nutrients.
4. With light and water, producers are able to make their own food in their leaves through the process of photosynthesis.
5. What are examples of producers? Be sure to use the word *producers* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “A producer I saw once was \_\_\_\_\_ . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *producers*?

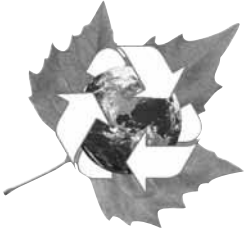
Use a *Drawing* activity for follow-up. Have students draw producers they see around the classroom or outside. Remind students that producers are eaten by consumers, mainly omnivores and herbivores.

- ✈ You may choose to have some students compare/contrast the contexts and definitions of *producers* and *consumers* as related to science and economics/social studies.



### Complete Remainder of the Lesson Later in the Day





# Food Chains, Part I

# 2<sub>B</sub>

## Extensions

20 minutes

### 10 Producer, Consumer, Decomposer Sort

Display Image Cards 6–29. Guide students in sorting the cards into groups of producers, consumers, and decomposers.

- You may choose to have students further classify the consumers into herbivores, carnivores, and omnivores.

### 10 Food Chain Graphic Organizer (Instructional Master 2B-1)

**Note:** Show students images 2A-6, 2A-7, and/or 2A-8 as they participate in this extension.

Have students look at Instructional Master 2B-1. Explain that they will write a sentence about how each part of the food chain receives food and nutrients. Remind students to write in complete sentences. Guide students to use temporal words such as *first*, *next*, *then*, and *finally* to describe the food chain cycle. Here is one possible response: “First, the producer makes its own food through the process of photosynthesis. Next, the first consumer eats the producer. Then, another consumer eats that consumer. Finally, the decomposer(s) eat the consumer and transfer energy back to the ground (producer).” Students will also write one sentence providing an example of a producer, a consumer, and a decomposer.

On the back of the page, students should draw a food chain with at least three trophic levels—one producer, one consumer, and one decomposer. Encourage students to try to include two consumers. Ask students to draw arrows to demonstrate the circular nature of the food chain. Encourage students to reference Image Cards 6–29 which were used in the previous sorting activity, to help them formulate their answers. Allow students to share their drawings and sentences as time permits, encouraging the use of domain vocabulary and temporal language.



# Food Chains, Part II

# 3

## ☑ **Lesson Objectives**

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### **Core Content Objectives**

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Students will:

- ✓ Describe and provide an example of a habitat
- ✓ Explain why certain organisms live in certain habitats and how they adapt to those habitats
- ✓ Describe and provide an example of an ecosystem
- ✓ Describe how organisms in an ecosystem depend on each other and their environment
- ✓ Describe what happens in a food chain
- ✓ Classify members of a food chain as producers, consumers, or decomposers
- ✓ Provide an example of a food chain in a given food web

### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Sequence sentences describing the trophic levels of food chains and food webs from “Food Chains, Part II” (RI.3.3)
- ✓ Describe the relationship between the trophic levels in a food chain and food web in “Food Chains, Part II” and between the tiers of an energy pyramid, using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Describe images, such as energy pyramids of the Sonoran Desert, Everglades, and the Amazon Rainforest, and how they contribute to what is conveyed by the words in “Food Chains, Part II” (RI.3.7)

- ✓ Interpret information about producers, consumers, and decomposers from the tiers of an energy pyramid (RI.3.7)
- ✓ Make personal connections to food chains in “Food Chains, Part I” by exploring one’s own neighborhood and observing connections in nature, such as which animals eat the berries, flowers, seeds, or nuts that plants produce (W.3.8)
- ✓ Categorize and organize the trophic levels of various food chains and food webs (W.3.8)
- ✓ Summarize the possible food chains and food webs in various ecosystems (SL.3.4)
- ✓ Determine the meaning of the new word formed when a known affix is added to a known word, such as *micro-* and *microorganism* (L.3.4b)
- ✓ Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships to describe the steps of a food chain, such as *first*, *next*, *then*, and *finally* (L.3.6)

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**canopy, n.** The cover in a forest formed by the leafy upper branches of the trees

*Example:* The spider monkey jumped from limb to limb across the great canopy of the rainforest.

*Variation(s):* canopies

**diverse, adj.** Describes different forms of a certain thing

*Example:* When Etienne went snorkeling, he was amazed at all the diverse fish he saw swimming around.

*Variation(s):* none

**energy pyramid, n.** A model that shows the amount of available energy in each trophic level of an ecosystem; trophic pyramid

*Example:* The energy pyramid shows that there is some energy lost at every trophic level.

*Variation(s):* energy pyramids

**tier, n.** One level of several levels


*Example:* Parker decorated the three tiers of the wedding cake with her favorite flower: lavender.

*Variation(s):* tiers

**wetland, n.** A low-lying area of land that has wet, spongy soil, such as a marsh, swamp, or bog

*Example:* The Everglades in South Florida form a vast wetland ecosystem that has a great variety of animal and plant life.

*Variation(s):* wetlands

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Have We Already Learned?</b>		10
	<b>Essential Background Information or Terms</b>	chart paper, chalkboard, or whiteboard	
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Food Chains, Part II</b>	Image Card 29	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Tier</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>Image Review</b>	Image Cards 6–29 (optional)	20
	<b>Create a Food Chain and Web</b>	drawing paper, drawing tools (green, red, and brown colored pencils)	



## Food Chains, Part II

3<sub>A</sub>

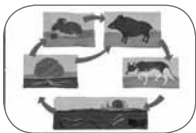
### Introducing the Read-Aloud

10 minutes

#### What Have We Already Learned?

Review with students what they have already learned about food chains. You may wish to guide the discussion by asking the following questions:

- What is an ecosystem? (a community of living organisms, including plants and animals, all interacting with one another and their physical environments)
- What is a habitat? (a home within an ecosystem)
- What are trophic levels? (connecting steps in a food chain) At least how many trophic levels exist in a food chain? (two)



#### ← Show image 2A-8: Full cycle completed

- In this illustration, which organism is a producer? (the berry bush) How does a producer get its food? (makes its own food through photosynthesis) In this illustration, which organisms are the consumers? (the boar, mouse, and wolf) How does a consumer get its food? (eats other plants and/or animals) In this illustration, which organisms are the decomposers? (worms, snail, and beetle) What is the role of a decomposer in a food chain? (breaks down dead plants and animals)

Remind students that at the end of the last read-aloud, Zeke asked them to look for food chains in their neighborhood. Ask students to share any food chains they identified. Encourage students to identify the parts of their food chains as a consumer, producer, or decomposer.

#### Essential Background Information or Terms

Tell students that today they will be looking at different ways that we organize information about feeding relationships in nature. Tell students that when we have a lot of information on one topic, it is helpful to organize that information on paper in certain ways. Tell students that there is more than one way they can organize information on paper. Ask students, “How did we organize all the information we learned about the classification of animals?” (in a chart) When the information was in a

chart, students could then see possible patterns and differences among the various classifications of animals. Review with students other visual ways they have organized information before, such as KWL (**K**now-**W**onder-**L**earn) charts, T-charts, Venn diagrams, the Native Americans Regions and Cultures Organizer, brainstorming links, etc.

Ask students, “What is one way that you have already seen the feeding relationships in ecosystems organized?” (food chain) Remind students that at the end of the last lesson, they heard that they will learn more about food webs, which are overlapping food chains. Tell students that they will see one additional way to organize information about the feeding relationships in ecosystems: an energy pyramid. Tell students that the energy pyramid shows the trophic levels (feeding levels) in a food chain. It also illustrates the amount of energy available to the different organisms.

Draw a simple pyramid on chart paper or on the board and ask students, “Which part of a pyramid is the widest, the base or the top?” (base) Producers, organisms that have the most energy, are shown at the base of the pyramid. Remind students that with sunshine and water, producers are able to make their own food, so they have the most energy available for themselves.

Tell students that they will hear about these three types of organizers today: energy pyramids, food chains, and food webs. All three of these things help us to understand and view patterns of feeding relationships within an ecosystem.

**Note:** If your students learned about the former food pyramid, you may wish to discuss this graphic organizer with them in order to compare the two organizers. Explain that the food pyramid was once used to show how much of each type of food (grains, dairy, fruits, vegetables, meats, fats, and sugars) a person should eat each day. At the widest point of the food pyramid, there were grains, meaning it was recommended that people have more grains than the other foods each day. Sugar, in contrast, was at the top, meaning that sugar was what people should have the least of each day. Tell students that the food pyramid is very different from the energy pyramid, but that they will soon see why a pyramid is an effective tool to show different amounts of energy.

### **Purpose for Listening**

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Tell students to listen carefully to learn more about food chains, food webs, and energy pyramids.



## Food Chains, Part II

### ← Show image 3A-1: Child with plate; Zeke

- 1 [Pause for answers.] Who can name the producers and consumers in this image?

Well, boys and girls, did anyone find examples of food chains in your own habitat or ecosystem? Think about what you ate for dinner last night. Where did the food that gave you energy get its own energy? Where do you belong in the food chain? <sup>1</sup>

Remember that ecosystems include all living and nonliving things in a particular community. All parts are interconnected. All living things in an ecosystem are essential and depend upon one another, and all nonliving things—the soil, climate, and amount of rainfall that an ecosystem receives—help determine what lives there.

Today, we're going to look at food chains and food webs to see what they tell us about the eating relationships among different animals in different ecosystems. First, I want to explain an **energy pyramid** to you, because I think it is a good way to view the trophic levels in a food chain.



### ← Show image 3A-2: Energy pyramid

- 2 [Move your finger in a circle.] What is the word we use to describe a cycle of energy that moves in this fashion? (*circular*)

You already know that food chains cycle energy and nutrients through an ecosystem from one organism to another and back to the soil again. <sup>2</sup> You already know that food chains have different trophic levels. Now think of these levels arranged in a pyramid. The bottom **tier** of the pyramid consists of plants. Notice that this trophic level is the widest, showing that plants have the most energy available for the major plant activity of life—growth. You know that green plants, the producers, get their energy from the sun.

Omnivores and herbivores, plant consumers, make up the second tier, or trophic level. Notice that the second tier of the pyramid is narrower than the bottom level of producers. That's because there are fewer organisms and less energy at this level. Most herbivores have to work very hard to get all the food energy that they need from plants. Moving about, staying warm, and reproduction—their activities of life—use up a lot of energy. Plus,

less energy is stored in their bodies compared to the energy stored in plants.

By the time carnivores enter the food chain at the third tier or trophic level, there is even less food energy available. Carnivores use a lot of energy for physical movement. Because there is less energy available and consumers use so much of it, the third tier of the pyramid is the smallest. This represents the least amount of energy of all the levels of the pyramid.

The energy pyramid shows how much energy flows from one organism to another in a food chain. Because energy is lost as it is passed along the food chain, there are usually fewer animals at the top of the pyramid. Those at the top of the pyramid may have to travel over large areas within an ecosystem to find enough food energy to survive. Think about that as we explore a variety of ecosystems.

Let's take a look at the eating relationships and how energy is passed along in several different ecosystems.



← **Show image 3A-3: Sonoran Desert**

First, we'll travel to the Sonoran Desert in the southwestern part of the United States to visit a desert ecosystem. Even though the Sonoran Desert is one of the largest and hottest deserts in the Americas, it has more plant and animal species than any other desert in the world. Each one of these species has its own habitat within the ecosystem, but we will look at the ecosystem as a whole.



← **Show image 3A-4: Sonoran Desert energy pyramid**

What do you see in this image? Yes, an energy pyramid. The main producers in this ecosystem are shrubs and cacti.<sup>3</sup> The plant consumers, both herbivores and omnivores, include ground squirrels, rabbits, kangaroo rats, mice, lizards, desert tortoises, and birds. Carnivores include kit foxes, elf owls, red-tailed hawks, roadrunners, scorpions, coyotes, badgers, raccoons, skunks, and rattlesnakes. Though they do not live in the driest parts of the desert, mountain lions often come down from surrounding mountain areas to hunt. Where they exist, mountain lions are at

3 Is *cacti* plural or singular? The plural of *cactus* is *cacti*, similar to the other plurals you have learned, *hippopotami* and *octopi*.



4 Based on the prefix *micro-*, would you say that microorganisms are very large or very small? [Show Image Card 29 (Fungi, Earthworm, Ground Beetle, and Microorganisms) and point out the microorganisms under the microscope.]



5 [Have volunteers find and trace each path as you read the following.]

the top of the food chain. Vultures and beetles are some of the scavengers of the desert. Remains left to rot by the scavengers become food for the decomposers—mushrooms, insects, and microorganisms.<sup>4</sup>

← **Show image 3A-5: Sonoran Desert food chains**

With so much **diverse** plant and animal life, there are many food chains in the Sonoran Desert. Let's look at two simple examples.<sup>5</sup>

- Ants eat desert plants. Next, the scorpion eats the ants. Then, the rat eats the scorpion. Then, the hawk eats the rat. Finally, beetles and fungi break down the hawk when it dies, returning nutrients to desert plants.
- Ants eat desert plants. Next, the scorpion eats the ants. Then, the bird eats the scorpion. Then, the fox eats the bird. Finally, beetles and fungi break down the fox when it dies, returning nutrients to desert plants.

Remember that the decomposers, like this beetle and fungi, play an important role in the food chain. They break down dead animals and plants into nutrients, and those nutrients are released into the soil. Do you see any connections between these food chains? Both food chains begin with ants feeding on plants, and in both chains, a scorpion eats the ants. When food chains connect, as they surely do, food webs are created. Here is what one possible desert food web may look like.



← **Show image 3A-6: Sonoran Desert food web**

- The kangaroo rat eats desert plants. Next, the snake eats the kangaroo rat. Then, the coyote eats the snake.
- The lizard eats desert plants. Next, the snake eats the lizard. Then, the roadrunner eats the snake. Then, the hawk eats the roadrunner.
- The tortoise eats desert plants. Then, the fox eats the tortoise.

- The lizard eats desert plants. Then, the hawk eats the lizard.
- The lizard eats plants. Next, the roadrunner eats the lizard. Then, the bobcat eats the roadrunner.
- The ant eats desert plants. Next, the scorpion eats the ant. Then, the rat eats the scorpion. Then, the hawk eats the rat.
- The ant eats desert plants. Next, the scorpion eats the ant. Then, the bird eats the scorpion. Then, the fox eats the bird.
- Finally, scavengers and decomposers eat the dead coyote, hawk, tortoise, roadrunner, etc., returning nutrients to the soil.

Can you identify the producers in each link? The producers are the desert plants with their seeds, nectar, and fruit. Who can name one of the consumers?<sup>6</sup> Which animal is a scavenger?<sup>7</sup> And who are the decomposers? They are the beetles and termites, and they are also the bacteria and fungi that produce carbon dioxide and water, returning nutrients to the ground to nourish the producers.

6 [Pause for answers.] (kangaroo, lizard, tortoise, ant)

7 [Pause for answers.] (vulture)



← **Show image 3A-7: The Everglades**

Let's move from the dry desert to a very different ecosystem, one that is far from being dry! Can you guess which ecosystem I am thinking about?<sup>8</sup> Good guesses! We'll take a peek at the Florida Everglades, the biggest freshwater marsh in North America.

8 [Pause for answers.]

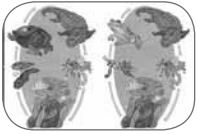


← **Show image 3A-8: Everglades energy pyramid**

What do you see in this image?<sup>9</sup> Yes, an energy pyramid. Low-lying aquatic plants are the producers in this giant **wetland** ecosystem. What consumers do you think live in the marsh? In other words, who eats the reeds, cattails, and water lilies that live there? Representatives from each of the five groups of vertebrate animals live here.<sup>10</sup> Amphibians, mammals, birds, fish, and reptiles all live in marshlands. We'll take a look at some of those hungry eaters who consume water plants and see who then feasts on them. Here are some examples of food chains in a wetland.

9 [Pause for answers.]

10 [If you have taught the *Classification of Animals* domain, you may wish to remind students of the mnemonic "All My Best Friends Represent Vertebrates."]



← **Show image 3A-9: Everglades food chain**

- Tadpoles eat plants. Next, the turtle eats the tadpoles. Then, the alligator eats the turtle. Finally, the decomposers break down the alligator, returning nutrients to the soil for producers.
- The grasshopper eats plants. Next, the frog eats the grasshopper. Then, the alligator eats the frog. Finally, decomposers break down the alligator, returning nutrients to the soil for new producers.

Just as there are many food webs in the desert, there are also many food webs in the marsh. Remember, the plant producers are at the bottom of both food chains and food webs. Not all of the consumers eat the plants, but the web of connections always returns to the producers. A food web in the marsh might look something like this.



← **Show image 3A-10: Everglades food web**<sup>11</sup>

- Tadpoles eat plants. Next, the turtle eats the tadpoles. Then, the alligator eats the turtle.
- The grasshopper eats plants. Next, the frog eats the grasshopper. Then the alligator eats the frog.
- The grasshopper eats plants. Next, the frog eats the grasshopper. Then, the raccoon eats the frog.
- The grasshopper eats plants. Next, the crayfish eats the grasshopper. Then, the snake eats the crayfish. Then, the raccoon eats the snake.
- Insects eat plants. Next, the frog eats the insects. Then, the snake eats the frog. Then, the hawk eats the snake.
- Insects eat plants. Next, the fish eat the insects. Then, the egret eats the fish. Then, the alligator eats the egret.
- Finally, bacteria, earthworms, insects, and other decomposers eat the animals and plants when they die and return nutrients to the soil for new producers.

11 [Have students find and trace each path as you read.]



← **Show image 3A-11: Amazon Rainforest**

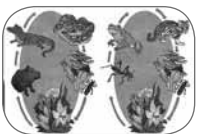
Before I leave you today, we'll look at one more ecosystem. This one lies along the equator in South America. Who can make an educated guess as to what ecosystem supplies energy for monkeys and jaguars? <sup>12</sup> Yes, the Amazon Rainforest! You can see the thick **canopy**, or layer of top branches of trees, that covers the rainforest and provides homes to many animals.

12 [Pause for answers.]



← **Show image 3A-12: Amazon Rainforest energy pyramid**

What do you see in this image? Yes, an energy pyramid. I've already named a few of the animals in the Amazon Rainforest. Look at the pyramid with all the different plants and animals. How many producers, consumers, and decomposers can you identify? Remember that an ecosystem's diversity of plant and animal life is what helps make it strong. On the bottom row, you can see the producers: tree trunk, banana plant, orchids, and grasses. On the next two rows, there are consumers: tapir, frog, monkey, capybara, toucan, crocodile, hawk, and eagle. At the top of the energy pyramid is the jaguar. On the sides, there are decomposers: bacteria, earthworms, fungi, termite, and beetle.



← **Show image 3A-13: Amazon Rainforest food chains**

Where do the plants at the bottom of the chart get their energy? Yes, the producers in the first trophic level get their energy from the sun. And who might eat the plants? Yes, the capybara or ant. And who might get energy from dining on the capybara or ant? Yes, possibly the baby crocodile or the frog. Who then may eat the baby crocodile or frog? Maybe a snake or ocelot. Then, the bodies of the snake and ocelot become food for the decomposers.



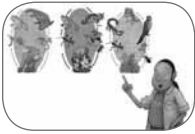
← **Show image 3A-14: Amazon Rainforest food web**

Look at all these plants and animals in the Amazon Rainforest! How many different combinations can you find to make a food web? <sup>13</sup>

- The monkey eats berries. Then, the jaguar eats the monkey.
- The monkey eats berries. Next, the baby crocodile eats the monkey. Then, the snake eats the crocodile.

13 [You may wish to allow student volunteers to come up with the following possible food webs in the read-aloud.]

- The monkey eats berries. Then, the hawk eats the monkey.
- The ant eats plants. Next, the frog eats the ant. Then, the ocelot eats the frog. Then, the snake eats the ocelot.
- The capybara eats plants. Then, the jaguar eats the capybara.
- The capybara eats plants. Then, the snake eats the capybara.
- The capybara eats plants. Then, the hawk eats the capybara.
- Finally, decomposers eat the remains of the dead animals and plants and return nutrients to the soil for new producers.



← **Show image 3A-15: Zeke in front of food chains**


Every ecosystem in the world is made up of interconnected living things that are dependent upon one another for survival. The food chains and food webs of the Sonoran Desert, the Everglades, and the Amazon Rainforest provide examples of the interdependence of organisms within each ecosystem. The ongoing, regular completion of this energy cycle in food chains determines an ecosystem's ability to survive.

The next time we are together, we will look at ways in which ecosystems change over time. Until then, enjoy your own habitat and your consumer friends. See you later!

### Comprehension Questions

15 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses. **It is highly recommended that students answer at least one question in writing and that some students share their writing as time allows.** You may wish to have students collect their written responses in a notebook or folder to reference throughout the domain as source material for longer writing pieces and as preparation for the Domain Assessment.

1. *Inferential* What is an ecosystem? (a community of plants and animals, all interacting with one another and their physical environments) What specific ecosystems did you hear about today in the read-aloud? (Sonoran Desert, Florida Everglades, Amazon Rainforest)
2. *Inferential* What is a habitat? (an animal's home in an ecosystem) What is an example of a habitat that you saw today in the read-aloud? (Answers may vary; you may wish to show students an image from the read-aloud to help them identify a habitat, such as a tree, rock, seabed, etc.)
3. *Evaluative* You heard in the read-aloud that in different ecosystems there is diverse plant and animal life. Explain how this diversity impacts the variety of food chain possibilities. (This diversity creates a greater number of possibilities of energy interactions.)
4.  *Inferential* What happens in a food chain? (One living thing serves as a food source for another living thing.)
5. *Inferential* How would you describe a food web? (multiple, interconnected food chains that overlap and form complicated patterns)



← **Show image 3A-4: Sonoran Desert energy pyramid**

6. *Evaluative* You heard in the read-aloud about the energy pyramid. First, explain on which tier each group is placed. Then describe how the pyramid shows the amount of energy within the producers and consumers. (Producers are on the bottom; consumers are on the second and third tiers. The widest tier at the bottom shows the most energy; the narrowest tier at the top shows the least energy.)



← **Show image 3A-6: Sonoran Desert food web**

7. *Evaluative* In this food web of the Sonoran Desert, who can identify one food chain? (Answers may vary; refer to the section under image 3A-5 for possible food chains, such as plant>ant>scorpion>rat>hawk>beetles/fungi>soil>new producers.) Which organism is a producer? A consumer? A decomposer? (producers: cacti and shrubs; consumers: ant, rat, turtle, scorpion, lizard, birds, snake, kit fox, coyote, etc; scavenger: vulture; decomposers: beetle, other insects, fungi, bacteria)



← **Show image 3A-8: Everglades energy pyramid**

8. *Inferential* Name some consumers from the read-aloud who live in the wetland ecosystem known as the Everglades. (tadpoles, grasshoppers, crayfish, hawk, etc.)



← **Show image 3A-12: Amazon Rainforest energy pyramid**

9. *Evaluative* You heard about the canopy of trees in the Amazon Rainforest. Explain why this canopy is necessary for food webs to thrive. (Answers may vary but may include that the canopy covers the rainforest and provide homes and shade to many animals.)

I am going to ask you a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

10. *Evaluative* *Think Pair Share:* You heard today that organisms in an ecosystem depend on each other and their environment. How does a consumer rely on a producer? How does a producer depend on a consumer? How does the food chain rely on the decomposers? (Consumers cannot make their own food and therefore depend on producers for their energy; decomposers depend on consumers and producers for energy; producers rely on decomposers and consumers. The food chain could not continue without decomposers breaking down the dead animals and plants.)

11. After hearing today’s read-aloud and comprehension questions and answers, do you have any remaining questions?

➤ You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

### Word Work: Tier

5 minutes

1. In the read-aloud you heard, “The bottom *tier* of the pyramid consists of plants.”
2. Say the word *tier* with me.
3. *Tier* means one level of several levels.
4. The wedding cake had seven layers, and each tier was stacked on top of another.
5. What have you seen that has tiers? Where was the object you are describing? Be sure to use the word *tier* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “ \_\_\_\_\_ has tiers . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *tier*?

Use a *Making Choices* activity for follow-up. Directions: I am going to name different objects. If the object has one or more tiers, or levels, say, “That object has tiers.” If the object does not have tiers, remain silent.

1. a staircase (That object has tiers.)
2. a wedding cake (That object has tiers.)
3. a trampoline
4. a pyramid (That object has tiers.)
5. a rectangular mound built by the Hopewell Mound Builders (That object has tiers.)
6. a flat piece of paper
7. a stadium (That object has tiers.)



### Complete Remainder of the Lesson Later in the Day





# Food Chains, Part II

3<sub>B</sub>

## Extensions

20 minutes

### 10 Image Review

Show images 3A-6, 3A-10, and 3A-14 from the read-aloud again, and have students review possible food webs in these different ecosystems, just as they did in the read-aloud. Encourage students to use domain-related vocabulary such as *trophic levels*, *energy pyramid*, *food web*, *food chain*, *producer*, *consumer*, *decomposer*, etc, as well as temporal words such as *first*, *next*, *then*, and *finally*.

As time permits, you may also wish to show additional images from the read-aloud and have students retell key facts from the read-aloud using the images. Discuss with students the ecosystems shown, and how each organism is suited to live in the particular environment. You may also discuss how the nonliving elements, such as rocks, soil, and rainfall, influence the lives of these organisms.



### 10 Create a Food Chain and Web

#### ← Show image 3A-4: Sonoran Desert energy pyramid

Tell students that with a partner, they will create a food web based on the organisms shown in this energy pyramid. Review the names of the producers, consumers, and decomposers shown. On their own pieces of paper, each student will work individually and sequence a food chain of at least three trophic levels. After they have completed their own food chains, students should compare theirs with their partner's food chain to see how the chains may overlap to create a food web. Have students decide on and make a shared food web, underlining the producers in green, the consumers in red, and the decomposers in brown. If time permits, students may illustrate their food webs.

**Note:** For some students who have not studied food chains before, you may wish to have them focus on creating only food chains for now. You may also wish to have some students use Image Cards 6–29 to create their own food chains/webs. Students may also have this opportunity in the Pausing Points.



# Balance of Nature

# 4

## ✔ Lesson Objectives

### Core Content Objectives

Students will:

- ✓ Provide an example of a food chain in a given food web
- ✓ Explain why nature and ecosystems are not static but are constantly changing
- ✓ Describe the balance of nature in an ecosystem
- ✓ Explain how changes in an ecosystem are caused by natural events and by humans

### Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the relationship between human actions and the balance of nature in “Balance of Nature,” using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Describe an image of nonliving cycles—the water cycle and rock-forming cycle—and how the image contributes to what is conveyed by the words in “Balance of Nature” (RI.3.7)
- ✓ Compare and contrast natural disruptions and human disruptions to the balance of nature presented in “Balance of Nature” (RI.3.9)
- ✓ Make predictions prior to “Balance of Nature” about why balance in nature would be important and what problems could occur if there was not balance in nature, and then compare the actual outcomes to predictions (SL.3.1a)
- ✓ Determine the meaning of the new word formed when a known affix is added to a known word, such as *dis-* and *disequilibrium* (L.3.4b)

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**disruptions, n.** Separations or interruptions that break up a pattern or flow

*Example:* Tina’s mother put her book down, threw up her hands, and proclaimed, “You kids are causing too many disruptions for me to read!”

*Variation(s):* disruption

**equilibrium, n.** A state of balance

*Example:* Before adding new fish to his aquarium, Finn had to make sure that the chemicals in the water were in a state of equilibrium; otherwise it would not be a healthy habitat for his fish.

*Variation(s):* equilibriums

**gradual, adj.** Changing or moving slowly over a long period of time

*Example:* Learning to read and write is a gradual process, taking years to master.

*Variation(s):* none

**overpopulation, n.** Too many people or animals living in a particular area

*Example:* When there is an overpopulation of deer in a particular area, they sometimes have difficulty finding enough food.

*Variation(s):* overpopulations

**stable, adj.** Firmly established; not likely to change or move very much


*Example:* Camden decided that he was ready to adopt a kitten and give it a stable home.

*Variation(s):* stabler, stablest; more stable, most stable

**static, adj.** Showing little or no change or progress; having a lack of movement

*Example:* The number of new students entering Lincoln Elementary School for the past five years has remained static.

*Variation(s):* none

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Have We Already Learned?</b>		10
	<b>Making Predictions About the Read-Aloud</b>		
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Balance of Nature</b>	Image Card 30	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Static</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>What Would Happen?</b>	Instructional Master 4B-1	20



# Balance of Nature

4<sub>A</sub>

## Introducing the Read-Aloud

10 minutes

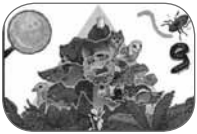
### What Have We Already Learned?

Review with students the information about eating and energy patterns in ecosystems. You may wish to guide the discussion by showing the following images and asking the following questions:



← **Show image 3A-14: Amazon Rainforest food web**

- What is a food web? (multiple food chains that overlap and form complicated patterns)
- What are some examples of food chains within this food web?



← **Show image 3A-2: Energy pyramid**

- What are trophic levels? (connecting steps in a food chain or food web)
- On the energy pyramid, which group has the most energy? (producers) Which groups have less energy? (consumers) Explain why.

### Making Predictions About the Read-Aloud

Remind students that at the end of the last read-aloud, Zeke told them that they would learn about changes in ecosystems. Tell students that the title of today's read-aloud is "Balance of Nature." Ask students to predict why it would be important to have balance in nature and what problems may occur if there is not a balance in nature.

### Purpose for Listening

Tell students to listen carefully to learn more about the balance of nature and to find out if their predictions are correct.



## Balance of Nature

### ← Show image 4A-1: Zeke in front of food chains

- 1 If all links need to be in place for an ecosystem to survive, and all links are connected to each other, how would you describe food chains? (interconnected and interdependent)

You've learned that plants and animals share planet Earth, depending upon one another for survival. Animals and plants are all links in a chain of feeding habits. One organism eats another until the top predator dies and its decayed remains return to the soil, providing nutrients to start the whole cycle over again. The ongoing, regular completion of this energy cycle in food chains determines an ecosystem's ability to survive. All links need to be in place.<sup>1</sup>



### ← Show image 4A-2: Nonliving cycles on Earth

- 2 [Pause for students' responses.] (nonliving cycles—water cycle, rock-forming cycle) What are the three stages of the water cycle? (precipitation, condensation, and evaporation)
- 3 [Show Image Card 30 (Four Layers of Earth).]

Food chains are only one of the important cycles for life on Earth. Cycles are common in every ecosystem. What are some living and nonliving cycles you have learned about? What nonliving cycles do you see happening in this image?<sup>2</sup>

As you can see by the arrows, rock-forming magma, or lava, cycles out from the earth's mantle, spilling over the earth, eventually becoming rock that breaks down, returning to the earth's crust.<sup>3</sup> In addition, water, minerals, and nutrients are all cycled throughout Earth's atmosphere. When the decomposers do their work, they are recycling carbon dioxide, water, and minerals. Plants in turn release oxygen, an important gas for all human and animal life, into the air. As long as these cycles remain undisturbed, life continues in a balanced way, everything distributed to living organisms and their surrounding environment in balanced proportions.

Life on Earth is well adapted to the planet's cycles; its cycles help to keep Earth in balance. Change is a normal part of life. Think of all the changes you have experienced in your life—hundreds and hundreds of changes. The same is true of our planet. It is constantly changing. Most of these changes are small, but sometimes changes to Earth's cycles affect all life on the planet, upsetting Earth's **equilibrium**.



← **Show image 4A-3: Grass, lemmings, and foxes adapting together**

Ecosystems are not **static**, meaning that they never stay the same. Rather, ecosystems change over time. All plant and animal species adapt to their environments. Like the desert cacti and the arctic fox, many species have adapted in response to certain changes. In this image, the grass has adapted, which causes the lemmings to adapt as they eat it, which causes the fox to adapt as it eats the lemmings. In nature, these changes are generally **gradual**. Conditions in the environment change very slowly, over hundreds and thousands of years, allowing plants and animals to adapt gradually as well.<sup>4</sup> When these changes occur slowly, the cycle of energy remains in balance, or in equilibrium, with nature. One **stable** condition gradually changes into another stable condition over a long period of time and with very few **disruptions**, or disturbances, to nature's cycles. This is called the balance of nature.

4 You may remember from the *Native Americans* domain that it is believed the buffalo became smaller and swifter gradually over many years.



← **Show image 4A-4: Koala eating eucalyptus, panda eating bamboo, children with food**

All ecosystems need a variety of species at each trophic level to ensure the health of the whole community. Diversity, or variety, in food webs increases the survival of each species—from the spiny cacti and deadly scorpions of the desert, to the hairy apes and brightly colored toucans of the rainforest. The more varied the animal's diet, the stronger its chances of survival. Some animals have a very limited diet. Can you think of an animal that eats only one thing?<sup>5</sup> The koala eats only eucalyptus leaves from gum trees. The panda bear eats only bamboo. Imagine what happens if that one food source is wiped out. Changes to one species in an ecosystem can affect the entire ecosystem. No food, no life. Think about it. Humans survive in large part because of having a varied diet. Humans eat many different things, meaning they are not dependent on one source for food—they are adaptable.

5 [Pause for students' responses.]



← **Show image 4A-5: Bee at flower**<sup>6</sup>

6 Who can tell me how you are connected to a bee? (Answers may vary with various food chains.)

7 What jobs can you think of that insects perform?

This connection is dependent on the balance of nature. Think back to the energy pyramid. There are more insects than any other group of living organisms at the second trophic level of the energy pyramid. Insects are kept in balance by feeding on one another, as well by feeding on plants. We sometimes think of insects as pests, yet they perform many important jobs.<sup>7</sup> Bees are examples of important insects. They can deliver a painful sting, but we depend upon their role in the food chain. Bees feed on nectar from flowers, pollinating plants to ensure the growth of new fruits and vegetables. Both the bee and the plants need one another to exist. They are an example of nature's wonderful balancing act.



← **Show image 4A-6: Hawk and mouse population in summer and winter**

Animal populations are kept in balance by the amount of food available and by predators in the food chain. For example, mice are usually plentiful on a farm. Mice feed on seeds. Seeds are most plentiful in the summer when rain is heavy and vegetables grow in abundance. Mice eat more and have more babies in summer. They also provide hawks and owls with more food during the summer months. When winter comes, fewer seeds are available, and the mice tend to have fewer babies. That means that there are fewer mice for the hawks and owls to eat in winter. These birds of prey have less to eat, so they tend to raise fewer young. Otherwise, they must move to new locations or risk starving to death. In this way, the animals balance nature. Mice have enough to eat and so do the hawks and owls. The food chain is stable. So, the seasonal cycles work together with the food chain cycles.

← **Show image 4A-7: Mouse-hawk diagram, hawk missing**



Animal populations are naturally kept in equilibrium by the well-established food webs in nature. When an ecosystem becomes unbalanced, or unstable, organisms react to these changes, often restoring the balance of nature and bringing the ecosystem back into equilibrium. This balance, however, is not always restored. Sometimes humans interfere. Cycles are disrupted, and unexpected



8 With *dis-* added to the word *equilibrium*, how does it change its meaning?



consequences may result. For example, what happens if the farmer gets upset with the hawks and owls, believing that they are eating his chickens? He shoots them, destroying the natural predators of mice and other rodents. Without danger from these birds of prey, the mice scamper out into the fields and begin to eat more than their share of the farmer's crops. Nature is thrown off-balance. There is disequilibrium.<sup>8</sup> A problem begins as the mice begin to destroy the grasses, the first link in human food chains.

← **Show image 4A-8: White-tailed deer in garden**

The white-tailed deer provide another example of animal **overpopulation**. White-tailed deer have lived in our forests for thousands of years and used to be kept in check by their natural predators—coyotes, wolves, and mountain lions. Over the years, humans have killed these natural enemies of the deer, leaving the deer at the top of their food chain. Many more deer lived, resulting in an overgrown deer population. At the same time, humans made other changes to deer habitats. Loggers entered the forests and cut down large areas of trees, leaving behind low-lying vegetation that deer love. With this new and plentiful food source, the deer did not have to work as hard to get food. Their populations grew and grew. Meanwhile, with all those cut logs from the forests, humans built new homes on the edge of the woods. Today, deer can easily wander out of the woods and be found foraging for vegetables and flowers in people's yards. Some people are angry. These animals, once known for their beauty, are now considered a problem instead. Humans build fences and plant foods that deer do not like, trying to encourage them to go back to the forest, but so far the deer are winning the battle. Life in the forest is unbalanced, forcing changes all along the food chain.





← **Show image 4A-9: Zeke saying goodbye; damaged landscape**





Changes to an ecosystem may be natural or caused by humans. Some changes are worse than others; sudden changes are worse than natural, gradual changes. When changes destroy plant and animal habitats, part of nature's balance is also destroyed. Be thinking about changes to the planet that might destroy animal habitats. I'll share some of those with you next time.

### Comprehension Questions

15 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses. **It is highly recommended that students answer at least one question in writing and that some students share their writing as time allows.** You may wish to have students collect their written responses in a notebook or folder to reference throughout the domain as source material for longer writing pieces and as preparation for the Domain Assessment.

1. *Evaluative* Were your predictions correct about why balance in nature is important and what problems could occur if there is not balance? Why or why not? (Answers may vary.)
2. *Evaluative* What does it mean if something is static? (It does not change.) Are ecosystems and nature static? Why or why not? (No, animals and plants adapt in response to their environments.)
3.  *Evaluative* How does the phrase “balance of nature” explain the natural events that occur in ecosystems? (It means one stable, or firmly established, condition changes gradually into another stable condition with very few disruptions to nature’s cycles.)
4. *Inferential* What are some examples of natural events or cycles that cause changes in an ecosystem? (living cycles such as the seasons; nonliving cycles such as the water cycle and the rock-forming cycle)
5.  *Evaluative* For an ecosystem to maintain equilibrium and for one stable condition to turn into another stable condition, which is better: a gradual change or a sudden change? Why? (Gradual changes are better because they allow ecosystems time to adapt for survival.)

6.  *Evaluative* You heard that in some areas overpopulation has become a serious problem with the white-tail deer species. When they leave the woods and go foraging in gardens, some humans can become very upset. How did this disequilibrium occur? (Humans killed the natural enemies of deer and changed their habitats through logging and building homes.) Was the change in the deer population caused by a natural or human event? (human)
  7.  *Evaluative* Compare and contrast natural and human disruptions to the balance of nature. (Examples of natural disruptions would be change of seasons, change of animal populations, and change of food availability; humans have no control over these. Examples of human disruptions would be the farmer shooting predators such as hawks or coyotes or building too many homes in animal habitats; humans can control these kinds of disruptions.)
  8.  *Evaluative* *What? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. Think of a question you can ask your neighbor about the read-aloud that starts with the word *what*. For example, you could ask, “What changes have you seen take place in nature?” Turn to your neighbor and ask your “what” question. Listen to your neighbor’s response. Then your neighbor will ask a new “what” question, and you will get a chance to respond. I will call on several of you to share your questions and answers with the class. (Answers may vary.)
  9. After hearing today’s read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Static

5 minutes

1. In the read-aloud, you heard, “Ecosystems are not *static*, meaning that they never stay the same.”
2. Say the word *static* with me.
3. *Static* means showing little or no change or progress.
4. The number of businesses in the small town has remained static over the past two years, because the number of people in the town has not changed very much.
5. What are some things that you can describe as static? What are some things that can never be described as static? Be sure to use the word *static* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “\_\_\_\_\_ is/is not static because . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *static*?

Use a *Making Choices* activity for follow-up. Directions: I am going to name different situations. If the situation demonstrates a static state, say, “That is static.” If the situation demonstrates a changing state or a state of movement, say, “That is not static.”

1. homework time every evening at 5:00 (That is static.)
2. a family that has not increased in number (That is static.)
3. winter weather that goes from cold, to warm, to cold again (That is not static.)
4. an area in the city where new buildings are being built (That is not static.)
5. receiving the same grades in science class for a year (That is static.)
6. eating a different kind of sandwich every day (That is not static.)



## Complete Remainder of the Lesson Later in the Day



# Balance of Nature

4<sub>B</sub>

## Extensions

20 minutes



### What Would Happen? (Instructional Master 4B-1)

Read the writing prompt on Instructional Master 4B-1 with students:

*Imagine a place where deer and wolves live together in a wooded ecosystem. The wolves sometimes leave the woods and kill sheep for food on nearby farms. Some farmers get mad at the wolves, so they trap and shoot them in large numbers. What do you think will now happen to this ecosystem? How might the balance of nature change?*

You may wish to have students work with a partner to discuss the question before they begin to write their individual responses. Encourage students to use domain-related vocabulary. If time permits, allow students to share their responses with the class.



# Pausing Point 1

PP<sub>1</sub>

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## **Note to Teacher**

Your students have now heard the first four read-alouds of the *Ecology* domain. It is highly recommended that you pause here and spend one day reviewing, reinforcing, or extending the material taught thus far.

You may have students do any combination of the activities listed below. The activities may be done in any order. You may wish to do one activity on successive days. You may also choose to do an activity with the whole class or with a small group of students who would benefit from the particular activity.

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## **Core Content Up to This Pausing Point**

Students will:

- ✓ Describe ecology as the study of relationships between living things and their environment
- ✓ Describe and provide an example of a habitat
- ✓ Explain why certain organisms live in certain habitats and how they adapt to those habitats
- ✓ Describe and provide an example of an ecosystem
- ✓ Describe how organisms in an ecosystem depend on each other and their environment
- ✓ Describe what happens in a food chain
- ✓ Identify the three essential parts of a food chain: producers, consumers, and decomposers
- ✓ Sequence a food chain of two or more trophic levels
- ✓ Classify members of a food chain as producers, consumers, or decomposers
- ✓ Provide an example of a food chain in a given food web
- ✓ Explain why nature and ecosystems are not static but are constantly changing

- ✓ Describe the balance of nature in an ecosystem
- ✓ Explain how changes in an ecosystem are caused by natural events and by humans

### **Image Review**

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Show the images from any read-aloud again, and have students retell the read-aloud using the images.

### **Image Card Review**

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#### **Materials: Image Cards 1–29**

Hold up Image Cards 1–29. Ask a student to choose a card but not show it to anyone else in the class. The student must then give clues about the picture s/he is holding. With each clue, allow for one guess from the rest of the students. Guide students to choose a particular ecosystem or a producer/consumer if needed. Encourage students to use domain-related vocabulary as they give clues and guesses.

### **Domain-Related Trade Book or Student Choice**

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#### **Materials: Trade book; chart paper, chalkboard, or whiteboard**

Read an additional trade book to review concepts such as ecosystems, biomes, food chains, food webs, or the balance of nature. Refer to the books listed in the domain introduction. You may also choose to have the students select a read-aloud to be heard again.

If students listen to a read-aloud a second time, you may wish to have them take notes and create an outline to summarize the main idea of a particular topic in the trade book or read-aloud. Be sure to guide students in this important method of gathering information.

You may wish to model how to actively listen and take notes by doing the following activity with students:

- In preparation for this activity, pick out two or three core vocabulary words from the read-aloud you plan to reread, and write them on chart paper, a chalkboard, or a whiteboard.
- Begin by asking a few volunteers to share what they would say the main idea is regarding the read-aloud you are about to reread. This discussion is meant as a review and warm-up for active listening. Point out the core vocabulary words you have chosen, and have students read them together chorally. Tell students that as you are

rereading, they should be carefully listening, especially when you get to one of the words on the board.

- Tell students that as you read, they will be jotting down notes—words or short phrases that best express the main idea. Be sure to tell them that they should not be writing in complete sentences. You may wish to model and have students follow an outline style. As you read, you may want to slow down or even pause after reading the Guided Listening Supports that follow the core vocabulary words you have chosen.
- When you are finished rereading the read-aloud, have a few volunteers share one or two notes they have taken. Be sure to give feedback to help shape effective notes, and allow students to record any modifications you guide them through.
- Now have students summarize in two or three sentences the main idea for this read-aloud, using the three core vocabulary words in their sentences.

### Key Vocabulary Brainstorming

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#### **Materials: Chart paper, chalkboard, or whiteboard**

Give students a key domain concept or vocabulary word such as *biomes*, *food chain*, or *food web*. Have them brainstorm everything that comes to mind when they hear the word, such as *rainforests*, *producers*, *consumers*, *interconnected*, etc. Record their responses on a piece of chart paper, a chalkboard, or a whiteboard for reference.

### Multiple Meaning Word Activity: Stable

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#### **Materials: Chart paper, chalkboard, or whiteboard; newspaper or magazine; drawing paper, drawing tools**

Display the following definitions of the word *stable* on a piece of chart paper, a chalkboard, or a whiteboard. Read each definition to students.

- “A” – not likely to change or move
- “B” – steady emotionally or in personality
- “C” – a building where animals are lodged and fed
- “D” – a group of people or animals under one manager

Students may refer to the letters in their answers, read the definition, or walk up to the definitions and point to the one that shows the use of the word you are describing.



1. In the read-aloud about the balance of nature you heard, “One stable condition gradually changes into another stable condition.” In this sentence, a stable condition is a condition that is not likely to change or changes very little. Which definition shows this meaning of stable? (A)
2. Stable can also refer to a structure that some animals live in, like a barn. Which definition shows this meaning of stable? (C)
3. Sometimes we use the word *stable* to describe the condition of someone’s emotions or their personality as in, “At play rehearsal each afternoon, Veronika found she could always count on Theo to be stable—he did not seem to get nervous and never forgot his lines.” Which definition shows this meaning of stable? (B)
4. Stable can also refer to a group of people or animals who are all trained or managed by the same person or agency as in, “The stable of circus clowns spends many hours a day together practicing being silly.” Which definition shows this meaning of stable? (D)
5. Now with your neighbor, quiz each other on the different meanings of the word *stable*. Think of a sentence that uses the word *stable*. Remember to be as descriptive as possible and use complete sentences. For example, you could say, “When I walked into the stable yesterday, a new baby horse had been born.” And your neighbor should respond, “That’s ‘C’.”
6. Extension: Have students work with a partner to find and cut out pictures showing the different meanings of the word *stable* and make a poster or collage using the images. Students may also illustrate their own images.

## Poetry Reading

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**Materials: *The Beauty of the Beast*, by Jack Prelutsky, from the list of Recommended Resources**

Pick a poem about an animal to read from this poetry collection, if it is available. Discuss with students the animal’s ecosystem/habitat and food chains/webs. Ask students if they think there is any adaptation that animal would need to have in order to survive in its habitat. Be sure to encourage students to use domain-related vocabulary during the discussion. You may also wish to show students some of the images and have them write a poem of their own.

## 10 Riddles for Core Content

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Ask students riddles such as the following to review core content:

- I come from the Greek word, *oikos* and the Greek suffix, *-ology*, and I am the study of living households. What word am I? (*ecology*)
- I am filled with trees which drop their leaves every year. What am I? (deciduous forest)
- I am the process by which the sun's energy changes water and carbon dioxide into food. What am I? (*photosynthesis*)
- I am the lowest trophic tier of the energy pyramid. What am I? (plants or producers)
- I receive the least amount of energy and use the most, and I am at the top of the energy pyramid. What am I? (*carnivore*)
- Sometimes I become upset, or disrupted, because the changes in Earth's cycles affect the balance in a habitat or ecosystem. What am I? (*equilibrium*)

## Writing Prompts

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Students may be given an additional writing prompt such as the following:

- Explain how . . .
  - a bear's claws help it live in the forest
  - a desert plant's spiny, waxy leaves help it live in the desert
  - an antelope's speed helps it survive in the grassland
  - ocean creatures have adapted and survived in oceans
- Choose one of the ecosystems from the read-aloud and describe how the organisms in it are interdependent.
- Describe the sequence of events that caused the overpopulation of the white-tailed deer in the eastern forests of North America.
- Describe a habitat that is close to your home or perhaps in your yard. Be sure to include in your writing the animals, plants, and food webs and how they are all interconnected.

## Oh Deer!

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**Materials:** *Project Wild*, by the Western Regional Environmental Council, from the list of Recommended Resources

Play the game “Oh Deer!” to reinforce information in Lesson 4 about deer overpopulation. When students have finished playing, have them write about the different reasons the deer population changed and why. Encourage students to use domain-related vocabulary in their writing.

## Research Activity: Ecosystems

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Tell students that they are to choose one ecosystem that they would like to learn more about. Students can write about the animals, weather, and plants of their chosen ecosystem.

## Research Activity: Balance or Imbalance?

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Have students research a habitat or ecosystem that has at some point lost its ecological balance but has come back or is coming back to balance once again. Some possible places may include:

- Adirondack Mountains
- Great Lakes fish habitat
- Colorado River
- Redwood Forest, California
- Sonoran Desert
- Hudson River

## Collage of Food Chain/Web

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**Materials:** Old magazines (*Ranger Rick*, *National Geographic*); glue or tape; paper; drawing paper, drawing tools

Have students make collages by cutting out and gluing magazine pictures of animals and plants onto construction paper or stock paper. Tell them that they will need to leave spaces around each glued picture. After the pictures are glued and dry, have students draw arrows indicating possible food chains or food webs. Then have students write several complete sentences on the same piece of paper or on a separate piece of paper describing the producers, consumers, and decomposers in their collages.



# Natural Changes to the Environment

## 5

### ☑ **Lesson Objectives**

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#### **Core Content Objectives**

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Students will:

- ✓ Explain why nature and ecosystems are not static but are constantly changing
- ✓ Describe the balance of nature in an ecosystem
- ✓ Explain how changes in an ecosystem are caused by natural events and by humans
- ✓ Explain why sometimes animals must leave their habitats when the natural balance is lost
- ✓ Explain how ecosystems are affected by changes in the environment

#### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the relationship between natural changes and human changes and their effect on the balance of nature in “Natural Changes to the Environment,” using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Distinguish disasters that happened long ago—such as the eruption of Mt. Vesuvius and subsequent destruction of the city of Pompeii, and the more recent time known as the Dust Bowl when crops could not grow—from current disasters (RI.3.3)
- ✓ Determine the literal and nonliteral meanings of and appropriately use common sayings and phrases, such as “on its last legs” as used in “Natural Changes to the Environment” (RI.3.4) (L.3.5a)

- ✓ Interpret information about the four layers of Earth from a diagram (RI.3.7)
- ✓ Categorize and organize the four layers of Earth (W.3.8)
- ✓ Give oral presentations with appropriate facts and relevant descriptive details about natural disasters, using appropriate volume and clear enunciation at an understandable pace (SL.3.4)
- ✓ Summarize the definition of a natural disaster and the effects it has on the environment (SL.3.4)
- ✓ Use a known root word as a clue to the meaning of an unknown word with the same root, such as *nutrition/nutritious* (L.3.4c)
- ✓ Provide and use synonyms for the word *periodic* (L.3.5b)
- ✓ Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships to describe the effects a natural disaster has on the balance of nature, such as *first, next, then, therefore, consequently, as a result, and/or finally* (L.3.6)

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**devastating, *adj.*** Severe; extreme; causing great danger

*Example:* Joanna could not believe the devastating effects the hurricane had on her hometown.

*Variation(s):* none

**drought, *n.*** A prolonged period of little to no rain that causes damage to plants, animals, and people

*Example:* The drought caused the land to be very dry.

*Variation(s):* droughts

**monsoons, *n.*** Seasonal heavy rains and strong winds in the Indian Ocean and in southern Asia

*Example:* Heavy monsoons in Southeast Asia caused flooding and damage to crops.

*Variation(s):* monsoon

**natural disaster, n.** A sudden event in nature that often causes terrible damage to affected areas

*Example:* A natural disaster, such as an earthquake or a tornado, can be difficult to predict.

*Variation(s):* natural disasters

**overgrazing, n.** Eating too much or in excess

*Example:* The overgrazing of the snowshoe rabbits causes a temporary increase in their population—which also affects the population of their predators, the hawks, owls, and lynxes.

*Variation(s):* none

**periodic, adj.** Happening regularly or repeatedly over a period of time


*Example:* The ancient Romans had periodic gatherings for events like chariot races and gladiator fights.

*Variation(s):* none

**tsunamis, n.** Large, dangerous ocean waves often caused by an underwater earthquake

*Example:* The earthquake that occurred in the Indian Ocean caused multiple tsunamis that hit the coasts of many countries, causing much damage and loss of life.

*Variation(s):* tsunami

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Have We Already Learned?</b>		10
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Natural Changes to the Environment</b>	Image Card 30; U.S. map (optional)	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Periodic</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>Disasters and Consequences</b>	Instructional Master 5B-1	20
	<b>Sayings and Phrases: On Its Last Legs</b>		
<b><i>Take-Home Material</i></b>	<b>Family Letter</b>	Instructional Master 5B-2	



# Natural Changes to the Environment

5<sub>A</sub>

## ***Introducing the Read-Aloud***

**10** minutes

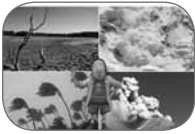
### **What Have We Already Learned?**

Review information about the balance of nature. You may wish to guide the discussion by asking the following questions:

- What does it mean if something is described as being static? (It does not change.) Are ecosystems static? (No, they are always changing.)
- What does the phrase “balance of nature” mean? (It means that one stable condition gradually changes into another stable condition with very few disruptions to nature’s cycles.)
- What kinds of changes are best for ecosystems? (gradual ones)
- Describe what we mean when we say that an ecosystem’s equilibrium is upset. (the balance is disturbed or lost)
- What is an example of when changes occur in nature and the balance of nature is maintained? (Answers may vary; one possible example would be how mice eat more and have more babies in the summer, so hawks have more food; in the winter, mice have fewer babies so the hawks also have fewer babies because there is less to eat, or hawks move to new locations; this means both the mice and hawks have enough food to eat.)

### **Purpose for Listening**

Tell students to listen carefully to hear more about the natural changes that occur in the environment.



## Natural Changes to the Environment

### ← Show image 5A-1: Drought, avalanche, hurricane, volcano; Zeke

For months and months, no rain falls over the nation's farmlands. Without water, crops dry up and food becomes scarce. This is called a **drought**. It is a **natural disaster**.

An avalanche begins at the top of a high snow-covered mountain when the weight of new or drifting snow becomes too heavy for it to be held by the snow pack. Another natural disaster.

A hurricane forms over the ocean. Heavy winds and rain sweep inland, toppling trees and bringing floods to coastal communities. A natural disaster occurs once more.

A volcano erupts, spewing large amounts of carbon dioxide into the air, killing plant and animal life in its fiery path. Yet another natural disaster.



### ← Show image 5A-2: Earthquake damage

Natural disasters are naturally occurring events that have always been a part of our changing planet, gradually altering its landscape. Earthquakes occur when stored-up energy in the earth's crust is released, causing the ground to suddenly shake due to movement of rock deep inside Earth's crust or mantle.<sup>1</sup> Earthquakes can be among the deadliest of natural disasters if they occur in areas where many people live. Generally, the most damage from an earthquake comes from collapsing buildings and fires caused by cracked underground gas pipes rather than from the quake itself. In largely unpopulated areas, earthquakes are much less of a threat to life. Even so, they often change the landscape. For example, earthquakes often cause cracks in Earth's surface, sometimes forming new valleys. As a result, heavy rains may fill these valleys with water, creating lakes where there were none before. When this happens, new ecosystems take shape.

1 Who remembers the four layers of Earth? [Show Image Card 30 (Four Layers of Earth).] (crust, mantle, outer core, and inner core)





← **Show image 5A-3: Flooding in a natural area**

Floods occur when water overflows the banks of rivers, ponds, or seas. Heavy rains, snowmelt, or unusually high tides can all cause flooding across vast distances on Earth. Some areas of the world have seasonal rains called **monsoons**, during which it rains nonstop for days on end. Flooding is an expected, natural event in those places. **Periodic** flooding had many good effects on the early civilizations of these areas, bringing nutrients to the soil and making it more fertile for crops.<sup>2</sup> Nowadays, flooding is nearly always associated with disaster because it often destroys homes and villages. Sometimes the water becomes polluted, destroying the natural breeding grounds of fish, thus affecting the entire food chain of an area.

2 What other civilizations have developed along the banks of rivers? (Egyptians, Romans, Asian, Mound Builders, etc.)

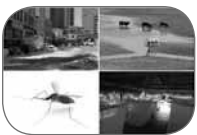


← **Show image 5A-4: Volcano**

Volcanoes are mountains formed by the ejection of lava, gases, and ash from an opening in the earth's crust. You could say that volcanoes are like hills of fire. When heat and pressure build up within Earth, these hills erupt, and hot gases and magma—or hot molten rock—rise up from deep inside Earth's crust, mantle, and core, and come out of the volcano's opening. Once the magma is released from the volcano, it becomes lava—flowing liquid rock that moves across the ground until it cools and hardens into rock once again.<sup>3</sup> The extra carbon dioxide in the air caused by the release of the gases can be poisonous to plant and animal life. Sometimes volcanoes cause landslides as well, with loose dirt from the side of the mountain sliding down and burying everything around it. Who remembers the name of the volcano that erupted during the time of ancient Rome and completely destroyed a nearby city?<sup>4</sup>

3 [You may wish to show image 4A-2.] Who remembers the name of this cycle? (rock-forming cycle)

4 [Pause for answers.] Mount Vesuvius erupted and completely buried the ancient city of Pompeii in Italy with ash. The volcanic eruption wiped out all plant and animal life in the area for a long time.



← **Show image 5A-5: Tsunami; standing water; mosquito; tents**

Disease is often caused by natural disasters. Floods, hurricanes, and **tsunamis** all create breeding grounds for mosquitoes.<sup>5</sup> A tsunami is a large, dangerous wave, often caused by an earthquake. Some mosquitoes carry a disease called malaria. It can make people and animals very sick, and many even die from the

5 [Point to the standing water in the image.] Mosquitoes quickly multiply in standing water caused by floods, tsunamis, and other disasters.

disease. In places where there are many mosquitoes, people often put tents around their beds to protect them while they are sleeping. So you see, sometimes one disaster can lead to another. This is called a domino effect; just as tipping over one domino tips over all of the other dominos if they are lined up in a row, so one change in nature can cause several other changes to occur.

Natural disasters cause changes to landscapes, and in turn, changes to ecosystems. As Earth changes, food webs change, too. The biggest changes to food webs are caused by habitat destruction. Habitats are destroyed when necessary amounts of food, water, and shelter are no longer readily available to the population. Living organisms have specific needs. If these needs are not met, organisms will die or will be forced to move to another habitat. Even disasters can be interconnected just as everything on earth is!



← **Show image 5A-6: Mudslide**

Over many years, wild animals have adapted to respond to changes in the natural environment. Animals are dependent upon plants to live and grow. Plants are dependent upon nutritious soil to live and grow.<sup>6</sup> The formation of soil is a very gradual process, requiring many, many years to build layers rich enough to support life. Natural disasters often cause imbalances to the soil, affecting the ability of plants and animals to survive. For example, a mudslide may occur after a heavy rainfall when the stabilizing soil is compromised. The soil becomes waterlogged, loses its supportive structure, and begins to slide down hills.

6 Who remembers what nutrients are? Based on the meaning of the noun *nutrition* and the context here, what do you think the adjective *nutritious* means? (filled with nutrients or substances that provide nourishment)



← **Show image 5A-7: Dust Bowl**

When a drought occurs, ponds, streams, and puddles dry up. The earth cracks open from lack of rain. Without water, crops die of thirst, leaving nothing to hold the soil together. This results in wind erosion. Soil disappears from the fields, carried away by the wind. Sometimes dust storms form over hundreds of miles.

The Dust Bowl is the name for the time in the 1930s when crops could not grow because there were not enough nutrients in the soil from over planting. Unimaginably vast clouds of dust blew around in parts of Kansas, Colorado, New Mexico, Oklahoma, and Texas.

7 Eighteen hundred miles is about the same distance that's between New York City and Denver, Colorado! [You may wish to point out this distance on a U.S. map.]



They were called dust storms, and these huge clouds of dust would pass over the land. In one major Dust Bowl storm, the dust cloud was 1,800 miles wide!<sup>7</sup> During these storms, the sky would turn dark, people could not see very well, and they would have to run for shelter. Can you imagine being caught in a dust storm with gritty bits of sandy soil whirling all about your face? That would surely be a disaster, wouldn't it? You will learn more about the causes of the Dust Bowl later. Because of the interconnected nature of life on Earth, sometimes disasters can be as complicated as food webs!

← **Show image 5A-8: Desert animals during a drought**

When droughts occur, some plants and animals die, but others adapt to the temporary changes. Some trees shed their leaves early so that the leaves will not use up all of the water that the plants need to survive. Some grasses become dormant, going into an inactive state and turning brown to save precious water. Animals slow down, too, conserving energy by moving around less. Nevertheless, food chains are always affected by drought. As plants dry up, there is less food for insects and rodents. With fewer insects and rodents, there is less food for carnivores. One change can cause changes to take place all along the food chain. Often animals at the top of the food chain decide to take care of themselves, abandoning their young. Without parents to care for them, the dependent babies die. The balance of nature is out of whack.



← **Show image 5A-9: Pine forest after a fire**

- 8 Why do you think a drought might lead to a wildfire?
- 9 As you may have learned, some Native Americans set fire to their land after harvesting their crops and before planting new crops. The ashes from the fire helped prepare the land for new growth.

Not only do droughts affect food chains, they can lead to wildfires as well.<sup>8</sup> Wildfires may also be started by lightning or volcanoes. Wildfires can be **devastating** to human populations, burning down homes and businesses. However, after the fire is over, fires can be beneficial for some wildlife habitats. In fact, some fires are started intentionally and are carefully controlled by humans.<sup>9</sup> Ecologists know that fires are a natural occurrence and that some habitats depend upon fire for their survival. For example, some pine cones remain shut until extreme heat opens them, releasing their seeds. Fires also promote fruit production, resulting in more seeds and berries for wildlife to consume. Some trees may

die as a result of fires, but their decaying trunks provide nesting cavities for birds, as well as food for insects and decomposers. Large animals such as bears, deer, and bobcats rarely die in these fires. Their natural instincts steer them away from danger, and they flee the area until they sense that it is safe to return. The cycle of life resumes, and soon the balance of nature returns to the forest.



← **Show image 5A-10: Predator and prey diagram**

Let's look at another natural change that can take place, one that is not a natural disaster but that can still impact ecosystems. This natural change is about the balance between predators and prey. Predators are hunters, meaning they hunt and kill other animals, their prey. The relationship between these animals—predators and prey—plays an important part in ensuring a healthy balance to Earth's ecosystems. Sometimes the predator-prey relationship is thrown off-balance by changes that occur in nature.

For example, scientists have studied the relationship between snowshoe rabbits and their predators—hawks, owls, and lynxes. Each of these species has a unique population cycle. About every ten years, snowshoe rabbits produce way too many babies for the amount of plant food available to them. They gobble up all of the food, increasing their population temporarily and then leaving little for the next generation of rabbits. This seriously affects the food chain. When one animal eats more plants than it should, it is called **overgrazing**. As a result, hawks, owls, and lynxes also experience overpopulation in their own species. They all prey on the rabbits, and their population also increases temporarily. But as summer changes to winter and the rabbits' food runs out, they begin to die out. Then their predators find that there is not enough food for everyone, and many of *them* starve to death. This natural overpopulation of multiple species creates limited resources in the animals' native habitats. But as seasons pass, nature corrects its own imbalance. The rabbits, hawks, and owls all repopulate and their natural cycles begin all over again.



← **Show image 5A-11: Diagram with organisms dying out**

Healthy ecosystems need a variety of living organisms. Every link in an ecosystem's food chain must be strong enough to ensure the survival of all organisms. When one link is broken, the rest of the food chain is affected. A single change can affect all of the organisms living within an ecosystem. Groups of plants may die out, forcing animals to adapt by finding other plants to eat. When the competition for food becomes too great, some animal species may disappear from Earth, becoming extinct.<sup>10</sup> These natural changes disrupt, or upset, the balance of nature, sometimes making equilibrium difficult to achieve for years to come. An example of this imbalance is the disappearance of the Eastern Wild Turkey in eastern forests of the United States. Because it depended on the American chestnut tree, a tree that is on its last legs and near extinction, the eastern wild turkey can no longer live in its habitat. The eastern wild turkey has been forced to move to another habitat.<sup>11</sup>

10 If an animal or plant is extinct, it no longer exists on Earth. Who recalls some animals that you have learned about that are now extinct? (woolly mammoths, mastodons, ground sloths, saber-toothed tigers, dinosaurs, etc.)

11 When you hear that the American chestnut tree is "on its last legs," do you think it means that this tree has legs? You will hear more about this figurative saying later that is used to describe something that is about to stop working or die.






← **Show image 5A-12: Zeke saying goodbye; Earth**



Today you've learned about some of the natural changes to Earth's environment. The next time we get together, we'll talk about some of the ways that humans have changed Earth. Be prepared. In spite of our wonderful brains, we humans are not always too smart when it comes to taking care of our natural world.

### Comprehension Questions

15 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses. **It is highly recommended that students answer at least one question in writing and that some students share their writing as time allows.** You may wish to have students collect their written responses in a notebook or folder to reference throughout the domain as source material for longer writing pieces and as preparation for the Domain Assessment.

1. *Literal* What is a natural disaster? (a sudden change in nature that can cause damage to affected areas)
2. *Evaluative* You heard that drought, monsoons, and tsunamis are a few types of natural disasters that can have devastating effects. Who can think of other types of natural disasters? (earthquakes, disease, volcanoes, mudslides, fires)
3.  *Evaluative* Natural disasters can change ecosystems, meaning they contribute to why ecosystems are not static. How might a natural disaster change an ecosystem? How might it affect the balance of nature? (Answers may vary, but may include some of the following: an earthquake may change the landscape, creating new valleys and ecosystems; a volcano can be poisonous to plant and animal life; mudslides can cause dirt to slide down and bury everything; a flood may pollute water, destroying breeding grounds for fish and affecting the entire food chain; etc.)
4.  *Inferential* In the read-aloud, you heard that one natural disaster may cause another disaster to occur. What is an example of this type of domino effect? (A flood creates breeding grounds for mosquitoes; the mosquitoes bring in disease like malaria.)
5.  *Evaluative* You heard about a disastrous time in history called the Dust Bowl in the read-aloud. Do you think that this disaster might have been avoided if there had been periodic flooding in that place at that time? Why or why not? (Answers may vary.)

6. *Evaluative* Zeke told us that natural disasters are not the only way changes occur in Earth’s environment. How else does the environment end up changing? (Humans change it.)
  7. *Inferential* What is overgrazing? (when animals eat more plants than they should and affect the food chain) What are two types of animals you have heard about that have overgrazed? (white-tailed deer and snowshoe rabbits)
  8.  *Evaluative* **What? Pair Share:** Asking questions after a read-aloud is one way to see how much everyone has learned. Think of a question you can ask your neighbor about the read-aloud that starts with the word *what*. For example, you could ask, “What types of things can be beneficial and help an ecosystem to be healthy?” Turn to your neighbor and ask your “what” question. Listen to your neighbor’s response. Then your neighbor will ask a new “what” question, and you will get a chance to respond. I will call on several of you to share your questions and answers with the class. (Answers may vary.)
  9. After hearing today’s read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Periodic

5 minutes

1. In the read-aloud, you heard, “*Periodic* flooding had many good effects on the early civilizations of these areas, bringing nutrients to the soil and making it more fertile for crops.”
2. Say the word *periodic* with me.
3. *Periodic* describes something that happens regularly or repeatedly over a period of time.
4. Mr. Ortiz would give periodic quizzes to make sure students understood the material he was teaching.
5. What are some things that happen in a periodic way? Be sure to use the word *periodic* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to be complete sentences: “\_\_\_\_\_ happens in a periodic way . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *periodic*?

Use a *Discussion* activity for follow-up. Have students provide synonyms for the word *periodic*, such as *regular*, *scheduled*, or *repeated*. Have students discuss periodic events in their lives, or periodic events in nature. As students share, make sure they use the word *periodic* in a complete sentence.



**Complete Remainder of the Lesson Later in the Day**





# Natural Changes to the Environment

5<sub>B</sub>

## Extensions

20 minutes



### Disasters and Consequences (Instructional Master 5B-1)

Have students take out Instructional Master 5B-1. Tell students that they are to think about one of the natural disasters they heard about today. They will write the name of the natural disaster, what happens during this natural disaster, and two or more effects of the natural disaster on the environment. Guide students to use temporal and cause-and-effect language such as *first*, *next*, *then*, *therefore*, *as a result*, etc. Have students share their writing with a partner or the class.

### Sayings and Phrases: On Its Last Legs

5 minutes

An idiom is an expression whose meaning goes beyond the literal meaning of its individual words. Idioms have been passed down orally or quoted in literature and other printed text. Idioms often use figurative language, meaning that what is stated is not literally taking place. It is important to help your students understand the difference between literal meanings of the words and their implied or figurative meanings.

Ask students if they have ever heard someone say that something was “on its last legs.” Have students repeat the idiom. Ask students what they think this phrase might mean. Explain that this idiom refers to something that is worn out and useless, or is about to collapse, break down, or die. Remind students that in the read-aloud, the American Chestnut is described as being “on its last legs” because soon it may be extinct.

Ask students if they have ever had an experience where the phrase “on its last legs” applies. What was breaking down? Do they know of an ecosystem or species that is “on its last legs”?

Be sure to find other opportunities to use this idiom in the classroom.

## Take-Home Material

### Family Letter

Send home Instructional Master 5B-2.



# Human Changes to the Environment

## 6

### ✔ **Lesson Objectives**

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#### **Core Content Objectives**

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Students will:

- ✓ Explain how humans affect ecosystems and the environment
- ✓ Describe and identify human-made threats to the environment
- ✓ Explain why sometimes animals must leave their habitats when the natural balance is lost

#### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the relationship between natural changes and human changes and their effect on the balance of nature in “Human Changes to the Environment,” using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Distinguish disasters that happened long ago, such as the time known as the Dust Bowl when crops could not grow, from current disasters (RI.3.3)
- ✓ Determine the literal and nonliteral meanings of and appropriately use common sayings and phrases, such as “on its last legs” as reviewed in “Human Changes to the Environment” (RI.3.4) (L.3.5a)
- ✓ Describe an image of a farm and family affected by the Dust Bowl and how the image contributes to what is conveyed by the words in “Human Changes to the Environment” (RI.3.7)
- ✓ Describe the logical connection between particular sentences and paragraphs in a worksheet recounting and expanding upon the events of the Dust Bowl as discussed in “Natural Changes to the Environment” and “Human Changes to the Environment” (RI.3.8)

- ✓ Conduct a short research project that builds knowledge about the Dust Bowl (W.3.7)
- ✓ Gather information about the Dust Bowl from print and visual sources; take brief notes on sources and sort evidence into provided categories (W.3.8)
- ✓ Make predictions prior to “Human Changes to the Environment” about how humans may have changed the environment over time based on the title, images, and/or text heard thus far, and then compare the actual outcomes to predictions (SL.3.1a)

## Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**agricultural, *adj.*** Relating to the raising of livestock and growing of crops

*Example:* Shanti bought the land for agricultural purposes, hoping to grow food she could eat throughout the year.

*Variation(s):* none

**endangered, *adj.*** At risk of becoming extinct

*Example:* The zoo kept a careful watch on its endangered animals, hoping to keep them alive so they would not become extinct.

*Variation(s):* none

**groundwater, *n.*** Water that exists below the surface of the earth

*Example:* When Geoffrey visited a local farm, he was told that the water retrieved from the well is groundwater.

*Variation(s):* groundwaters

**invasive species, *n.*** A species not native to an area it is inhabiting that causes significant changes to the environment

*Example:* The red fire ant, a native species of South America, is an invasive species that was accidentally brought to the United States through imported shipments of soil.

*Variation(s):* none

**leach, *v.*** To leak or release

*Example:* Faye had left her watercolors at the park, and when she returned a few days later, she discovered that her paints had started to leach into the ground due to all of the rain.

*Variation(s):* leaches, leached, leaching

**pesticides, n.** Chemical substances used to kill pests and other unwanted organisms to prevent them from damaging plants or crops

*Example:* The local farmer decided to spray his apple orchard with pesticides to keep the harmful insects away.

*Variation(s):* pesticide

**smog, n.** A form of air pollution that looks like a mix of smoke and fog


*Example:* As Roxanne drove away from the crowded city, she could see the orange-colored smog along the skyline.

*Variation(s):* none

**toxic, adj.** Poisonous

*Example:* The bottle had a skull-and-crossbones symbol to make sure that people knew the liquid inside was toxic.

*Variation(s):* none

<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Do We Know?</b>		10
	<b>Making Predictions About the Read-Aloud</b>		
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Human Changes to the Environment</b>	Image Card 28	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Toxic</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>The Dust Bowl</b>	Image Card 31; Instructional Master 6B-1; Internet access; trade books (optional)	20



# Human Changes to the Environment

6A

## ***Introducing the Read-Aloud***

**10** minutes

### **What Do We Know?**

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Ask students, “Think back to the ancient civilizations that you have learned about. How have ancient civilizations like those in Egypt, Asia, Rome, and North America changed the landscape and parts of nature for their own benefit?” (Egyptians created channels off the Nile for their crops; Romans created aqueducts so they could receive water from distant hills; irrigation canals were built on the Indus River to water the crops in India; and Native Americans created channels to divert and store water.) Changes to the environment can have positive effects, such as bringing water, and therefore food, to a new area. Human changes to the environment can also have a negative effect on nature, causing more harm than good.

### **Making Predictions About the Read-Aloud**

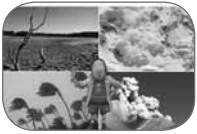
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Remind students that at the end of the last read-aloud, Zeke shared that they would hear how humans have changed the environment over time. Ask students to predict what things they think humans have done that have been harmful to the environment.

### **Purpose for Listening**

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Tell students to listen carefully to hear more about human changes to the environment and to find out if their predictions are correct.



## Human Changes to the Environment

### ← Show image 6A-1: Natural disasters and Zeke

You've seen that natural disasters such as droughts and floods can cause disruptions to nature, knocking it out of balance for many, many years. It takes a long time to restore Earth's balance of nature once its natural cycles are disrupted. You have also learned that sudden changes are far worse than gradual changes. Humans are guilty of causing some of the most rapid changes to nature. Today we are going to look at a few of the ways humans have upset the equilibrium of nature on planet Earth.



### ← Show image 6A-2: Forests being cleared for development

We have made drastic changes to Earth in an attempt to meet our needs. Many of these changes are a result of the growing number of people on planet Earth—Earth's overpopulation. The human population has exploded. There are two babies born every second somewhere in the world. In 2011, the world's population reached seven billion! That's a lot of mouths to feed! More homes are needed to house all those people, and more natural resources are required to meet their energy needs. Deforestation takes place, and this cleared-out space is used to grow food and to build cities and towns. Grasslands and wetlands are also being destroyed for **agricultural** purposes, making space for crops. Some animals have been overhunted. Wild animals and plants are being squeezed out of their natural habitats to make room for all the humans, just like the deer you heard about earlier.



### ← Show image 6A-3: Farm fertilizer leaching into water; erosion

In a natural ecosystem, animals eat only a small portion of the plants in their habitats. Other plants die and decompose, or break down, returning nutrients back to the soil. Over time humans have developed farming methods that have changed this natural order of things.

In the past century, farmers have begun planting large amounts of crops. Sometimes, they farmed continuously on the same plot of land, not allowing enough time for the soil's nutrients to be replenished. You heard about the Dust Bowl in the previous read-aloud, and you will read more about it later. It was a prime example of humans changing the environment, thereby partially causing a terrible disaster that drought alone may not have caused. Once farmers used up the naturally-occurring nutrients in the soil, they thought it would be best to add back some nutrients themselves. Some farmers use organic fertilizers in the form of animal and human wastes; however more and more, farmers have developed artificial nutrients, called chemical fertilizers, to speed the growth of their crops.

Soil cannot hold all of the added fertilizers. Some fertilizers **leach** into the earth, contaminating **groundwater**. When rains come down, the loose, excess soil with its added fertilizers is carried into neighboring rivers and streams.

Fertilizers can be extremely damaging, sometimes causing **toxic** algae to grow. When fertilizers enter streams, they help form large blooms of algae.<sup>1</sup> When the algae blooms die, they deplete oxygen in water that is needed to feed animal life. Some algae have toxins in them. A toxic or poisoned food chain is created. Tiny aquatic animals feed on the poisonous algae. Next, small fish become poisoned when they feed on the tiny aquatic animals that have eaten the poisonous algae. Then, large fish eat the small poisoned fish and end up being poisoned as well. Birds and other animals that eat the large fish end up being poisoned. Links in the contaminated food chain may break at any level. As a result, food webs are also changed. Nature's equilibrium is disrupted, knocked off balance.

1 Who can share what algae is? (very small, plant-like organisms without leaves, stems, or normal roots that grow in and/or near water) [Show Image Card 28 (Algae, Grass and Berries, Lichen, and Moss).] An algae bloom is a large growth of algae in one area.



← **Show image 6A-4: Fields being sprayed with pesticide**

Along with the use of fertilizers, farming methods have changed in other ways as well. Have you ever driven past fields of corn or soybeans that seem to go on forever? In nature, a variety of different plants grow side by side, but farmers today often plant miles and miles of a single crop.<sup>2</sup> Having miles of a single crop

2 Remember that eating diverse types of food helps the survival of a species, and having a variety of living organisms creates a healthy ecosystem. Crops also do best when planted with a diversity, or variety.

disrupts the balance of nature. There is less pest resistance, and when pests attack the crops, they do a lot of damage. Farmers then fight the pests with **pesticides**.

When pesticides were first introduced, farmers welcomed them with open arms. “What a miracle!” they said. “Finally we can grow plants with fewer pests.” But it was too good to be true. The pesticides killed more than they were intended to kill.<sup>3</sup> One pesticide, DDT, was once widely used to kill mosquitoes and other annoying pests. The insects that were poisoned by DDT were eaten by fish, and the fish were eaten by birds, such as hawks and eagles. At one point, the bald eagle, America’s national bird, was **endangered** due to DDT. The DDT made the bald eagles unable to have babies because their eggs were too weak to survive. Pesticides are unsafe for humans, too. Think back to the diagram of the girl eating an apple. Would you want to eat an apple that had been sprayed with pesticides? As the toxins build up over time, they may produce cancers and other diseases in humans.

Realizing how dangerous these pesticides are, farmers began to look for other ways to fight pests. Some farmers decided to try biological pest control. In other words, why not bring in another species, one that feeds naturally on the pests, thereby controlling the pest population without dangerous chemicals? But, in many cases, this solution backfired.



← **Show image 6A-5: Cane toad**

One such example is the case of the cane toad in Australia. Cane toads are named for the sugarcane plant. Here’s why: Beetles were eating all the sugarcane plants in Australia. Australian farmers heard that the giant toads of South America loved to eat beetles, so they packed crated toads onto ships and sailed them halfway around the world as a pesticide-free solution to their problem. But, guess what? These toads were used to a wet, shady habitat in which they rested during the day and ate at night. Their new habitat was quite sunny and dry. Pretty soon, the toads began wandering off from the sugarcane fields to the cooler, wetter gardens in the

3 Think about the contaminated food chain you heard about with algae and fish and birds. How might pesticides disrupt, or ruin, food chains? Listen to hear about one disrupted food chain.



surrounding towns. They found lots of bugs to eat there. Without any natural predators, the toads began to multiply. Pretty soon, Australia had more toads than they could handle, and the beetles were still happily destroying the sugarcane plants!

Cane toads are called an **invasive species**. Invasive species are living things that invade a habitat by expanding rapidly, often affecting the organisms around them. Invasive species are moved from their native habitat to a foreign one, usually by humans. Farmers purposefully brought cane toads to Australia, but invasive species may also enter habitats uninvited or accidentally.<sup>4</sup> With all of the different modes of transportation today—such as cargo ships, planes, and trains—it is very easy to have plants and animals enter into habitats other than their own.<sup>5</sup> Invasive species have the ability to change whole ecosystems upon their arrival.

4 Can you think of an *invasive* species in your area? (kudzu, stink bugs, etc.)

5 A foreign species could accidentally be carried on someone's boots or on the side of a ship without anyone knowing.



← **Show image 6A-6: Manufacturing with polluted water**

Farming practices are just one way we have damaged the earth. We have also built large factories for manufacturing, or creating, all sorts of goods. Many of these manufacturing plants, often built beside rivers, have caused water pollution from the chemicals they dumped into the rivers for many years, resulting in killing and contaminating fish. Pollutants from these manufacturing plants are carried up the food chain, and even humans become sick from their own poisonous practices.<sup>6</sup> Some rivers that were once a source of food for many people have become unsafe places to fish.

6 How might water pollution work through the food chain and make humans sick?



← **Show image 6A-7: Exhaust from smokestack**

Have you ever been behind a car with a stinky exhaust pipe or seen smoke pouring out of a factory smokestack? These are visible air pollutants, creating thick **smog** in many cities and crowded areas. There are also, however, things that pollute the air, such as some emissions from factories that we cannot see. Anything that does not harmlessly evaporate pollutes the air that we breathe, causing problems for plants and animals all along the food chain. Humans burn lots of fossil fuels—such as gas, coal, and oil—for energy.<sup>7</sup> These fuels release toxic gas into the air and that becomes trapped in Earth's natural cycles. Mixing with water in the

7 Fossil fuels are formed from the fossils, or remains, of prehistoric organisms.

8 Acid rain is formed when the water in the air mixes with toxic gases. Rain, sleet, hail, or snow can carry these gases and are all known as acid rain.



air, chemicals form acid rain.<sup>8</sup> In the same way, anything that you pour down the drain may end up polluting Earth's water or air. As you have learned, water is constantly being cycled through Earth's atmosphere, and all water eventually makes its way back to the ocean. There is yet another form of pollution called light pollution. Though light pollution is not toxic to breathe like air pollution is, it does reduce the magnificent number of bright, twinkling stars in a dark sky that we can see with the naked eye.

← **Show image 6A-8: Zeke saying goodbye; smokestack**


Burning fossil fuels also releases gases into the air that trap heat in the atmosphere. This extra heat is changing the climate on Earth. Global temperatures are rising, and this has already affected ecosystems around the world. Birds and butterflies are arriving earlier in spring; plants flower and lose their leaves earlier. Some spiders, beetles, and grasshoppers are moving north to find cooler, more comfortable climates. Like the Eastern Wild Turkey, they have been forced out of their habitats, because they cannot adapt. It is hard to predict what will happen, but there is much that you and I can do to help protect our planet from damaging changes. Next time we meet, we will talk about some of the ways that you can help planet Earth.

## Discussing the Read-Aloud

20 minutes

### Comprehension Questions



15 minutes

1. *Evaluative* Were your predictions correct about what things humans have done that have been harmful to the environment? Why or why not? (Answers may vary.)
2.  *Evaluative* I will say a sentence, and I want you to tell me if it is true or false: Humans are responsible for drastic disruptions to ecosystems. (true) Why is this a true statement? (Humans are destroying habitats, and polluting air and water.)





← **Show image 6A-5: Cane Toad**

3. *Evaluative* What do you see here? (cane toad) What did the cane toad become to Australia? (an invasive species) What are invasive species? (animals or plants that have invaded habitats different from their native ones)

4. *Evaluative* Why are invasive species a problem? (They can change ecosystems upon their arrival because they might not have natural predators in their new habitats.) How do invasive species enter new habitats? (sometimes on purpose, brought in by people; other times by accident, perhaps on cargo ships, planes, and trains)
5.  *Evaluative* You heard that we can create water pollution through some agricultural practices, such as using products like fertilizers and toxic pesticides that might leach into the groundwater and be swept by rain into other bodies of water. Why would this be a problem? (Fertilizers can cause algae blooms that take away oxygen; both could be poisonous to animals and contaminate food chains.) Which animal became endangered due to DDT? (bald eagle) What is another farming practice that can cause problems? (farming one type of crop instead of a diversity, or variety, or crops)
6.  *Evaluative* How do we pollute the air and create things like smog? (Emissions from exhaust pipes and factory smokestacks can create smog; fossil fuels release toxic gas that can turn into acid rain, which can be in the form of rain, sleet, hail, or snow.)
7. *Evaluative* Describe the time known as the Dust Bowl. (The Dust Bowl was a time in the 1930s in parts of the midwest and southwest of the United States when crops could not grow because of a drought and the lack of nutrients in the soil from overplanting.)

I am going to ask you a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

8.  *Evaluative Think Pair Share:* Why is it important to protect our air and water? What might happen if these two natural, renewable resources were to become too polluted? (We breathe air and need the air to be clean so we can stay healthy; we need to protect our water because we could run out of it, and it also needs to be healthy for us to drink, etc.)
  9. After hearing today's read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Toxic

5 minutes

1. In the read-aloud, you heard, “Fertilizers can be extremely damaging, sometimes causing *toxic* algae to grow.”
2. Say the word *toxic* with me.
3. *Toxic* describes something that is poisonous.
4. The people were warned not to drink the water that had become toxic as a result of chemical run-off from the nearby factory.
5. What are some things that are toxic? Be sure to use the word *toxic* when you tell about them. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to be complete sentences: “\_\_\_\_\_ are toxic because . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *toxic*?

Use a *Making Choices* activity for follow-up. Directions: I am going to read several phrases. If what I describe is an example of something toxic, say, “That is toxic.” If what I describe is not an example of something toxic, say, “That is not toxic.”

1. the bottle of pesticide on the shelf (That is toxic.)
2. the heavy summer rains that leached fertilizer into the pond, creating algae blooms (That is toxic.)
3. a glass of lemonade (That is not toxic.)
4. mouse poison (That is toxic.)
5. gas from a volcano (That is toxic.)
6. filtered water (That is not toxic.)



**Complete Remainder of the Lesson Later in the Day**



# Human Changes to the Environment

6<sub>B</sub>

## Extensions

20 minutes

### The Dust Bowl (Instructional Master 6B-1)

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Display Image Card 31 (Dust Bowl) and image 5A-7. Ask students to describe what they see in the images. Have students read on their worksheet about the Dust Bowl that occurred in America in the 1930s. These short paragraphs include information about the human actions and natural events that contributed to the creation of the Dust Bowl. After reading the paragraph, students will answer questions about the content.

**Note:** Based on your students' needs, you may choose to complete this activity as a class, or have students work independently or with a partner. As time permits, you may choose to have some students complete extended research using the trade books and/or websites from the Recommended Resources list, either now or during the Pausing Point.



# Protecting the Environment

# 7

## ☑ **Lesson Objectives**

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### **Core Content Objectives**

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Students will:

- ✓ Explain how humans affect ecosystems and the environment
- ✓ Describe and identify human-made threats to the environment
- ✓ Identify different types of resources including renewable and non-renewable
- ✓ Explain the importance of conservation and recycling to the health of the environment
- ✓ Identify different ways to protect and restore the environment

### **Language Arts Objectives**

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The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Sequence sentences for the three ‘R’s—reduce, reuse, and recycle (RI.3.3)
- ✓ Describe the relationship between human actions and the state of the environment in “Protecting the Environment,” using language that pertains to time, sequence, and cause/effect (RI.3.3)
- ✓ Distinguish their own point of view from that of Zeke the ecologist by establishing their own ideas for how to reduce, reuse, and recycle in order to help conserve resources and protect the environment (RI.3.6)
- ✓ Interpret information from a diagram of the three ‘R’s—reduce, reuse, and recycle (RI.3.7)
- ✓ Compare and contrast finite energy and sustainable energy (RI.3.9)

- ✓ Conduct a short research project that builds knowledge about ways to reduce, reuse, and recycle in the classroom (W.3.7)
- ✓ Make personal connections to “Protecting the Environment” by creating and sharing a plan for specific ways to reduce, reuse, and recycle in the classroom (W.3.8)
- ✓ Categorize and organize the steps of and ways to reduce, reuse, and recycle (W.3.8)
- ✓ Make predictions prior to “Protecting the Environment” about how humans can help protect and restore the environment based on the text heard thus far, and then compare the actual outcomes to predictions (SL.3.1a)
- ✓ Give oral presentations with appropriate facts and relevant descriptive details about ways to reduce, reuse, and recycle in the classroom to help conserve resources and protect the environment, using appropriate volume and clear enunciation at an understandable pace (SL.3.4)
- ✓ Determine the meaning of the new word formed when a known affix is added to a known word, such as *re-* and *renewable*, *non-* and *nonrenewable*, and *in-* and *infinite* (L.3.4b)
- ✓ Listen to and understand a variety of texts, including poetry

### Core Vocabulary

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**Note:** You may wish to display some of these vocabulary words in your classroom for students to reference throughout the domain. You may also wish to have students write some of these words in a “domain dictionary” notebook, along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**conserve, v.** To keep something safe from destruction or depletion

*Example:* The Kirk family decided to conserve water and energy by turning off the faucet while brushing their teeth and turning off the lights when leaving a room.

*Variation(s):* conserves, conserved, conserving

**finite, adj.** Having a limit; having an end to an amount of something

*Example:* Many of Earth’s resources are finite, and we must conserve and manage these resources wisely so that future generations will have what they need.

*Variation(s):* none

**irreversible, *adj.*** Unable to return to a previous state or condition; not reversible

*Example:* If an endangered species is completely wiped off of the earth, becoming extinct, the effects are irreversible.

*Variation(s):* none

**nonrenewable, *adj.*** Unable to be renewed

*Example:* Bodie learned about the importance of carefully using nonrenewable resources, such as the gasoline he put into his car every two weeks.

*Variation(s):* none

**recycling, *v.*** The process of treating resources or materials so they can be used again

*Example:* Laney has been recycling paper and plastic materials for years because her parents taught her it was important.

*Variation(s):* recycle, recycles, recycled

**renewable, *adj.*** Able to be replaced by nature

*Example:* Sunlight and wind are renewable sources of energy because their energy is naturally replaced.

*Variation(s):* none

**stewards, *n.*** People whose responsibility it is to protect and care for something or someone; caretakers

*Example:* Carina and some of her classmates realized they needed to be better stewards of their neighborhood, so they helped organize a clean-up day.


*Variation(s):* steward

**sustainable, *adj.*** Able to support itself by reusing

*Example:* Our rooftop garden is sustainable because the families who live in the building use their vegetable and fruit scraps and autumn leaves to help create soil.

*Variation(s):* none



<i>At a Glance</i>	<b>Exercise</b>	<b>Materials</b>	<b>Minutes</b>
<b><i>Introducing the Read-Aloud</i></b>	<b>What Have We Already Learned?</b>		10
	<b>Making Predictions About the Read-Aloud</b>		
	<b>Purpose for Listening</b>		
<b><i>Presenting the Read-Aloud</i></b>	<b>Protecting the Environment</b>	Image Card 32	20
<b><i>Discussing the Read-Aloud</i></b>	<b>Comprehension Questions</b>		15
	<b>Word Work: Irreversible</b>		5
 <b>Complete Remainder of the Lesson Later in the Day</b>			
<b><i>Extensions</i></b>	<b>Good Stewards of the Earth in the Classroom</b>	chart paper, chalkboard, or whiteboard; Internet access; trade books (optional)	20
	<b>Poetry Reading</b>	U.S. map (optional)	



# Protecting the Environment

7A

## **Introducing the Read-Aloud**

**10** minutes

### **What Have We Already Learned?**

Review with students information about how humans have made an impact on the environment. You may wish to ask the following questions to guide the discussion:

- Are the changes humans have caused in nature usually gradual or rapid? (rapid) Which type of change is harder on an ecosystem? (rapid) Why are gradual changes easier on ecosystems? (Gradual changes allow ecosystems time to adapt as needed.)
- What types of things have we done agriculturally to affect ecosystems and the balance of nature? (Deforestation has occurred to make room for crops and homes, and grasslands and wetlands have been cleared out as well. By destroying these areas, animals have to leave their habitats and look for new homes. Farming practices have changed such that more of the same types of crops are planted in smaller areas, and pesticides and fertilizers are used more, both of which can be harmful to living creatures.)
- What are invasive species? (things that have invaded, or taken over, areas) How do nonnative invasive species end up in habitats that are not their own? (People sometimes introduce them on purpose, or they may be introduced accidentally.)
- What are some types of pollution? (water, air, soil) What are causes of these types of pollution? (Factories and exhaust cause air pollution; pesticides and fertilizers cause both soil and air pollution.)

### **Making Predictions About the Read-Aloud**

Ask students to make a prediction about what can be done to help protect and restore the environment.

### **Purpose for Listening**

Tell students to listen carefully to learn more about what they can do to help keep the environment healthy and to find out if their predictions are correct.



## Protecting the Environment

### ← Show image 7A-1: Zeke pointing to his head; Earth

- 1 Can you think of an everyday choice that might make a difference? Keep your answer in mind, and we'll discuss it later.

Today, I really need you to put on your thinking caps. *You* are very important to the future of planet Earth. Earth is your home. Conservation of Earth and its natural resources is very important. The everyday choices that you make in how to live your life can affect the health of the planet.<sup>1</sup>



### ← Show image 7A-2: Pollution

- 2 [Pause for answers.]

You've seen how humans can create unhealthy environments and cause disruptions to the balance of nature. We are dependent upon water and air to live, but we have done things to pollute both of these essential natural resources. We have many people on earth, and we have tapped into natural resources to try to support all of this life. What is a natural resource?<sup>2</sup>



### ← Show image 7A-3: Different types of resources<sup>3</sup>

- 3 [Point to each image as you read the following.]

A resource is something that helps or supports you. If it is natural, it is something that is produced by nature. Natural resources are found in the environment. These include water, air, trees, fowl, and fish, but they also include things that are hidden beneath the ground, like minerals and oil—things that provide materials and energy for a lot of people. Air and water are **renewable** resources, meaning that they recycle themselves so that they are never used up. But, many natural resources are **nonrenewable**.<sup>4</sup> They will not last forever. For example, it takes a long time for rich soil to form. The same is true of fossil fuels, like coal, oil, and gas. They take many, many years to form! So, you can see that if we use up all these natural resources, there will be nothing left for all the rest of the people who will follow us on the earth. It is important to remember that we are **stewards** of the earth. We must take care of Earth and its **finite** resources for our children and their children and so on.

- 4 [Point out the meaning of the prefix *non-*.] Based on the word meanings you have just heard, who can tell me what the word *nonrenewable* means?



← **Show image 7A-4: Water cycle**

Protecting the environment means efficiently using resources and doing our best not to waste them. How can you help do that? Let's first think about renewable resources like water and air. Both water and air are renewable, having been cycled through Earth's atmosphere again and again for many, many years. But pollution makes even these renewable resources more difficult to use.<sup>5</sup> How can we help keep our air and water clean, free of pollutants? One way is to make sure that you work hard not to pollute them.

5 Why does pollution make water and air difficult to use?



← **Show image 7A-5: Aquifer tapped; uses of water in house**

Let's start with water. You know that Earth is covered mostly by water, so it is hard to imagine that we could ever run out of it. But most of that water is salty, and we can't drink it, nor can our crops. However, humans have found ways of tapping into the aquifers. Aquifers are natural underground areas containing fresh water. These aquifers help satisfy the needs of Earth's growing number of people. Even with these aquifers, however, it is possible that we could run out of usable water. So, what can *you* do to **conserve** water? Here are a few easy ways that you can help: Take shorter showers. Turn the faucet off when you are brushing your teeth. Make sure you have a full load of laundry when you wash clothes. Place a brick in the toilet tank so that it uses less water to flush. Recycle water by collecting rainwater in a garden barrel.<sup>6</sup>

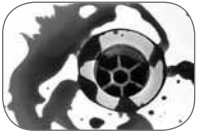
6 How many of these small changes could you help to make in your household?



← **Show image 7A-6: Litter**

Litter is another pollutant—it comes from trash. Have you ever seen cans, bottles, and leftover food wrappers thrown along the side of the road or floating in the water? Did you know that until about one hundred years ago there was almost no concept of trash in the United States? Everything that people used or purchased for their homes, farms, and/or businesses was reused, remade, or traded. Even containers that were packed with goods and shipped would be made into furniture or toys, or parts would be used to repair broken things. Trash is an example of a rapid change caused by humans which has disrupted the balance of nature.

Litter is not only unattractive, it can also be dangerous. For example, to sea turtles and other animals, plastic bags bobbing on the surface of the water look a lot like jellyfish that they want to eat. Once eaten, the plastic bags cannot be digested, and animals often die. Cigarette butts thrown on the ground can leach dangerous chemicals into the soil. So, what can *you* do to prevent litter? The easiest step is not to litter! You can also organize a litter brigade, collecting litter along the streets and waterways of your community.



← **Show image 7A-7: Polluted water going down a drain**

You've learned how chemicals pollute our rivers and streams. Can anyone think of something that would be harmful to the environment if it was dumped down the kitchen sink or flushed down the toilet? Sometimes people pour grease down the drain. Other times, people flush medicines or pesticides down their toilets. Both of these things can pollute our drinking water. Where does your family dispose of old paints, car oil, weed killers, and leftover cleaning products? Your city might provide you with important information about where you can get rid of these products in a safe way. Find out and encourage your parents to find safer ways to dispose of dangerous waste. None of these substances should end up in our water. You can also use cleaners and products that are not harmful to the environment.



← **Show image 7A-8: Child reducing by consuming less**

Have you ever experienced a power outage? When the power goes out, your lights and everything else that runs on electricity cannot work. Power outages can be caused when too many people use energy at the same time. They are an inconvenience, but you know that the power will soon come on and you will be able to watch television and use the computer once again. What if the power went out for good? What can *you* do to help prevent that? How can you conserve, or save, energy? Be sure to turn off lights and appliances when you aren't using them. Close windows and doors when the heat or air conditioner is running. In the winter, turn the heat down and add an extra layer of clothing to stay warm. In the summer, minimize the use of air conditioning by using a fan.

Carpool or ride on public transportation, like a bus or train, to cut down on using extra fuel in a personal car.



← **Show image 7A-9: Windmills and solar cells**

Scientists are working hard to develop new ways of supplying energy to our households, schools, and businesses. In the future, they hope to rely less on fossil fuels by gathering energy from the sun and the wind. Have you ever passed a row of windmills or seen solar panels on rooftops? <sup>7</sup> There are already many places on Earth that rely on wind and solar energy. These are two forms of **sustainable** energy that hold great hope for the future.

7 Where do you think solar panels get their energy? (the sun)



← **Show image 7A-10: Child reusing products**

There are so many things that you can do to help the earth right in your own home. I am sure that you have heard and seen the words *reduce*, *reuse*, and *recycle*. <sup>8</sup> To *reduce* means to make something smaller. So, if you reduce the amount of trash that you throw away, you are throwing away less. What can you do with some of the trash that you are used to throwing in the garbage? You can reuse it or recycle it. For example, if you get a birthday present wrapped in beautiful paper, you can remove it carefully from the package and use it over again to wrap another gift. Instead of using paper napkins at meals, use cloth napkins; wash them and use them over and over again. When you draw on one side of a piece of paper, turn it over and use the other side for another drawing. When you use fewer paper products, fewer trees will need to be cut down. Instead of using plastic bags at the grocery store, take your own cloth bags and reuse them every time you shop. When you use less plastic, you use fewer nonrenewable resources. And, while you are shopping, look at the labels on paper products, laundry detergents, and dish soaps. Choose products that are “green,” “eco-friendly,” and nontoxic—products that are safe for the environment.

8 [Show Image Card 32 (Reduce, Reuse, Recycle).] Say that phrase with me: *reduce, reuse, recycle*. What symbol is often used with this phrase? (triangle made of arrows) [Show students the icon on the back of the image card.]



← **Show image 7A-11: Children recycling**

Many local garbage collectors give you bins for **recycling** things such as paper, plastic bottles, glass jars, and plastic containers. If you use the bins, those items will not fill up large landfills with trash, but will instead be made into other useful items. Many cities and towns also have recycling centers where you can take recyclable goods. Did you know that metal containers—like empty cans from canned vegetables—are melted down to make bikes and scooters, or that old school papers can be shredded and made into new books, or that plastic is sometimes turned into sofas and chairs, rugs, and even clothes? It's amazing, isn't it? So, be sure to reduce, reuse, and recycle as much as you can.





← **Show image 7A-12: Zeke at compost pile**

If you have a yard, you can conserve resources and protect the environment there, too. Instead of using chemicals on your plants and lawn, find natural ways of controlling pests and weeds. What else can *you* do? Instead of throwing food wastes, like orange rinds and potato peels, into the garbage, start a compost pile. Compost is decayed matter, so you can serve as your own decomposer. Combine grass clippings, leaves, and food wastes, and over time, they will turn into rich soil for your garden. Worms are helpful decomposers in the composting process. Learn more about how to compost and spread the word to others. It's a fun and natural way to nourish the soil in your yard, and to get rid of food waste and other materials without crowding the landfills.





Protecting the environment is key to preventing **irreversible** damage to the planet. For many years, people have warned others about our destructive ways, but sometimes people choose not to listen. Harmful practices still take place, damaging ecosystems and threatening the balance of nature. It is up to you and me to make necessary changes if we are to save the finite resources of our endangered planet. One resource that humans potentially have more than any other animal is infinite wisdom to learn from mistakes and change bad habits. You *can* make a difference! Remember that your decisions every day have an impact on the ecosystem you live in.

### Comprehension Questions

15 minutes

1. *Evaluative* Were your predictions correct about what can be done to help restore and protect the environment? (Answers may vary.)
2. *Evaluative* What renewable resources become difficult to use once they are polluted? (air and water) How are our air and water polluted? (Answers may vary, but students may say that air is polluted through things like exhaust; water is polluted through things like pesticides and fertilizers; etc.)
3.  *Evaluative* You heard there are aquifers that supply fresh water, and that the Earth is covered mainly in salt water. Do these things mean we will always have water to use, or is there a finite amount? (finite) Why? (Much of the water is salty and cannot be used; aquifers alone cannot supply all of the water that we need.)
4. *Evaluative* Is the energy we receive from fossil fuels finite, or will we always have as much as we need? (finite) Why? (Fossil fuels may run out, and that is a main way we get energy.)
5. *Evaluative* Compare and contrast finite energy sources and sustainable energy sources. (Both are forms of energy that we use. Finite energy is nonrenewable; it comes from limited resources like coal and oil. Sustainable energy is renewable; it comes from unlimited resources like the sun and wind.)
6. *Inferential* If we are not careful in protecting the environment, some damage may be irreversible. Can you think of an example from the read-aloud of irreversible damage? (when an animal becomes extinct)
7.  *Evaluative* Can you think of a nonrenewable resource that is on its last legs? Explain why. (Answers may vary.)
8. *Inferential* What types of household things did you hear about in the read-aloud that may cause water pollution? (grease, pesticides, medicine, car oil, paint, weed killer, cleaning products) How must we dispose of these things that may cause water pollution? (not dispose of them down the drain or toilet, but according to suggested guidelines)



9.  *Evaluative* How can you be good stewards of the earth and conserve water? (take short showers, turn off water when brushing teeth, run full loads of laundry, catch rainwater, place a brick in the toilet) How can you conserve energy? (turn off lights when not in use, run fans when air conditioner is on, wear more clothes so you don't have to run the heat as much, carpool, take public transportation)
  10. *Evaluative* In the story, you heard that you can be good stewards of the earth by forming a litter brigade to pick up trash. Why is getting rid of litter important? (Litter can harm or kill animals, and it can also harm the environment through pollution.)
  11.  *Evaluative* *How? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. Think of a question you can ask your neighbor about the read-aloud that starts with the word *how*. For example, you could ask, "How can you be a good steward of the earth in your classroom, home, and neighborhood?" Turn to your neighbor and ask your "how" question. Listen to your neighbor's response. Then your neighbor will ask a new "how" question, and you will get a chance to respond. I will call on several of you to share your questions and answers with the class. (Answers may vary.)
  12.  *Evaluative* Pretend you are an ecologist like Zeke. Decide on a plan that you could put into practice in your classroom to conserve resources, protect the environment, and help keep equilibrium. (Answers may vary.) [Tell students that they will have more time to develop their ideas later.]
  13. After hearing today's read-aloud and comprehension questions and answers, do you have any remaining questions?
-  You may wish to allow time for individual, group, or class research of the text and/or other resources to answer any remaining questions.

## Word Work: Irreversible

5 minutes

1. In the read-aloud, you heard, “Protecting the environment is key to preventing *irreversible* damage to the planet.”
2. Say the word *irreversible* with me.
3. *Irreversible* describes something that is not able to be reversed, or changed.
4. Toby carefully cut the paper, knowing the changes he made would be irreversible.
5. What are some things that can be described as irreversible? Be sure to use the word *irreversible* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses to be complete sentences: “\_\_\_\_\_ is irreversible because . . .”]
6. What’s the word we’ve been talking about? What part of speech is the word *irreversible*?

Use a *Making Choices* activity for follow-up. Directions: I am going to read a sentence about a situation. If it is about something that is irreversible, say, “That is irreversible.” If it is about something that is reversible, meaning it can be changed, say nothing. [Note: You may wish to discuss the distinction between things that are immediately reversible and things that are eventually reversible.]

1. cutting your hair
2. walking in the wrong direction
3. an animal becoming extinct (That is irreversible.)
4. being born (That is irreversible.)
5. a decision to not go to the park
6. an animal becoming endangered



**Complete Remainder of the Lesson Later in the Day**



# Protecting the Environment

7<sub>B</sub>

## Extensions

20 minutes

### Good Stewards of the Earth in the Classroom

Have students work in small groups to brainstorm ways that they can reduce, reuse, and recycle in the classroom. As time permits, have students reference trade books and/or websites from the Recommended Resources list. After students have had enough time to come up with at least five ideas, have groups share their ideas as a class. You may wish to record their classroom conservation ideas on a piece of chart paper, a chalkboard, or a whiteboard. Discuss how you can put their ideas into action. For example, if you do not already have one, you may place a recycling bin in your classroom, or pick a student each week to make sure the lights are turned off when everyone leaves the classroom.

### Poetry Reading

Tell students that they are going to hear a poem titled, “Trees,” by Joyce Kilmer. You may wish to share with students that Joyce Kilmer was an American poet and journalist, and he is remembered for this famous poem. On a U.S. map, you may wish to show students where the Joyce Kilmer Memorial Forest is located in North Carolina. Tell students that the trees in this forest have never been cut down, and they are so large that four people holding hands can’t reach all the way around one of the trees. Have four students hold hands and spread out to demonstrate just how large these trees are. Tell students to listen for the ways trees are described as being like people.

*Trees*

*by Joyce Kilmer*

*I think that I shall never see*

*a poem lovely as a tree.*

*A tree whose hungry mouth is pressed*

*Against the earth’s sweet flowing breast;*

*A tree that looks at God all day,  
And lifts her leafy arms to pray;  
A tree that may in summer wear  
A nest of robins in her hair;  
Upon whose bosom snow has lain;  
Who intimately lives with rain.  
Poems are made by fools like me,  
But only God can make a tree.*

After reading the poem, ask students, “What do we call it when an author describes a nonhuman thing as having human characteristics?” (personification) Ask students for some examples of personification in the poem, and guide the discussion to compare the literal and figurative nuances in these personifications. Then ask, “How does Joyce Kilmer feel about trees? How do you know?”

If time permits, you may have students choose their favorite line(s) from the poem and create an illustration. You may also wish to have students write their own poems about trees or another subject related to ecology.



## Pausing Point 2

PP<sub>2</sub>

### **Note to Teacher**

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This is the end of the *Ecology* read-alouds. Students have studied ecosystems and habitats, feeding relationships in nature, the balance of nature, and changes that occur in ecosystems due to both humans and nature itself. It is highly recommended that you pause here and spend one day reviewing, reinforcing, or extending the material taught thus far.

You may have students do any combination of the activities listed below. The activities may be done in any order. You may wish to do one activity on successive days. You may also choose to do an activity with the whole class or with a small group of students who would benefit from the particular activity.

### **Core Content Addressed in this Domain**

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Students will:

- ✓ Describe ecology as the study of relationships between living things and their environment
- ✓ Describe and provide an example of a habitat
- ✓ Explain why certain organisms live in certain habitats and how they adapt to those habitats
- ✓ Describe and provide an example of an ecosystem
- ✓ Describe how organisms in an ecosystem depend on each other and their environment
- ✓ Describe what happens in a food chain
- ✓ Identify the three essential parts of a food chain: producers, consumers, and decomposers
- ✓ Sequence a food chain of two or more trophic levels
- ✓ Classify members of a food chain as producers, consumers, or decomposers
- ✓ Provide an example of a food chain in a given food web

- ✓ Explain why nature and ecosystems are not static but are constantly changing
- ✓ Describe the balance of nature in an ecosystem
- ✓ Explain how changes in an ecosystem are caused by natural events and by humans
- ✓ Explain why sometimes animals must leave their habitats when the natural balance is lost
- ✓ Explain how ecosystems are affected by changes in the environment
- ✓ Explain how humans affect ecosystems and the environment
- ✓ Describe and identify human-made threats to the environment
- ✓ Identify different types of resources including renewable and nonrenewable
- ✓ Explain the importance of conservation and recycling to the health of the environment
- ✓ Identify different ways to protect and restore the environment

## **Activities**

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### **Image Review**

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Show the images from any read-aloud again, and have students retell the read-aloud using the images.

### **Image Card Review**

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#### **Materials: Image Cards 1–32**

Hold up Image Cards 1–32. Ask a student to choose a card but not show it to anyone else in the class. The student must then give a clue about the picture s/he is holding. For example, for the Dust Bowl, a student may say, “I am an event that occurred in the 1930s that was a combination of man-made and natural disasters.” The rest of the class will guess what is being described. Proceed to another card when the correct answer has been given.

## Food Chains and Webs

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### Materials: Image Cards 6–29; drawing paper, drawing tools

Display Image Cards 6–29. Have students choose one producer, two consumers, and one decomposer from the images to create a food chain. Have students decorate the background or border of their paper to indicate the ecosystem. You may also wish to have some students create overlapping food webs, either with a partner or in a group.

## Domain-Related Trade Book or Student Choice

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### Materials: Trade book

Read an additional trade book to review the feeding relationships in nature, the balance of nature, changes to ecosystems, and how to be good stewards of the earth. Refer to the books listed in the domain introduction. You may also choose to have the students select a read-aloud to be heard again.

If students listen to a read-aloud a second time, you may wish to have them take notes about a particular topic. Be sure to guide them in this important method of gathering information. You may wish to model how to take notes, construct an outline, etc.

## ✈ Multiple Meaning Word Activity: Leach

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### Materials: Chart paper, chalkboard, or whiteboard with the words *leach* and *leech*

#### ← Show image 6A-3: Farm fertilizer leaching into water; erosion

Complete a *Sentence in Context* activity with the homonyms *leach* and *leech*.

1. In Lesson 6, you heard, “Some fertilizers leach into the earth, contaminating groundwater.” [Ask students to describe the meaning of the word *leach* based on this context (*release*), and be sure to point out that the leaching water in the image is at the top of the hill where water soaks into the ground, affected by the chemicals being sprayed from the tractor. Point to the word *leach* on the board so students can see the correct spelling. Spell the word together out loud.]
2. Tell students that the word *leach* is a homonym and remind them that a homonym is a word that sounds exactly like another word but has a different spelling and meaning. [Point to the word *leech*, and spell it out loud together.] The homonym *leech* is a name for a kind of worm



that has a sucker. For example, “When I stepped out of the creek, I noticed a leech on my ankle and pulled it off.”

3. Tell students that because the worm called a leech can literally cling fast to other objects, there is a third meaning for the word *leech*, a figurative meaning to describe one person as clinging to or taking from another person. For example, “When we swim in the ocean waves, my older brother doesn’t mind that I am a leech, hanging onto his arm.” [Point to the word *leech*.]
4. Now have students take turns making sentences for either *leach* or *leech* and come to the board to share and point to the correct spelling. Encourage students to be as descriptive as possible and use complete sentences.

### Key Vocabulary Brainstorming

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#### Materials: Chart paper, chalkboard, or whiteboard

Give students a key domain concept or vocabulary word such as *balance of nature*. Have them brainstorm everything that comes to mind when they hear the word, such as *natural disasters*, *damage to ecosystems*, *disruptions*, etc. Record their responses on a piece of chart paper, a chalkboard, or a whiteboard for reference.

### 10 Riddles for Core Content

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Ask students riddles such as the following to review core content:

- I am an animal’s special home in an ecosystem. What am I? (*habitat*)
- I am made up of different types of habitats, and may be a swamp, a forest, a savanna, or another type. What am I? (*ecosystem*)
- I am a series of overlapping food chains. What am I? (*food web*)
- I am used to organize information and demonstrate how energy flows from one organism to another. What am I? (*energy pyramid*)
- Droughts, volcanoes, plagues, floods; these are a few examples of us. What are we? (*natural disasters*)
- I am used to speed the growth of crops, but can leach into soil and pollute groundwater. What am I? (*fertilizer*)
- I am made up of grass clippings, food waste, and old leaves. What am I? (*compost*)



## **Class Book: Ecology**

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### **Materials: Drawing paper, drawing tools**

Tell the class or a group of students that they are going to make a class book to help them remember what they have learned in this domain. Have students brainstorm important information about ecology, focusing on either feeding relationships, or on pollution and conservation efforts. Have each student choose one idea to draw a picture of, and ask him or her to write a caption for the picture. Bind the pages to make a book to put in the class library for students to read again and again.

## **Writing Prompts**

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Students may be given an additional writing prompt such as the following:

- The most interesting thing I've learned about ecology is \_\_\_\_\_ because . . .
  - It is important to reduce, reuse, and recycle because . . .
  - I recommend \_\_\_\_\_ to help protect the environment because . . .
  - If I could choose a habitat or ecosystem in which to live, I would choose . . .
-  Compare and contrast the eastern wild turkey and the bald eagle.
-  Write about something we think of as trash, and describe how it could be made into something new, e.g., a plastic gallon jug made into plant cover in the garden in early spring; tea boxes made into storage containers; plastic individual serving cups made into seed starters; etc.

## **Natural Disaster**

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Students may choose one natural disaster that they would like to learn more about. Students may choose to learn more about a local natural disaster, such as a hurricane, tornado, or oil spill, and how their area has been and still may be affected by these events. Have students write about what happens during this natural disaster and what causes it to happen. Students may also research what they can do be prepared for natural disasters, such as having a safe space to take cover during a storm, etc.

## Taking Care of the Earth Poster

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**Materials: Image Card 32 (Reduce, Reuse, Recycle); drawing paper, drawing tools**

Give each student a blank piece of paper. They should draw a picture of ways they can be good stewards of the earth. They may wish to make three columns and draw one way they can reduce, reuse, and recycle.

Tell students to include one to two key words explaining what they have drawn.



## Layers of the Earth Clay Model

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**Materials: Image Card 31 (Four Layers of Earth); modeling clay in colors blue, red, orange, yellow; clay knife**

Have students create a model representing the layers of the earth. Have them start with the yellow clay to represent the inner core. Students will roll this piece into a ball that is about one inch in diameter. Next they will wrap a thick layer of orange clay around the yellow ball to represent the outer core. The mantle is next, represented by a thick piece of red clay. Finally, students will wrap a thin layer of blue clay which represents the Earth's crust around the ball. When they have finished wrapping all the colors of clay, students will cut a cross-section out of their models. This will reveal the four layers of the Earth. The size of a completed model is flexible—between two and four inches in circumference works well.

After students have finished creating and cross-sectioning their models, have them write a paragraph that explains either the sequence of events that causes a volcano to erupt, or the nonliving cycle of rock formation in the Earth. As students are writing, encourage them to use domain-related vocabulary.



## Research Activity: Ecosystems

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**Materials: Trade books; online resources**

Tell students that they are to choose one ecosystem that they would like to learn more about. Students can write about the animals, weather, plants, and location of their chosen ecosystem.

Students may want to research more about the ecosystem in which they live, including nonnative invasive species and species that have become extinct. Students may also be interested to learn more about species that were once endangered but are no longer considered endangered because of human involvement.



## Research Activity: Negative and Positive Effects

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Remind students that they heard about potential negative and positive effects caused by natural disasters, such as fires started by lightning. Have them research the following natural events and write about both the negative and positive effects. You may wish to suggest that students research and report on specific events that have occurred in real places.

- flooding
- winter storms or wind storms in a forest
- fires

## Domain-Related Trade Book: *The Lorax*, by Dr. Seuss

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**Materials:** *The Lorax*, by Dr. Seuss, from the list of Recommended Resources; chart paper, chalkboard, or whiteboard

Introduce students to the story by sharing the cover with them. You may wish to ask if students are familiar with this story, or what they predict it is about from looking at the cover. Tell them to listen carefully to hear about something that is on its last legs in the story. After you read the story out loud to students, guide discussion to include some of the following main ideas in the story.

- Describe the setting of the story before the Once-ler starts manufacturing thneeds. What trees or animals are there?
- Do you agree that everyone needs a thneed?
- Describe a habitat in this story.
- You are in charge of the last Truffula Seed. What will you decide to do with it?
- Would you say that the Brown Bar-ba-loot is on its last legs? Why?
- How did one man's decisions and actions affect a vibrant ecosystem?
- Would you recommend this story to a friend? Why or why not?
- With a partner, decide on a conservation plan that might help this ecosystem get back into equilibrium.

If there is time after the discussion, you may wish to go through *The Lorax* and pick out various nonsensical words. Write these words in bold print on individual pieces of paper. Remind students that Dr. Seuss uses silly, made-up words in his stories, along with silly rhymes and alliteration,

but that we can often guess the meanings of the words from their context and sound. Show students the words you picked out, and ask them to guess what the word means. Record their answers on a piece of chart paper, a chalkboard, or a whiteboard. Next, read the sentence from the trade book that includes each word to provide context. Compare with students' earlier answers to see if their definitions are correct. Remind students that context is important in trying to figure out the meaning of words and phrases, even silly words and phrases.

### **Future Ecologists**

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Discuss with students the field of ecology. Ask students if anyone is interested in studying ecology like Zeke. Ask students, "What does the field of ecology study?" Ask students what they would want to focus on as an ecologist: water pollution, air pollution, etc. You may wish to invite an ecologist to come speak to the class.

### **Guest Speaker**

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Invite a park ranger or someone else in your community who is involved in conservation efforts to come speak to your students. They may speak about the effects of litter or pollution, and discuss with students what they can do to help.

**Note:** If you arrange a guest speaker, you may wish to have students prepare questions in advance to ask during that time.



# Domain Assessment

# DA

This domain assessment evaluates each student's retention of the core content targeted in *Ecology*.

## 10 Domain Assessment

**Note:** You may wish to have some students do the three parts of this assessment in two or three sittings. Some students may need help reading the questions. You may wish to allow some students to respond orally.

### *Part I (Instructional Master DA-1)*

Directions: Listen to the sentence I read. I will also read the three words in the row. Circle the name of the person, place, or thing described in the sentence.

1. A \_\_\_\_\_ is an animal's special home in an ecosystem. (habitat)
2. Animals' habitats, including both living and nonliving things, make up \_\_\_\_\_. (ecosystems)
3. The study of the households, or homes, of living things is called \_\_\_\_\_. (ecology)
4. In a food chain, producers \_\_\_\_\_ their own food. (make)
5. In a food chain, consumers \_\_\_\_\_ producers and often other consumers for food. (eat)
6. Beetles and worms break down dead animals and plants and return nutrients to the earth; they are examples of \_\_\_\_\_. (decomposers)
7. The balance of nature means that one \_\_\_\_\_ condition changes gradually into another stable condition with few disruptions to nature's cycles. (stable)
8. A food \_\_\_\_\_ is a series of overlapping food chains. (web)

### *Part II (Instructional Master DA-2)*

Directions: Pick four organisms—a producer, two consumers, and a decomposer—and create a food chain.

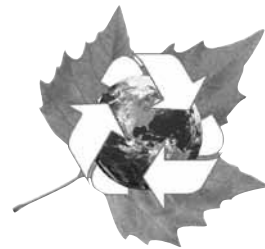
**Part III (Instructional Master DA-3)**

**Note:** You may wish to have some students write more sentences or have some students focus only on responding to one or two questions.

Directions: Read along as I read each sentence. Write one or two complete sentences to respond to each question.

1. Why do certain organisms, or living things, exist in certain habitats?
2. What are two ways that humans have changed ecosystems?
3. What are two things you can do to help protect Earth?
4. Why might the disappearance of one species from an ecosystem affect the survival of others?
5. What is an example of a natural disaster and the changes it can cause to an ecosystem?

**For Teacher Reference Only:**  
*Copies of Tell It Again! Workbook*









## Dear Family Members,

During the next couple of weeks, your child will be learning about ecology, or the study of how living things relate to their environments. S/he will be learning about organisms and why certain organisms live in certain habitats; what an ecosystem is; the difference between a habitat and an ecosystem; how organisms depend on both their environment and other organisms that live in their habitat; how a food chain operates in an ecosystem; and how changes in an ecosystem are caused by both natural events and humans.

Below are some suggestions for activities that you may do at home to reinforce what your child is learning about ecology.

### 1. Draw and Discuss

Your child will be hearing the words *ecology*, *ecosystem*, and *ecologist*. Ask your child what the prefix *eco-* means. S/he may recall that it means “house” or “household” in Greek and refers to Earth’s environments as the household of living things. Discuss with your child the fact that ecosystems exist throughout the earth and can be very small, like a puddle, or very large, like an ocean. They can exist either on land or in water. What they all have in common, however, is that they all include living organisms.

Your child will be hearing about certain types of ecosystems, including deserts; savannas; forests; rainforests; freshwater streams, ponds, lakes, and rivers; and saltwater oceans. Have your child select an ecosystem and draw a picture of it. The picture may include various organisms and nonliving things that exist within the ecosystem. Have your child describe the habitat of the living organisms in the ecosystem (i.e., under a rock on the sea bed) and what role each of the organisms plays in the food chain of the ecosystem (i.e., producer, consumer, or decomposer).

### 2. Walk and Categorize

Choose a place where you and your child can walk and observe an ecosystem, such as a beach near an ocean or lake, a trail through a forest, or on a neighborhood street. As you walk with your child, ask your child to point out the living and nonliving things that exist in that ecosystem. Have your child categorize the living things according to the role each plays in the food chain (i.e., producer, consumer, or decomposer).

After you have completed the walk through the ecosystem, you may wish to have your child draw either a food chain or a food web that shows the relationships between the living organisms s/he observed on the walk. Your child may also label the picture, using the terms s/he learned in school while studying ecology.

### 3. Topics to Discuss

Your child will be hearing the words *equilibrium* and *disequilibrium*. Discuss with your child the meaning of *equilibrium* (in balance) and *disequilibrium* (out of balance). Ask your child to explain how equilibrium is maintained in an ecosystem. (Changes occur gradually, allowing organisms time to adapt to the changes.) Ask your child to explain how an ecosystem can experience disequilibrium. (Changes occur, and organisms try to restore a balance of nature, but are unable to do so.) Discuss with your child various events, both those that occur naturally and those caused by humans, that can cause disequilibrium.

### 4. Words to Use

Below is a list of some of the words that your child will be learning about and using. Try to use these words as they come up in everyday speech with your child.

- *interdependent*—The animals and plants in every habitat are all interdependent.
- *tolerant*—Tariq knew that his pet lizard was not tolerant of cold temperatures, so he bought a special heating lamp to put in the terrarium to keep Liz warm.
- *tier*—Parker decorated the three tiers of the wedding cake with her favorite flower—lavender.
- *stable*—Camden decided that he was ready to adopt a kitten and give it a stable home.
- *static*—Mayuko was happy to see that his good grades remained static throughout third grade.

### 5. Read Aloud Each Day

It is very important that you read with your child every day. Set aside time to read to your child and also time to listen to your child read to you. I have attached a list of recommended trade books related to ecology that may be found at the library, as well as a list of informational websites.

Be sure to praise your child whenever s/he shares what has been learned at school.



## Recommended Resources for Ecology

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### Trade Book List

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#### Ecology and Conservation

1. *Air Pollution (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2002) ISBN 0516259989
2. *Aliens from Earth: When Animals and Plants Invade Other Ecosystems*, by Mary Batten (Peachtree, 2008) ISBN 1561454508
3. *Buried in Garbage*, by Bobbie Kalman and Janine Schaub (Crabtree, 1991) ISBN 9780865054547
4. *The Green Alphabet: A First Look at Ecology*, by Donna L. Hurst and Allison Wagner Taylor (Eloquent Books, 2010) ISBN 9781609116422
5. *John Muir: America's Naturalist*, by Thomas Locker (Fulcrum Publishing, 2003) ISBN 9781555917050
6. *The Lorax*, by Dr. Seuss (Random House Books for Young Readers, 1971) ISBN 9780394823379
7. *Oil Spill!*, by Melvin Berger (HarperCollins Publishers, 1994) ISBN 0064451216
8. *Recycling (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2001) ISBN 0516273566
9. *A River Ran Wild*, by Lynne Cherry (First Voyager Books, 2002) ISBN 9780152163723
10. *Trash!*, by Charlotte Wilcox (Carolrhoda Books, 1988) ISBN 0876143117
11. *Water Pollution (A True Book)*, by Rhonda Lucas Donald (Children's Press, 2001) ISBN 0516273574
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Name: \_\_\_\_\_

*Directions: Answer the questions about producers, consumers, and decomposers. On the back of the worksheet, draw a picture of a food chain that includes at least one producer, consumer, and decomposer. Use arrows to demonstrate the circular flow of energy in the food chain.*

How do producers get their food? What is an example of a producer?

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How do consumers get their food? What is an example of a consumer?

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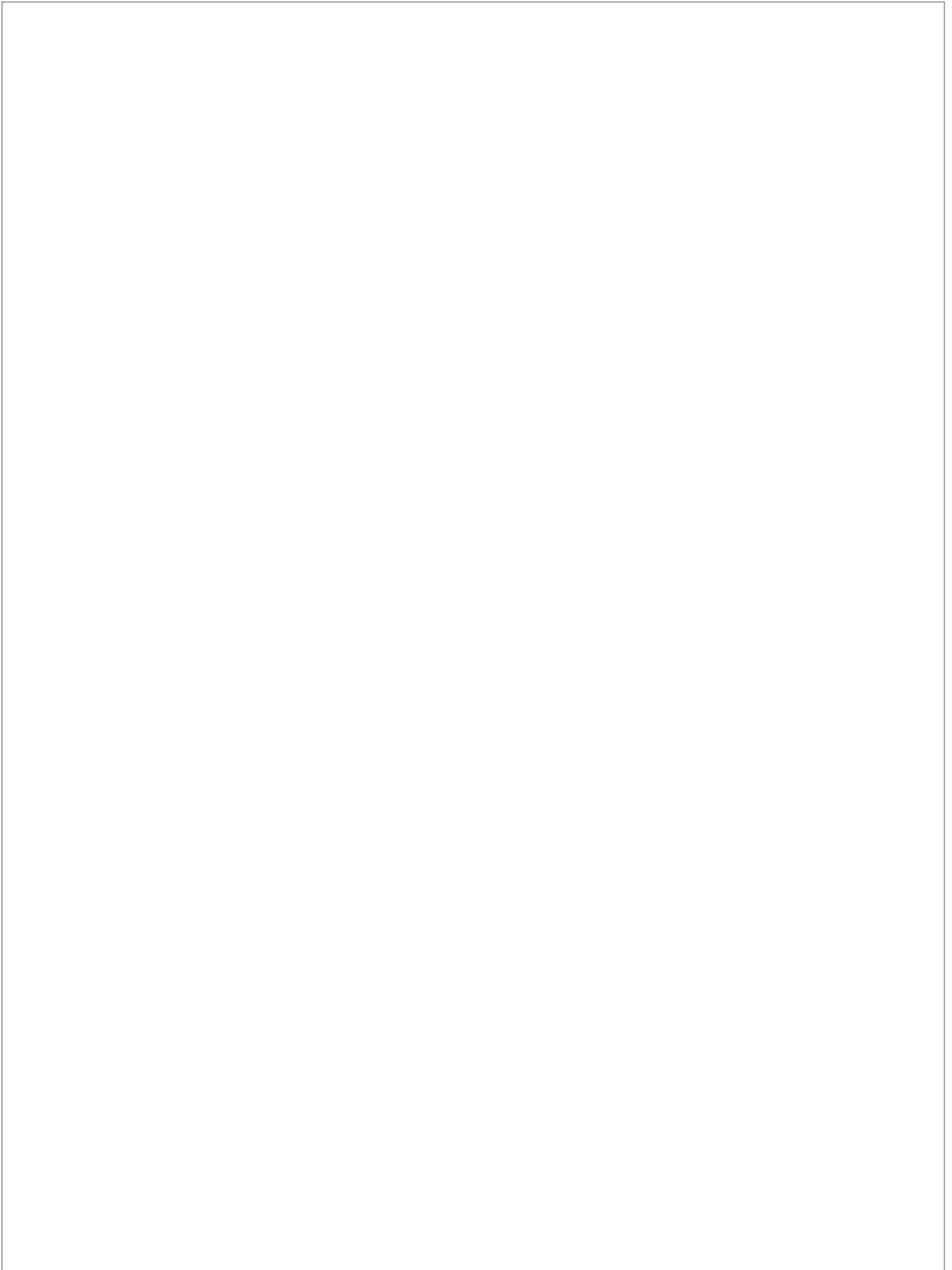
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How do decomposers get their food? What is an example of a decomposer?

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Name: \_\_\_\_\_

## Natural Disasters

One natural disaster is:

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This natural disaster happens when:

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One effect of this natural disaster is:

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Another effect of this natural disaster is:

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*Directions: Choose a natural disaster that you heard about today: drought, volcanoes, plagues, earthquakes, flooding, fires, mudslides, and dust storms. Fill in the information based on your chosen natural disaster.*





## Dear Family Members,

Your child has been hearing about ecology, or the study of how living things relate to their environments. S/he will be learning that ecosystems are always changing, that those changes can be caused by either natural events or human actions, and that people can do things to protect the environment, such as conserve resources and reuse or recycle items.

Below are some suggestions for activities that you may do at home to reinforce what your child is learning about ecology.

### 1. Draw and Write

Your child will be hearing about ways nature can send an ecosystem into disequilibrium. Among these natural occurrences are droughts, storms (such as hurricanes), diseases, volcanic eruptions, earthquakes, floods, and fires. Ask your child to draw a picture of one of the natural occurrences and write about the way in which this natural occurrence can cause disequilibrium in an ecosystem.

Your child will learn about another natural occurrence that is not a natural disaster but can also affect the balance in an ecosystem: a change in the balance between predator and prey. Ask your child to draw a predator and prey diagram and explain how an ecosystem can be sent into disequilibrium when there is a change in the relationship between predator and prey.

### 2. Topics to Discuss

Your child will be hearing about ways in which human activity causes disequilibrium in an ecosystem. Discuss with your child some human activities that cause disequilibrium in nature, such as over-crowding, poor management of natural resources, over-farming and use of chemical fertilizers, use of pesticides, use of fossil fuels that may create greenhouse gases that contribute to a rise in Earth's temperature, and activities that cause an increase in air and water pollution. Discuss with your child ways s/he can help protect the planet from dangerous changes that affect the balance of nature.

### 3. Protecting the Environment

Your child will be hearing about different ways s/he can help protect the environment. Discuss with your child one or more actions your child would like to take to help maintain a balance of nature. For example, your child may decide s/he would like to protect the earth or conserve its resources by taking shorter showers; turning off the water faucet when brushing teeth; doing laundry only when there is a full load to wash; collecting rainwater to use to water plants; picking up litter along the waterways and streets of your community; properly disposing of old paints, car oil, weed killers, and leftover cleaning products; turning off lights and appliances when not in use; closing windows and doors when using heat or air conditioning; carpooling, walking, or using public transportation; reusing or recycling items such as paper, plastic, and glass; and composting.

When your child determines the way s/he would like to protect the earth or conserve its resources, you may wish to have your child make a sign or poster that will remind your child how s/he can accomplish these goals. For example, if your child decides s/he will conserve water by turning off the faucet while brushing teeth, s/he may make a sign to hang in the bathroom as a reminder. Similarly, if s/he decides to make a greater effort to turn off lights when not in use, s/he may make signs to place on several light switches.

#### **4. Sayings and Phrases: On Its Last Legs**

Your child will be learning the saying “on its last legs.” Talk with your child about the meaning of this phrase. In reference to this saying, discuss with your child something that is worn out, or dying. Ask your child to share with you why the eagle was once “on its last legs.” Discuss with your child an ecosystem or species that is on its last legs. Find other opportunities to use this saying.

#### **5. Words to Use**

Below is a list of some of the words that your child will be learning about and using. Try to use these words as they come up in everyday speech with your child.

- *periodic*—The ancient Romans had periodic gatherings for events like chariot races and gladiator fights.
- *leach*—Faye had left her watercolors at the park, and when she returned a few days later, she discovered that her paints had started to leach into the ground due to all of the rain.
- *finite*—Many of Earth’s resources are finite, and we must learn to conserve and manage these resources so they will be available for future generations.
- *pesticides*—Organic fruits and vegetables are grown without the use of chemicals and pesticides.
- *stewards*—In an effort to be good stewards of the Earth, Niall and his family try not to create any trash;—they have a compost container and a recycling bin so that all their waste can be reused.

#### **6. Read Aloud Each Day**

It is very important that you read with your child every day. Set aside time to read to your child and also time to listen to your child read to you. Please refer to the list sent home with the previous family letter of recommended trade books related to ecology that may be found at the library, as well as the list of informative websites.

Be sure to praise your child whenever s/he shares what has been learned at school.

## The Dust Bowl

In the 1930s, the United States went through some very hard times. One serious problem was an event that lasted for eight years: the Dust Bowl. The Dust Bowl is the name for the time when crops could not grow and dust blew around in parts of Kansas, Colorado, New Mexico, Oklahoma, and Texas. There were dust storms, and large clouds of dust would pass over the land. In one major Dust Bowl storm, the dust cloud was 1,800 miles wide! During a Dust Bowl storm, the sky would turn dark, people could not see very well, and gritty dust would cover everything.

What caused the Dust Bowl to take place? First of all, farmers were overusing the land. They removed grasses native to the area, making more room for their crops. They did not give the soil time to replenish itself. The farmers also planted rows and rows of the same crop. All of these things stripped the topsoil, and the soil became weak. Also, in 1931, a drought hit, drying up all the land. Without rain, crops could not grow. With loose, weak soil, dry conditions, and strong winds, the soil was picked right up and rolled along as a big dust cloud. The drought ended in 1939, but it took more than rain to end the Dust Bowl. Farmers had to change their practices, too, to help restore the balance of nature.

*Directions: Read the paragraphs about the Dust Bowl, and then answer the following questions.*

1. Where and when did the Dust Bowl take place?

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2. Is the Dust Bowl an example of the balance of nature or an imbalance in nature?

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3. What natural disaster contributed to the Dust Bowl?

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Name: \_\_\_\_\_

4. What human practices contributed to the Dust Bowl?

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5. Do you think another dust bowl could happen again today?  
Why or why not?

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Name: \_\_\_\_\_

*Directions: Listen to the sentence and the three words read by the teacher. Circle the word that best completes the sentence.*

1.            habitat                    ecosystem                    food chain

2.            rock                                    habitat                                    ecosystems

3.            ecology                                astronomy                                history

4.            make                                    eat                                    kill

5.            eat                                        create                                        buy

6.            decomposers                            producers                                    consumers

7.            changing                                stable                                        devastating

8.            chain                                    pyramid                                        web



Directions: Listen to the sentence and the three words read by the teacher. Circle the word that best completes the sentence.

- |    |             |           |             |
|----|-------------|-----------|-------------|
| 1. | habitat     | ecosystem | food chain  |
| 2. | rock        | habitat   | ecosystems  |
| 3. | ecology     | astronomy | history     |
| 4. | make        | eat       | kill        |
| 5. | eat         | create    | buy         |
| 6. | decomposers | producers | consumers   |
| 7. | changing    | stable    | devastating |
| 8. | chain       | pyramid   | web         |

1. **habitat**      *A \_\_\_\_\_ is an animal's special home in an ecosystem.*

2. **ecosystems**      *Animals' habitats, including both living and nonliving things, make up \_\_\_\_\_.*

3. **ecology**      *The study of the households, or homes, of living things is called \_\_\_\_\_.*

4. **make**      *In a food chain, producers \_\_\_\_\_ their own food.*










5. **eat**      *In a food chain, consumers \_\_\_\_\_ producers and often other consumers for food.*

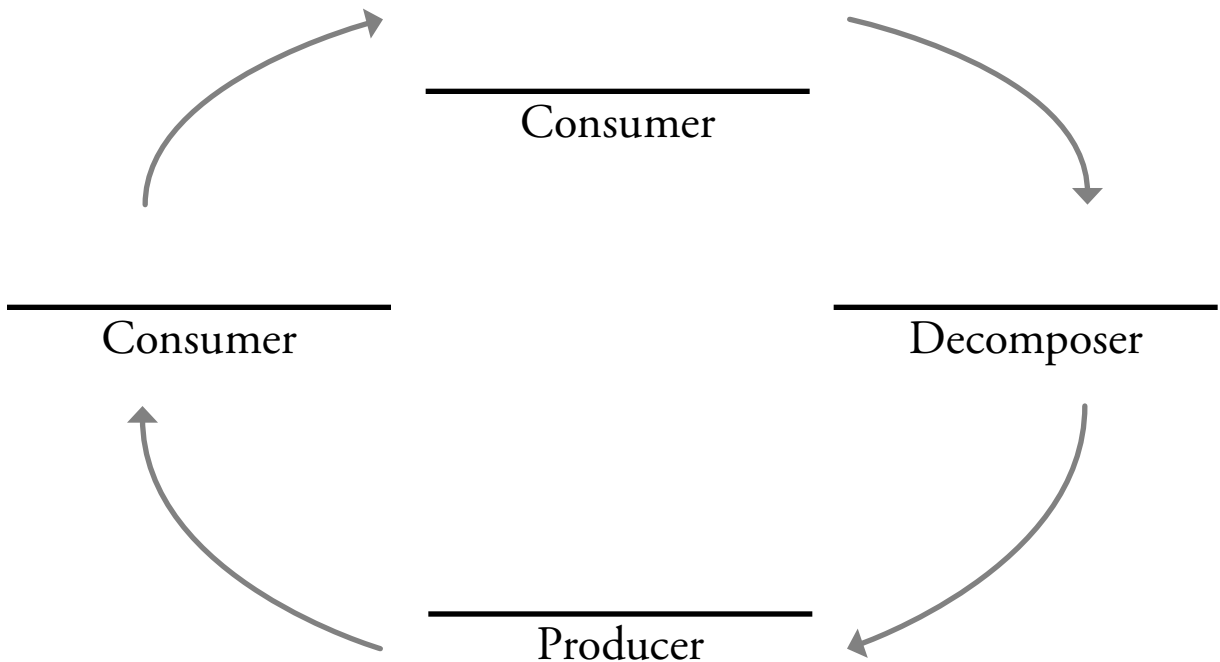
6. **decomposers**      *Beetles and worms break down dead animals and plants and return nutrients to the earth; they are examples of \_\_\_\_\_.*

7. **stable**      *The balance of nature means that one \_\_\_\_\_ condition changes gradually into another stable condition with few disruptions to nature's cycles.*

8. **web**      *A food \_\_\_\_\_ is a series of overlapping food chains.*

*Directions: Pick four organisms—a producer, two consumers, and a decomposer—and create a food chain.*










 <p><b>Mushroom</b></p>	 <p><b>Wheat Field</b></p>	 <p><b>Rabbit</b></p>
 <p><b>Owl</b></p>	 <p><b>Worm</b></p>	 <p><b>Beetle</b></p>
 <p><b>Grass</b></p>	 <p><b>Mouse</b></p>	 <p><b>Fox</b></p>

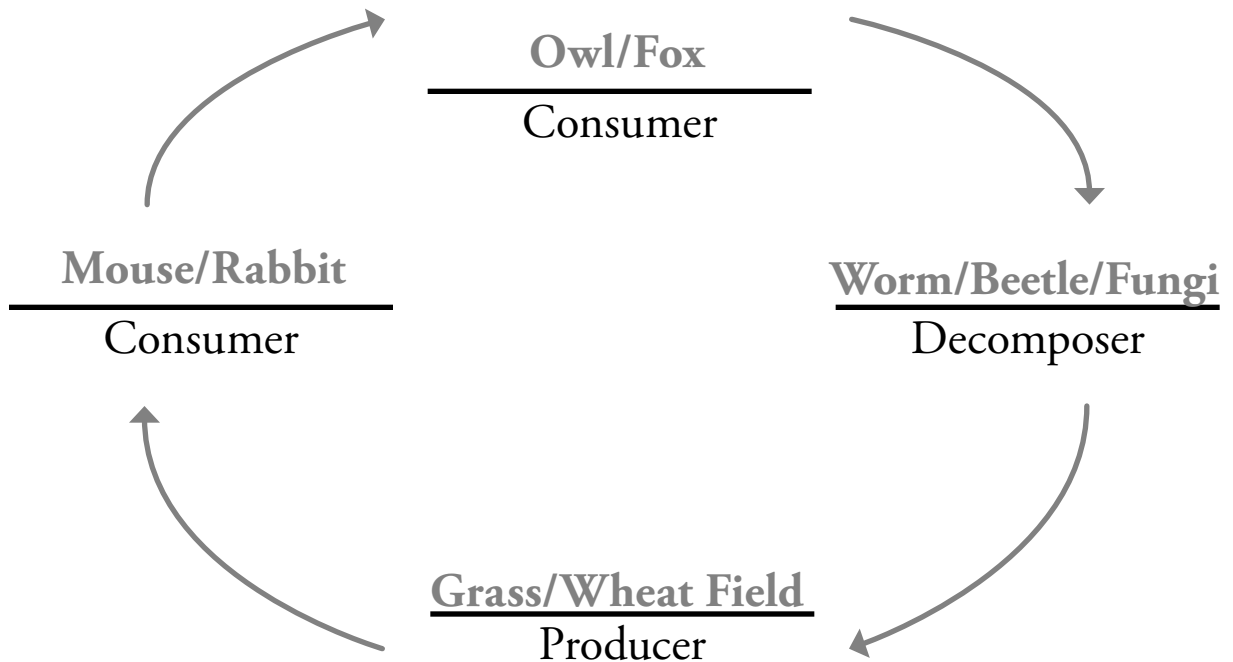






*Directions: Pick four organisms—a producer, two consumers, and a decomposer—and create a food chain.*

 <b>Mushroom</b>	 <b>Wheat Field</b>	 <b>Rabbit</b>
 <b>Owl</b>	 <b>Worm</b>	 <b>Beetle</b>
 <b>Grass</b>	 <b>Mouse</b>	 <b>Fox</b>





Name: \_\_\_\_\_

*Directions: Read along as your teacher reads each sentence. Think about the answer to the question. Write one or two complete sentences to answer each question.*

1. Why do certain organisms, or living things, exist in certain habitats?

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2. What are two ways that humans have changed ecosystems?

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3. What are two things you can do to help protect Earth?

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4. Why might the disappearance of one species from an ecosystem affect the survival of others?

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5. What is an example of a natural disaster and the changes it can cause to an ecosystem?

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# Tens Recording Chart

Use this grid to record Tens scores. Refer to the Tens Conversion Chart that follows.

Name														

# Tens Conversion Chart

## Number Correct

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0	10																			
2	0	5	10																		
3	0	3	7	10																	
4	0	3	5	8	10																
5	0	2	4	6	8	10															
6	0	2	3	5	7	8	10														
7	0	1	3	4	6	7	9	10													
8	0	1	3	4	5	6	8	9	10												
9	0	1	2	3	4	6	7	8	9	10											
10	0	1	2	3	4	5	6	7	8	9	10										
11	0	1	2	3	4	5	5	6	7	8	9	10									
12	0	1	2	3	3	4	5	6	7	8	8	9	10								
13	0	1	2	2	3	4	5	5	6	7	8	8	9	10							
14	0	1	1	2	3	4	4	5	6	6	7	8	9	9	10						
15	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10					
16	0	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10				
17	0	1	1	2	2	3	4	4	5	6	6	7	7	8	8	9	9	10			
18	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10		
19	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	
20	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10

Simply find the number of correct answers the student produced along the top of the chart and the number of total questions on the worksheet or activity along the left side. Then find the cell where the column and the row converge. This indicates the Tens score. By using the Tens Conversion Chart, you can easily convert any raw score, from 0 to 20, into a Tens score.

Please note that the Tens Conversion Chart was created to be used with assessments that have a defined number of items (such as written assessments). However, teachers are encouraged to use the Tens system to record informal observations as well. Observational Tens scores are based on your observations during class. It is suggested that you use the following basic rubric for recording observational Tens scores.

9–10	Student appears to have excellent understanding
7–8	Student appears to have good understanding
5–6	Student appears to have basic understanding
3–4	Student appears to be having difficulty understanding
1–2	Student appears to be having great difficulty understanding
0	Student appears to have no understanding/does not participate

# CORE KNOWLEDGE LANGUAGE ARTS

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Dorrit Green  
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