

Appendix A

**Tables of Next Generation Science Standards (NGSS)
and Common Core State Standards
for English Language Arts (ELA) Addressed
in *Perfect Pairs* Lessons**

Table 1. NGSS Performance Expectations Addressed in Each Grade 3 Lesson

Lesson	Disciplinary Core Idea(s)	Performance Expectation
3.1 What the Lives of All Creatures Have in Common, Even When Their Life Cycles Are Different	Growth and Development of Organisms Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.	3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3.2 How Being Part of a Group Helps Animals Survive	Social Interactions and Group Behavior Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.	3-LS2-1. Construct an argument that some animals form groups that help members survive.
3.3: Why Some Animals Look Different from Their Family Members	Inheritance of Traits Many characteristics of organisms are inherited from their parents. Variation of Traits Different organisms vary in how they look and function because they have different inherited information.	3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
3.4: What Fossils Can Tell Us About Life and Environments Long Ago	Evidence of Common Ancestry and Diversity <ul style="list-style-type: none"> • Some kinds of plants and animals that once lived on Earth are no longer found anywhere. • Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. 	3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
Lesson 3.5: How Variations in Characteristics Can Help Some Animals Survive	Natural Selection Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
3.6: How Animals Survive in a Cold Environment	Adaptation For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Biodiversity and Humans Populations live in a variety of habitats, and change in those habitats affects the organisms living there.	3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
3.7: How People Try to Solve Problems That Occur When an Environment Changes	Ecosystem Dynamics, Functioning, and Resilience When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.	3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Table 2. NGSS Performance Expectations Addressed in Each Grade 4 Lesson

Lesson	Disciplinary Core Idea(s)	Performance Expectation
4.1: How Our Body Structures Help Us Survive	Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.	4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4.2: How Feathers Help Birds Survive	Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.	4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4.3: How a Tree's Structures Help It Survive	Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.	4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4.4: How Animals Depend on Their Senses	Information Processing Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.	4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
4.5: How Natural Resources Provide Electrical Energy	Natural Resources Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
4.6: How Energy Use Affects Environments and the Animals Living There	Natural Resources Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Table 3. NGSS Performance Expectations Addressed in Each Grade 5 Lesson

Lesson	Disciplinary Core Idea(s)	Performance Expectation
5.1A: Where Plants Get Most of the Materials They Use to Grow	<p>Organization for Matter and Energy Flow in Organisms Plants acquire their material for growth chiefly from air and water.</p>	5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.
5.1B: Where Animals Get the Energy They Need to Live and Grow	<p>Energy in Chemical Processes and Everyday Life The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).</p> <p>Organization for Matter and Energy Flow in Organisms Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.</p>	5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
5.2 Why Dead Plants and Animals Don't Pile Up in Natural Places	<p>Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.</p> <p>Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.</p>	5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
5.3 How Matter Moves Among Living Things and the Environment	<p>Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.</p> <p>Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.</p>	5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

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Table 3. NGSS Performance Expectations Addressed in Each Grade 5 Lesson
(continued)

<p>5.4 How Living Things Depend on Their Environment for Survival</p>	<p>Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.</p> <p>Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.</p>	<p>5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p>
<p>5.5 How Introduced Species Can Affect an Ecosystem</p>	<p>Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.</p> <p>Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.</p>	<p>5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p>
<p>5.6: How We Can Protect Earth’s Resources and Environments</p>	<p>Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.</p>	<p>5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p>

Table 4. NGSS Science and Engineering Practices Included in Each Grade 3 Lesson

Practice	3.1	3.2	3.3	3.4	3.5	3.6	3.7
1. Asking Questions and Defining Problems	X	X	X	X	X	X	X
2. Developing and Using Models	X	X		X	X		X
3. Planning and Carrying Out Investigations	X	X	X	X	X	X	X
4. Analyzing and Interpreting Data	X	X	X	X	X	X	X
5. Using Mathematics and Computational Thinking		X					X
6. Constructing Explanations and Designing Solutions	X	X	X	X	X	X	X
7. Engaging in Argument from Evidence	X	X	X	X		X	X
8. Obtaining, Evaluating, and Communicating Information	X	X	X	X	X	X	X

The targeted practice for each lesson is indicated with a bold **X**.

Table 5. NGSS Science and Engineering Practices Included in Each Grade 4 Lesson

Practice	4.1	4.2	4.3	4.4	4.5	4.6
1. Asking Questions and Defining Problems	X	X	X	X	X	X
2. Developing and Using Models	X		X	X	X	
3. Planning and Carrying Out Investigations	X	X	X	X	X	X
4. Analyzing and Interpreting Data	X	X	X	X	X	X
5. Using Mathematics and Computational Thinking	X					X
6. Constructing Explanations and Designing Solutions	X	X	X	X	X	X
7. Engaging in Argument from Evidence	X	X	X	X		X
8. Obtaining, Evaluating, and Communicating Information	X	X	X	X	X	X

The targeted practice for each lesson is indicated with a bold **X**.

Table 6. NGSS Science and Engineering Practices Included in Each Grade 5 Lesson

Practice	5.1A	5.1B	5.2	5.3	5.4	5.5	5.6
1. Asking Questions and Defining Problems	X	X	X	X	X	X	X
2. Developing and Using Models	X	X	X	X	X	X	X
3. Planning and Carrying Out Investigations	X	X	X	X	X	X	X
4. Analyzing and Interpreting Data	X	X	X	X	X	X	X
5. Using Mathematics and Computational Thinking							
6. Constructing Explanations and Designing Solutions	X	X	X	X	X	X	X
7. Engaging in Argument from Evidence	X	X	X	X	X	X	X
8. Obtaining, Evaluating, and Communicating Information	X	X	X	X	X	X	X

The targeted practice for each lesson is indicated with a bold **X**.

Table 7. Common Core State Standards for ELA Addressed in Each Grade 3 Lesson

	Standards for Reading Literature	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Key Ideas and Details	1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	X	X	X	X	X	X	X
	2. Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.							
	3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.	X	X	X	X	X	X	X
Craft and Structure	4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.		X		X	X	X	X
	5. Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.	X	X	X	X	X	X	X
	6. Distinguish their own point of view from that of the narrator or those of the characters.							X
Integration of Knowledge and Ideas	7. Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).	X	X	X	X	X	X	X
	8. (Not applicable to literature)							
	9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series).							
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 2–3 text complexity band independently and proficiently.	X	X	X	X	X	X	X

Table 7. Common Core State Standards for ELA Addressed in Each Grade 3 Lesson (continued)

	Standards for Reading Informational Text	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Key Ideas and Details	1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	X	X	X	X	X	X	X
	2. Determine the main idea of a text; recount the key details and explain how they support the main idea.	X	X	X	X	X	X	X
	3. 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.	X	X	X	X	X	X	X
Craft and Structure	4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	X	X		X	X	X	X
	5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.		X		X		X	X
	6. Distinguish their own point of view from that of the author of a text.							X
Integration of Knowledge and Ideas	7. 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).	X	X	X	X	X	X	X
	8. Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).	X	X	X	X	X	X	X
	9. Compare and contrast the most important points and key details presented in two texts on the same topic.	X	X	X	X	X	X	X
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.	X	X	X	X	X	X	X

Table 7. Common Core State Standards for ELA Addressed in Each Grade 3 Lesson (continued)

	Standards for Writing	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Text Types and Purposes	1. Write opinion pieces on topics or texts, supporting a point of view with reasons.							X
	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	X	X	X	X	X	X	X
	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.				X	X		
Production and Distribution of Writing	4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose.		X	X	X	X	X	X
	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.						X	
	6. 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.							
Research to Build and Present Knowledge	7. Conduct short research projects that build knowledge about a topic.				X	X		
	8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	X	X	X	X	X	X	X
	9. (Begins in grade 4)							
Range of Writing	10. 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.							
	Standards for Speaking and Listening	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Comprehension and Collaboration	1. 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.	X	X	X	X	X	X	X
	2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	X	X	X	X	X	X	X
	3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	X	X	X	X	X	X	X
Presentation of Knowledge and Ideas	4. 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.			X		X	X	X
	5. Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.						X	
	6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.	X	X	X	X	X	X	X

Table 8. Common Core State Standards for ELA Addressed in Each Grade 4 Lesson

	Standards for Reading Literature	4.1	4.2	4.3	4.4	4.5	4.6
Key Ideas and Details	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	X	X	X	X	X	X
	2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.		X				X
	3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character’s thoughts, words, or actions).	X	X		X	X	X
Craft and Structure	4. Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean).	X	X	X	X	X	X
	5. Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., cast of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text.						
	6. Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.			X		X	
Integration of Knowledge and Ideas	7. Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text.	X	X	X	X	X	X
	8. (Not applicable to literature)						
	9. Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.						
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	X	X	X	X	X	X

Table 8. Common Core State Standards for ELA Addressed in Each Grade 4 Lesson (continued)

	Standards for Reading Informational Text	4.1	4.2	4.3	4.4	4.5	4.6
Key Ideas and Details	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	X	X	X	X	X	X
	2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.	X	X	X	X	X	X
	3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.	X	X	X	X	X	X
Craft and Structure	4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.	X	X	X	X	X	X
	5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.	X	X	X	X	X	X
	6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.					X	
Integration of Knowledge and Ideas	7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	X	X	X	X	X	X
	8. Explain how an author uses reasons and evidence to support particular points in a text.	X	X	X		X	X
	9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.	X	X	X	X	X	X
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	X	X	X	X	X	X

Table 8. Common Core State Standards for ELA Addressed in Each Grade 4 Lesson (continued)

	Standards for Writing	4.1	4.2	4.3	4.4	4.5	4.6
Text Types and Purposes	1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.					X	
	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	X	X	X	X	X	X
	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.		X			X	
Production and Distribution of Writing	4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.	X	X	X	X		X
	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.						
	6. With guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.						X
Research to Build and Present Knowledge	7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.		X	X		X	
	8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.	X	X	X	X	X	X
	9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	X	X	X	X	X	X
Range of Writing	10. 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.			X			

Table 8. Common Core State Standards for ELA Addressed in Each Grade 4 Lesson (continued)

	Standards for Speaking and Listening	4.1	4.2	4.3	4.4	4.5	4.6
Comprehension and Collaboration	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.	X	X	X	X	X	X
	2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	X	X	X	X	X	X
	3. Identify the reasons and evidence a speaker provides to support particular points.	X	X	X	X	X	X
Presentation of Knowledge and Ideas	4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	X	X	X	X	X	X
	5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.		X	X	X	X	X
	6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation.	X	X	X	X	X	X

Table 9. Common Core State Standards for ELA Addressed in Each Grade 5 Lesson

	Standards for Reading Literature	5.1A	5.1B	5.2	5.3	5.4	5.5	5.6
Key Ideas and Details	1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.	X	X	X	X	X	X	X
	2. Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.	X				X	X	X
	3. Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).	X			X	X	X	
Craft and Structure	4. Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.				X		X	
	5. Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem.						X	
	6. Describe how a narrator’s or speaker’s point of view influences how events are described.		X		X	X		
Integration of Knowledge and Ideas	7. Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).	X	X	X	X		X	X
	8. (Not applicable to literature)							
	9. Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.							
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently.	X	X	X	X	X	X	X

Table 9. Common Core State Standards for ELA Addressed in Each Grade 5 Lesson (continued)

	Standards for Reading Informational Text	5.1A	5.1B	5.2	5.3	5.4	5.5	5.6
Key Ideas and Details	1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.	X	X	X	X	X	X	X
	2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.	X	X	X	X	X	X	X
	3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	X	X	X	X	X	X	X
Craft and Structure	4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	X	X	X			X	X
	5. Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.	X	X	X	X	X	X	X
	6. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.							
Integration of Knowledge and Ideas	7. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.	X	X	X	X	X	X	X
	8. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).	X	X	X	X	X	X	X
	9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	X	X	X	X	X	X	X
Range of Reading and Level Text Complexity	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.	X	X	X	X	X	X	X

Table 9. Common Core State Standards for ELA Addressed in Each Grade 5 Lesson (continued)

	Standards for Writing	5.1A	5.1B	5.2	5.3	5.4	5.5	5.6
Text Types and Purposes	1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.	X				X	X	X
	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	X	X	X	X		X	X
	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.		X			X	X	
Production and Distribution of Writing	4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.	X		X	X			X
	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.							
	6. With guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.						X	
Research to Build and Present Knowledge	7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.	X	X	X	X	X	X	X
	8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.	X		X	X	X	X	X
	9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	X	X	X	X	X	X	X
Range of Writing	10. 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.							

Table 9. Common Core State Standards for ELA Addressed in Each Grade 5 Lesson (continued)

	Standards for Speaking and Listening	5.1A	5.1B	5.2	5.3	5.4	5.5	5.6
Comprehension and Collaboration	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.	X	X	X	X	X	X	X
	2. Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	X	X	X	X	X	X	X
	3. Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.	X	X	X	X	X	X	X
Presentation of Knowledge and Ideas	4. Report on a topic or text, or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	X	X	X	X	X	X	X
	5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.	X	X	X	X			X
	6. Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.	X	X	X	X	X	X	X

Appendix B

Reproducibles for *Perfect Pairs* Lessons

(The pages in Appendix B also may be printed from
www.stenhouse.com/0959.)

Lesson 3.1 Wonder Journal Labels

I wonder what the lives of all creatures have in common, even when their life cycles are different.

.....

What do the lives of all creatures have in common, even when their life cycles are different?

I wonder what the lives of all creatures have in common, even when their life cycles are different.

.....

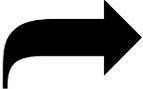
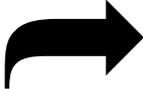
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.....

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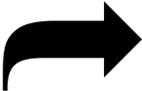
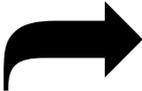
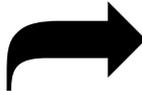
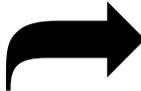
Lesson 3.1 Frog Life Cycle and Activity Card Set

Born/hatches	Egg	Grows	Grows
Lays eggs (reproduces)	Froglet	Develops legs and arms	Loses tail
Dies	Tadpole	Adult frog	Turns green
			

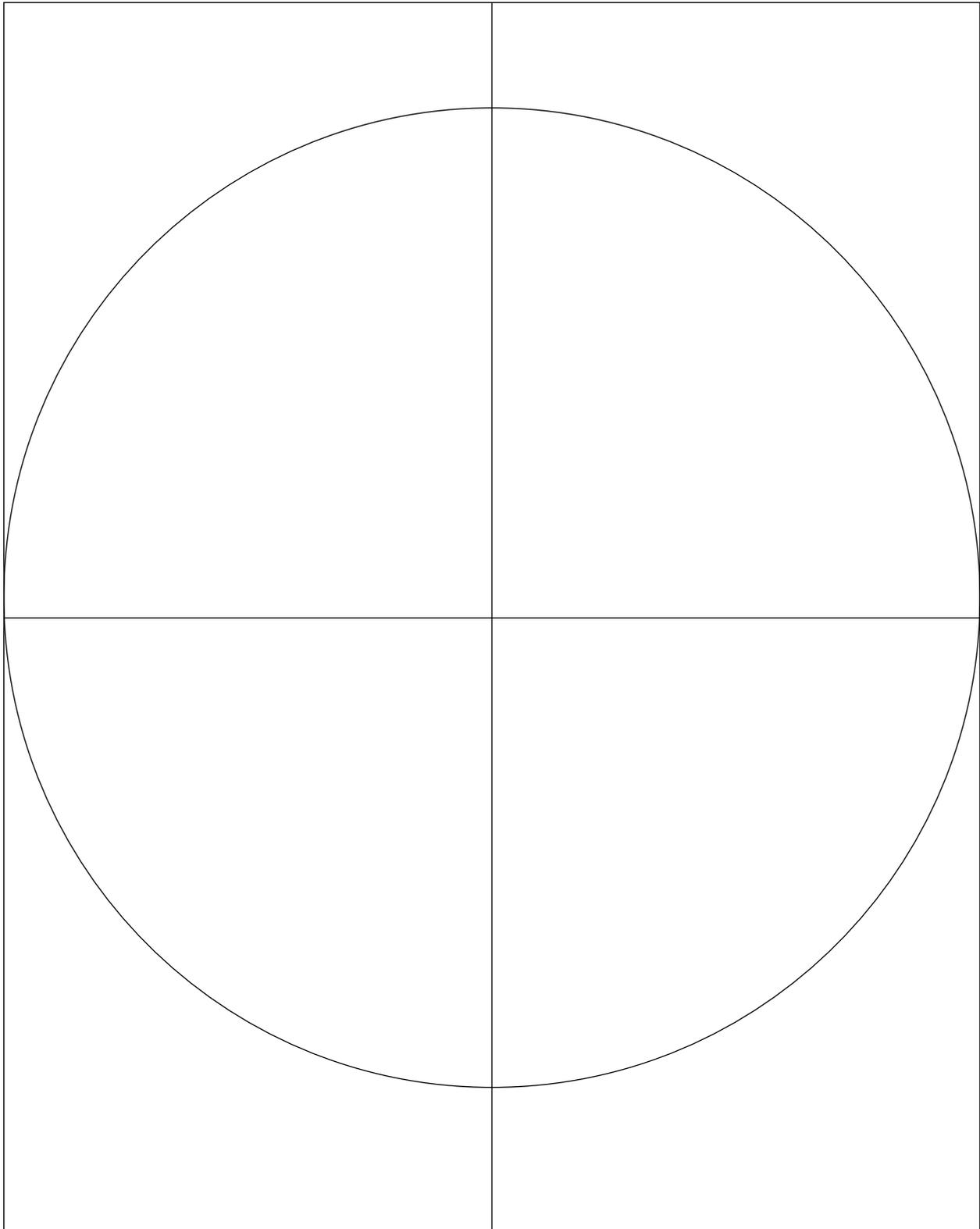
Lesson 3.1 Butterfly Life Cycle and Activity Card Set

Born/hatches	Egg	Grows	Spins chrysalis
Caterpillar	Dies	Pupa	Body changes
Breaks out of chrysalis	Adult butterfly	Lays eggs (reproduces)	
			

Lesson 3.1 Dogwood Tree Life Cycle and Activity Card Set

Born/sprouts	Seed	Gets buried in soil	Adult tree
Seedling	Pokes out of ground	Grows	Sapling
Grows	Fruit falls off tree	Dies	Grows
Produces flowers that develop into fruits with seeds (reproduces)			
			

Lesson 3.1 Life Cycle and Activity Template



Lesson 3.2 Wonder Journal Labels

I wonder how being part of a group can help animals survive.

.....
How can being part of a group help animals survive?

I wonder how being part of a group can help animals survive.

.....
How can being part of a group help animals survive?

I wonder how being part of a group can help animals survive.

.....
How can being part of a group help animals survive?

I wonder how being part of a group can help animals survive.

.....
How can being part of a group help animals survive?

Lesson 3.2 Wolf and Elk Data Table

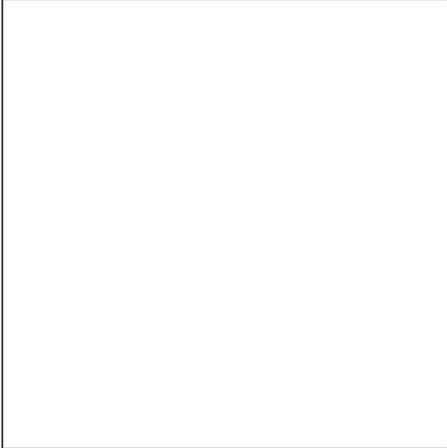
Number of Wolves	Time to Catch Elk, Round 1	Time to Catch Elk, Round 2
1		
2		
3		
4		
5		

Lesson 3.2 Sample *Blackout* Data Table

Character	Before the Blackout	During the Blackout	After the Blackout
Mom	Typing on computer		
Dad	Cooking		
Sister	Talking on phone		
Boy	Trying to get someone to play a game, watching TV		

Lesson 3.2 Wolf Pack Membership Card

Member Photo



This is to certify that

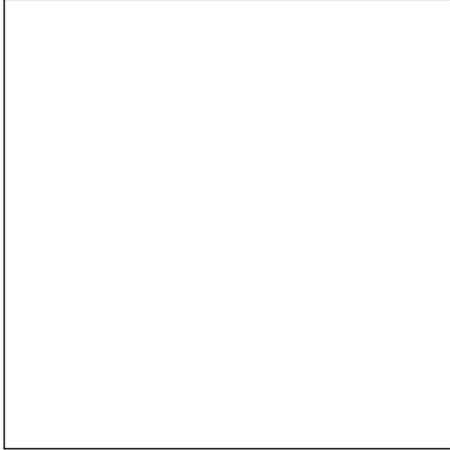
Name of wolf

is an active member in good standing of the Wolf Pack.

Survival benefits include:

Lesson 3.2 Elk Herd Membership Card

Member Photo



This is to certify that

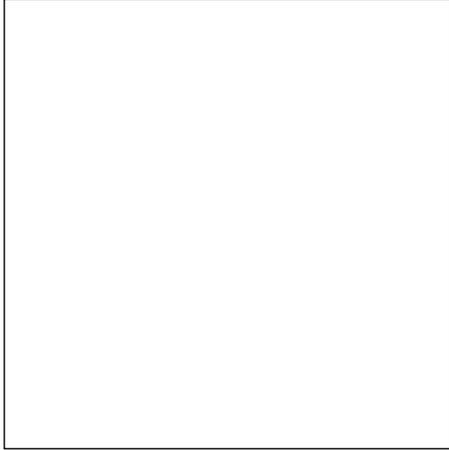
Name of elk

is an active member in good standing of the Elk Herd.

Survival benefits include:

Lesson 3.2 Human Family Membership Card

Member Photo



This is to certify that

Name of human

is an active member in good standing of the Human Family.

Survival benefits include:

Lesson 3.3 Wonder Journal Labels

I wonder why some animals look different from other members of their family.

.....
Why do some animals look different from other members of their family?

I wonder why some animals look different from other members of their family.

.....
Why do some animals look different from other members of their family?

I wonder why some animals look different from other members of their family.

.....
Why do some animals look different from other members of their family?

I wonder why some animals look different from other members of their family.

.....
Why do some animals look different from other members of their family?

Lesson 3.3 Find the Puppy's Parents Handout

I am looking for the parents of puppy Number _____.

I think one of the puppy's parents is a _____.

I think this because it has the following trait variations in common with my puppy:

I think the puppy's other parent is a _____.

I think this because it has the following trait variations in common with my puppy:

Lesson 3.3 Puppy Breed Name Strips

Labradoodle (Labrador retriever + poodle)

Peekapoo (Pekingese + poodle)

Goldendoodle (golden retriever + poodle)

Corgi-husky mix (corgi + husky)

Puggle (pug + beagle)

Corgi-dalmatian mix (corgi + dalmatian)

Dalmador (dalmatian + Labrador retriever)

Bullmatian (bulldog + dalmatian)

Answers: 1. Corgi-dalmatian mix, 2. Bullmatian, 3. Corgi-husky mix, 4. Dalmador, 5. Peekapoo, 6. Puggle, 7. Labradoodle, 8. Goldendoodle.

Lesson 3.3 Draw the Puppy's Sibling Handout

Name: _____ Date: _____

My puppy is a _____.

I know one of its parents is a _____.

I know its other parent is a _____.

I think another puppy in the same litter might look like the picture I've drawn below. My evidence is:

Lesson 3.4 Wonder Journal Labels

I wonder what fossils can tell us about life and environments long ago.

.....

What can fossils tell us about life and environments long ago?

.....

This is what the boy's fossils tell us life and the environment were like 30 to 50 million years ago in the place he visited.

I wonder what fossils can tell us about life and environments long ago.

.....

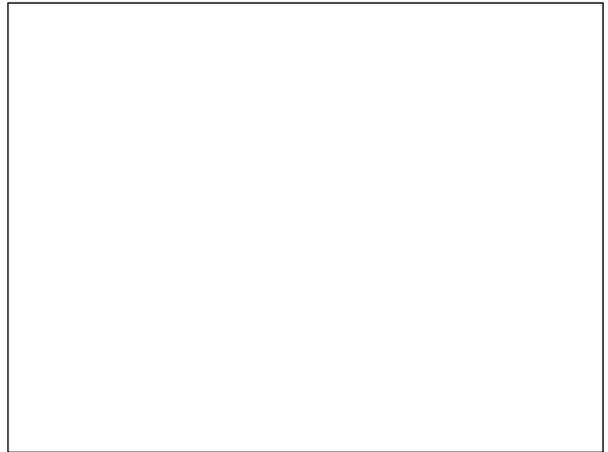
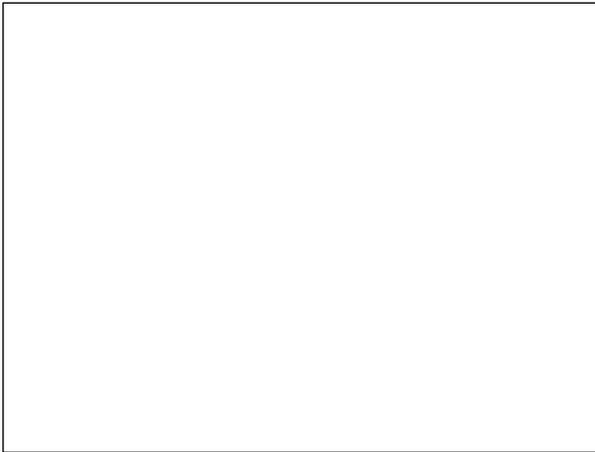
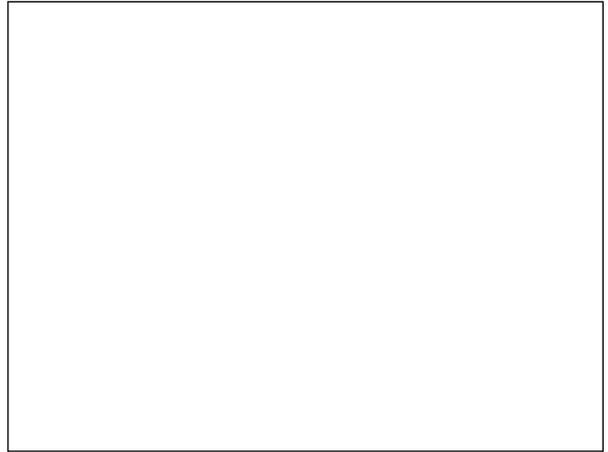
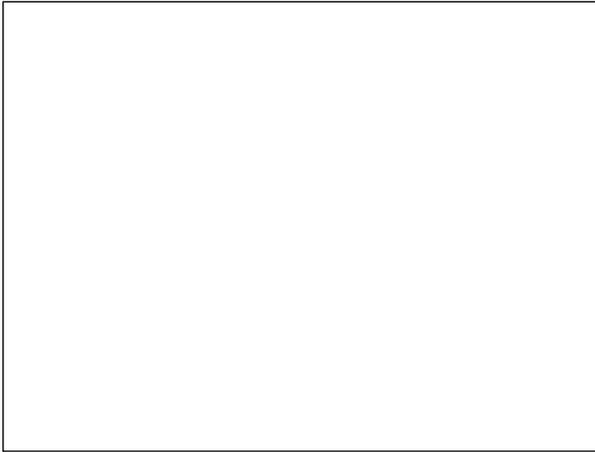
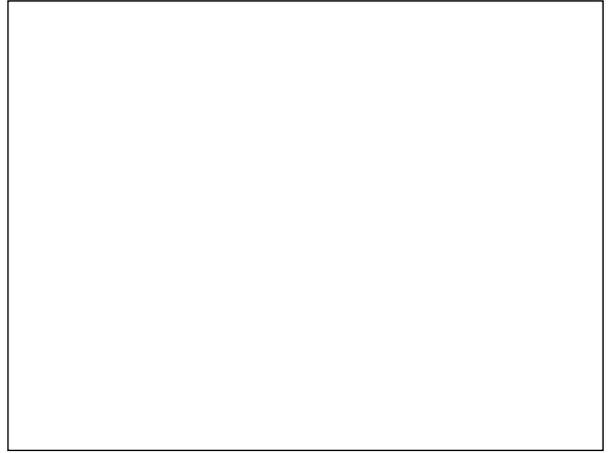
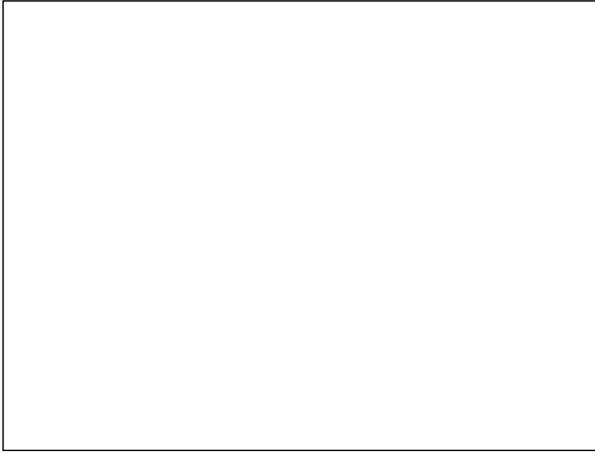
What can fossils tell us about life and environments long ago?

.....

This is what the boy's fossils tell us life and the environment were like 30 to 50 million years ago in the place he visited.

Lesson 3.4 Picture Story Panels

Title: _____



Lesson 3.4 Dinosaur Card Set

Saltasaurus	Argentinosaurus	<i>Tyrannosaurus rex</i>
Oviraptor	Hypacrosaurus	Psittacosaurus
Maiasaura	Troodon	

Lesson 3.4 How the Boy Developed Ideas About Ancient Life and Environments Handout

What the Boy Found	What He Knows from the Fossil (and the Creature That Appeared)	What He Learned Through Research	What I Think Based on Evidence
		<p>The first ferns lived 350 million years ago.</p> <p>Ferns grow in moist, shady places, such as wetlands or forests.</p>	
		<p>Dragonflies hunt smaller insects.</p> <p>Dragonflies live near ponds, lakes, and wetlands.</p> <p>Dragonflies like this one lived 30 to 50 million years ago.</p>	
		<p>The creature was a pteranodon.</p> <p>It lived 80 to 88 million years ago.</p> <p>Fish bones have been found in the stomachs of pteranodons.</p>	

Lesson 3.5 Wonder Journal Labels

I wonder how variations in body features and behaviors can help some animals survive.

.....

How can variations in body features and behaviors help some animals survive?

.....

Variations in body features and behaviors can provide advantages that help animals in four different ways. They are:

I wonder how variations in body features and behaviors can help some animals survive.

.....

How can variations in body features and behaviors help some animals survive?

.....

Variations in body features and behaviors can provide advantages that help animals in four different ways. They are:

Lesson 3.5 Sage Grouse Prediction Handout

Place a check mark next to the answer you think best describes the sage grouse's behavior. Then explain your rationale.

I'm a male sage grouse. I'm strutting around and sounding off because:

_____ An elk is coming my way. I want it to know I'm here, so it won't trample me.

_____ I'm warning other sage grouse that there is danger.

_____ I'm trying to impress female sage grouse so they will want to mate with me.

_____ I can't find my chicks. I hope they will see or hear me, and let me know where they are.

_____ I'm a big show-off, and I want everyone to look at me.

Lesson 3.5 Bird Species Cards

Blue bird of paradise	American goldfinch male	American goldfinch female
Sage grouse	Wild turkey	Palm cockatoo
Blue-footed booby	Emperor penguin	American bittern
North American killdeer	Northern mockingbird	

Lesson 3.6 Wonder Journal Labels

I wonder how animals survive in a cold environment.

.....
How do animals survive in a cold environment?

.....
Due to its body features and behaviors, a _____ can survive well in Irene’s yard. My evidence is:

.....
Due to its body features and behaviors, a _____ can survive less well in Irene’s yard. My evidence is:

.....
Due to its body features and behaviors, a _____ can’t survive at all in Irene’s yard. My evidence is:

Lesson 3.6 Bird Clues

Clue 1: Age of Chicks at First Flight

Parakeets—about 6 weeks old

Chickadees—about 2 weeks old

Clue 2: How the Birds Sleep

Parakeets—in large groups on the central branches of trees

Chickadees—usually alone inside tree holes

Clue 3: What the Birds Eat

Parakeets—fruits, flowers, seeds, and insects all year round

Chickadees—mostly caterpillars in summer; seeds and insect eggs and pupae in winter

Lesson 3.6 Name That Bird Statements

- Can migrate to a warmer part of the world in winter.
- Must live in a warm climate all year.
- Can survive cold Arctic winters.
- Eats fruits, flowers, seeds, and insects all year long.
- Eats water plants.
- Can store food, such as seeds and insects.
- Shivers to stay warm.
- Sleeps in tree holes.
- Can live in the same area as chickadees for at least part of the year.
- Can live in a cool climate as an inside pet.

Lesson 3.7 Wonder Journal Labels

I wonder how people try to solve problems that occur when an environment changes.

.....

How do people try to solve problems that occur when an environment changes?

.....

The balance of nature was restored in Yellowstone and the meadow environment, but neither place was the same as before. What is your evidence?

I wonder how people try to solve problems that occur when an environment changes.

.....

How do people try to solve problems that occur when an environment changes?

.....

The balance of nature was restored in Yellowstone and the meadow environment, but neither place was the same as before. What is your evidence?

Lesson 3.7 Question Set

- *These pages describe the first solution scientists proposed to the problems in Yellowstone. What was it? (Forest fires.)*
- *Why did scientists think this solution might work?*
- *Did the solution work? (No.) Why or why not? (Elk quickly ate the new shoots that grew from the burned roots.)*

Lesson 3.7 Yellowstone Environment Handout

Initial change to the environment:

One problem caused by the change:

Solution scientists tried:

Is the solution working?

What is your evidence?

Lesson 3.7 Meadow Environment Handout

Initial change to the environment:

One problem caused by the change:

Solution the moles tried:

Is the solution working?

What is your evidence?

Lesson 3.7 Wolf Solution Handout

Read the list of possible solutions below. Place a check mark next to the one you think will work best and explain your rationale. Then explain why you think the other solutions won't work as well.

_____ 1. Ranchers should be paid for cattle and sheep that wolves kill.

_____ 2. Ranchers should be allowed to kill wolves on their property.

_____ 3. Yellowstone National Park should hire shepherds to protect ranchers' cattle and sheep.

_____ 4. Yellowstone National Park should build a fence to keep wolves inside the park.

Lesson 4.1 Wonder Journal Labels

I wonder how our body parts, or structures, help us survive.

.....

My resting heart rate is _____ beats per minute.

My active heart rate is _____ beats per minute.

.....

How do our body parts, or structures, help us survive?

.....

The _____ in my circulatory system helps me survive.
My evidence is:

.....

The _____ in my skeletal system helps me survive.
My evidence is:

Lesson 4.2 Wonder Journal Labels

I wonder how feathers can help a bird survive.
.....

How can feathers help a bird survive?

I wonder how feathers can help a bird survive.
.....

How can feathers help a bird survive?

I wonder how feathers can help a bird survive.
.....

How can feathers help a bird survive?

I wonder how feathers can help a bird survive.
.....

How can feathers help a bird survive?

Lesson 4.2 Bird Name Card Set

Blue jay	Female wood duck	Tricolored heron
Red-tailed hawk	Male sandgrouse	Sandgrouse chick
Sandgrouse chick	American bittern	Dark-eyed junco
Male club-winged manakin	Female rosy-faced lovebird	Female rosy-faced lovebird
Male bank swallow	Female northern cardinal	Peacock
Emperor penguin	Mute swan	Anhinga (an HING guh)
Willow ptarmigan (TAR mi gin)	Narrator	Narrator
Narrator	Narrator	Narrator

Lesson 4.2 Readers Theater Script**Based on *Feathers: Not Just for Flying* by Melissa Stewart****Getting Started**

Many readers theater scripts have just ten or twelve parts, but this script has twice as many roles! It includes nineteen animal parts and a narrator. The parts vary in difficulty to accommodate children at a variety of reading levels. The script also includes a variety of choruses—lines read by everyone.

If you are working with a small group of children, some students can perform two roles. If you have a group larger than twenty, some children can share a role or you can divide the narrator role into multiple parts.

After you have matched students with parts, ask the class to read through the script a few times. As the children practice, provide as much support and advice as needed.

Planning the Performance

When the children feel confident about their roles, ask them to think about staging. Where and how will they stand during the performance? Are there times when they should move?

Consider inviting a class of younger students to your classroom for the final performance. It will give your class a sense of accomplishment, and both groups will enjoy interacting.

Lesson 4.2 Readers Theater Script (continued)

CHORUS: *Birds use their feathers in all kinds of ways.*

Narrator: A blue jay's feathers warm like a blanket.

Blue jay: *Jay! Jay!* On cold, damp days, I fluff up my feathers. They trap a layer of warm air next to my skin.

Narrator: A wood duck's feathers cushion like a pillow.

Wood duck: *Crrek, crrek.* I pluck my feathers—ouch!—and add them to my nest. They cushion my eggs and keep them warm.

Narrator: You'll never guess how a tricolored heron uses its feathers.

CHORUS: *How?*

Narrator: To shade out the sun—like an umbrella.

Tricolored heron: *Aaah, scaah!* You bet! When I hunt, I raise my wings high over my head. My fabulous feathers block sunlight, so it's easy to spot tasty fish and frogs in the water below. Yum!

Red-tailed hawk: My feathers are even better than that! *Ker-ree, ker-ree.*

Narrator: Hold on, you red-tailed hawk. I didn't introduce you yet.

Red-tailed hawk: Sorry. I'm just so excited to tell everyone what my feathers do.

Narrator: Okay, go ahead.

Red-tailed hawk: They protect my skin like sunscreen. That's why I can soar through the sky, hour after hour.

Narrator: A sandgrouse's feathers can soak up water like a sponge.

Lesson 4.2 Readers Theater Script (continued)

CHORUS: *A sponge? You're kidding!*

Sandgrouse: No really, it's true. On hot days I cool off by soaking my belly feathers at a watering hole. Then I fly back to my nest, and—

Chicks 1 & 2: We suck his feathers dry!

Sandgrouse: Didn't I teach you chicks not to interrupt?

Chicks 1 & 2: Sorry, Dad.

Narrator: An American bittern's feathers clean up messes like a scrub brush.

American bittern: *Oong-ka choonk, oong-ka choonk.* The tips of my feathers crumble into powder. It's perfect for scrubbing dirt and slime off my body.

Narrator: A dark-eyed junco's feathers distract attackers like a bullfighter's cape.

Dark-eyed junco: *Ticker, ticker, ticker.* I flash my bright white tail feathers at predators. It startles them just long enough so I can fly away.

CHORUS: *Pretty nifty!*

Dark-eyed junco: You can say that again.

CHORUS: *Pretty nifty!*

Narrator: Okay, okay. Settle down, you bird brains. Where's the northern cardinal?

Northern cardinal: *Birdy, birdy, birdy.* I'm right here.

Narrator: Oh, sorry. I didn't see you.

Northern cardinal: That's because my girlish grayish-tan feathers hide me from enemies. They're just like camouflage clothing.

Lesson 4.2 Readers Theater Script (continued)

- Narrator: They sure do. But a club-winged manakin's feathers do just the opposite.
- Club-winged manakin: That's right! When I raise my wings and shake them, my feathers whistle. The ladies really like it.
- Peacock: My peacock feathers are more like fancy jewelry.
- Narrator: Yes, that's true. Your bright, beautiful feathers make you easy to spot.
- Peacock: Discriminating peahens look for males with the biggest, most colorful fan of feathers.
- Bank swallow: You'll never guess what my leg feathers can do. They dig holes like a backhoe.
- Narrator: That's why bank swallows nest in holes in stream banks, isn't it?
- Bank swallow: That's right. It's a great place to live.
- Narrator: You might get along well with rosy-faced lovebirds. They use their feathers like a forklift.
- Rosy-faced lovebird 1: Most birds carry nesting materials in their beaks, but not us.
- Rosy-faced lovebird 2: We tuck building supplies under our rump feathers.
- Narrator: Ever wondered why a mute swan glides so gracefully across the water?
- CHORUS:** ***Yeah, that's a good question.***
- Mute swan: Thank goodness for my feathers. Pockets of air get trapped between them, so they work just like a life jacket.
- Narrator: Believe it or not, an aninga's feathers help it plummet downward like the sinker on a fishing lure.

Lesson 4.2 Readers Theater Script (continued)

Anhinga: The weight of my wet feathers helps me dive deep down in search of fish, crayfish, and shrimp.

Narrator: Can you guess whose feathers help it glide like a sled?

CHORUS: *No, whose?*

Narrator: The emperor penguin's.

Emperor penguin: My tightly packed belly feathers are perfect for whizzing across ice and snow. *Wheeee!*

Narrator: A willow ptarmigan's feathers help it sprint across the snow.

Willow ptarmigan: That's right. In the fall I grow a thick layer of feathers on top of my toes. They help my feet move across snow just like snowshoes.

CHORUS: *Wow! That's a great trick.*

Narrator: No doubt about it. Feathers make birds special.

**CHORUS: *Three cheers for feathers.
Hip, hip, hooray!
Hip, hip, hooray!
Hip, hip, hooray!***

Lesson 4.2 Debate Strips

1. Cardinal: Why I signed up for Staying Warm, Safe, and Healthy

2. Cardinal's School Counselor: Why Cardinal should take Raising Chicks

3. Hawk: Why I signed up for Staying Warm, Safe, and Healthy

4. Hawk's School Counselor: Why Hawk should take Hunting for Food

1. Cardinal: Why I signed up for Staying Warm, Safe, and Healthy

2. Cardinal's School Counselor: Why Cardinal should take Raising Chicks

3. Hawk: Why I signed up for Staying Warm, Safe, and Healthy

4. Hawk's School Counselor: Why Hawk should take Hunting for Food

Lesson 4.3 Wonder Journal Labels

I wonder how a tree's structures help it live, grow, and reproduce.

.....

How do a tree's structures help it live, grow, and reproduce?

I wonder how a tree's structures help it live, grow, and reproduce.

.....

How do a tree's structures help it live, grow, and reproduce?

I wonder how a tree's structures help it live, grow, and reproduce.

.....

How do a tree's structures help it live, grow, and reproduce?

I wonder how a tree's structures help it live, grow, and reproduce.

.....

How do a tree's structures help it live, grow, and reproduce?

Lesson 4.3 Sample Structure-Function Index Card

<p>Tree Structure:</p> <p>Function:</p> <p>Work(s) Like Our:</p>

Lesson 4.3 Information for Structure-Function Index Cards

Tree Structure	Function	Work(s) Like Our
Roots	Anchor tree; absorb water and minerals	Feet
Trunk	Supports tree; contains small tubes that transport sap (food), water, and minerals throughout the tree	Legs
Branches	Contains small tubes that transport sap (food), water, and minerals throughout the tree	Arms
Bark	Protects inside of tree	Skin
Leaves	Stomata take in air; make food; store water and food	Nose and lungs
Small Tubes	Transport sap (food), water, and minerals throughout the tree	Veins
Flowers	Contain pollen; attract animals that spread pollen so fruits can grow	Smiling face
Fruits	Have seeds inside	
Seeds	Sprout and become new trees	Babies

Lesson 4.3 Tree Structure Cards

trunk	leaves	roots
branches	flowers	seeds
fruits	small tubes	bark

Lesson 4.4 Wonder Journal Labels

I wonder how animals, including humans, depend on their senses.
.....

How do animals, including humans, depend on their senses?

I wonder how animals, including humans, depend on their senses.
.....

How do animals, including humans, depend on their senses?

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.....

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.....

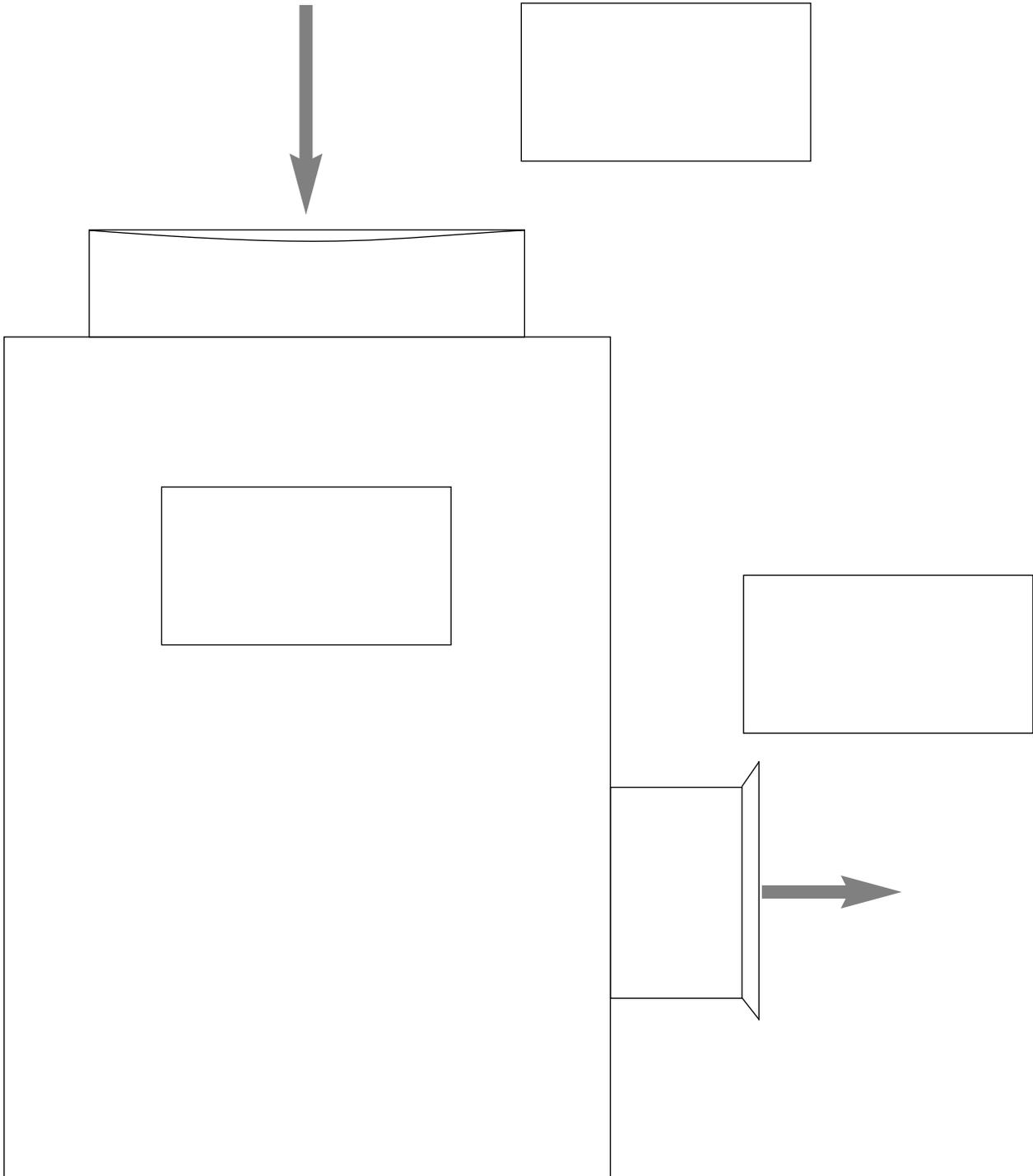
How do animals, including humans, depend on their senses?

Lesson 4.4 Complete *Sun Dance, Water Dance* Data Table

How Humans Respond to Information from Their Five Senses

Which Sense?	What They Detect	How They Respond
Touch	Heat from sun	Sweat, go swimming
Touch	Cold river water	Get goose bumps, climb out of river
Sight	A calm pool, a rock	Skip stones, try to hit the rock
Sight	Rock topples over	Shout "Yes!"
Touch	Body bobbing in the current	Enjoy the ride
Touch	Smooth, warm stones	Walk tenderly
Sight	Snake	Avoid the snake
Touch	Pain from sharp rocks	Walk on tiptoes
Taste	Flavor of chips and fruit	Eat snack, laugh
Sound	Shaking leaves	Look up?
Touch	Wind	Feel a chill?
Sight	Willow tree, alder tree, pine and fir trees, blue sky, bright sun	Squint?
Sight	Cabin, winding path	Race to cabin
Touch, taste	Ice cold drink	Say, "Ahhhhhh!"
Sight	Lizards	Chase them
Touch	Heat from sun	Sweat, go swimming
Touch	Cold river water	Enjoy swimming
Sight	Sky darkening, first star	Make a wish
Touch	Cooling air	Hug boulder to warm up
Sight	Shooting stars	Say, "There's one!"
Touch	Chilly night air	Return to cabin, go to bed

Lesson 4.4 Receive-Process-Respond Model



Lesson 4.5 Wonder Journal Labels

I wonder how natural resources provide the electrical energy we use every day.
.....

How do natural resources provide the electrical energy we use every day?

I wonder how natural resources provide the electrical energy we use every day.
.....

How do natural resources provide the electrical energy we use every day?

I wonder how natural resources provide the electrical energy we use every day.
.....

How do natural resources provide the electrical energy we use every day?

I wonder how natural resources provide the electrical energy we use every day.
.....

How do natural resources provide the electrical energy we use every day?

Lesson 4.6 Wonder Journal Labels

I wonder how using energy from natural resources can change environments in ways that make it hard for animals to survive.

.....

How can using energy from natural resources change environments in ways that make it hard for animals to survive?

.....

How has burning oil, gas, and coal changed one of the environments mentioned in *Earth: Feeling the Heat* or *365 Penguins*?

.....

Name at least one animal affected by that change and explain how it was affected.

.....

Did the change make it easier or harder for that animal to survive? Explain your answer.

.....

Lesson 4.6 Earth: Feeling the Heat Data Sheet

How Warmer Temperatures Are Affecting Environments and Animals

Animal	Environment	Warmer Temperatures Are Causing . . .	Effect
Polar bear	Canadian Arctic		
Puffin	Island in North Sea		
Orange-spotted filefish	Great Barrier Reef, Australia		
Adélie penguin	Ross Sea, coast of Antarctica		
Edith's checkerspot butterfly	Prairie in California		
Zebra	Grassland in Africa		
Orangutan	Forest in Borneo		
Long-nosed fly	Desert in South Africa		
Bicolored dart frog	Rain forest in Colombia		
Caribou	Forest in Alaska		
Pika	Mountain in Nepal		
Bengal tiger	Lowlands of Bangladesh		

Lesson 4.6 See-Saw Animal Card Set

pika polar bear	bicolored dart frog caribou	puffin tiger
puffin pika	orange-spotted filefish long-nosed fly	zebra bicolored dart frog
pika polar bear	bicolored dart frog caribou	puffin tiger
puffin pika	orange-spotted filefish long-nosed fly	zebra bicolored dart frog

Common problems: pika, polar bear (ice in their environment is melting); bicolored dart frog, caribou (harmful species grow faster when their environment is warmer); puffin, tiger (prey is moving to environments where it can survive better); puffin, pika (creatures they depend on for food are moving to cooler environments); orange-spotted filefish, long-nosed fly (creatures they depend on for food are dying); zebra, bicolored dart frog (the water in their environment is drying up)

Lesson 4.6 Sample See-Saw Script

Student 1: Orangutans live in the forests of Borneo.

Student 2: Penguins live in the Ross Sea and along the coast of Antarctica.

Both Students: Both animals are having trouble surviving because the land they depend on isn't available.

Student 1: The orangutans' home was destroyed by fire.

Student 2: The penguins' home was blocked by icebergs.

Both Students: Both problems occurred because burning oil, gas, and coal to provide energy has caused Earth's temperature to rise.

Both Students: We can help both animals by turning off lights when we leave a room.

Lesson 5.1A Wonder Journal Labels

I wonder where plants get most of the materials they use to produce new plant parts as they grow.

.....

Where do plants get most of the materials they use to produce new plant parts as they grow?

I wonder where plants get most of the materials they use to produce new plant parts as they grow.

.....

Where do plants get most of the materials they use to produce new plant parts as they grow?

I wonder where plants get most of the materials they use to produce new plant parts as they grow.

.....

Where do plants get most of the materials they use to produce new plant parts as they grow?

Lesson 5.1B Wonder Journal Labels

I wonder where animals get the energy they need to live and grow.
.....

Where do animals get the energy they need to live and grow?

I wonder where animals get the energy they need to live and grow.
.....

Where do animals get the energy they need to live and grow?

I wonder where animals get the energy they need to live and grow.
.....

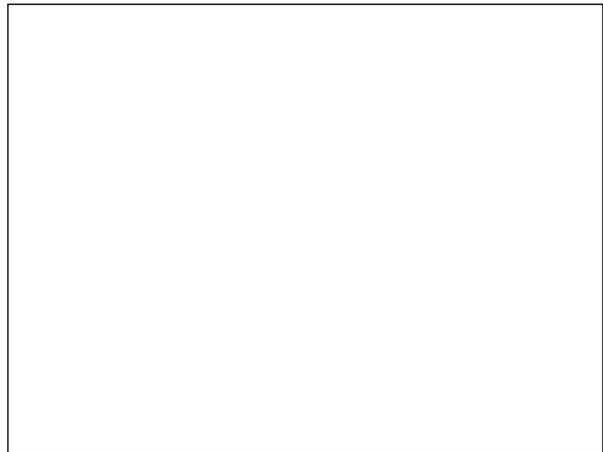
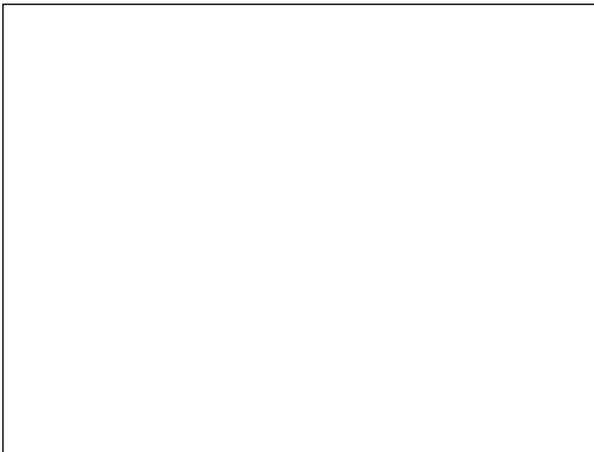
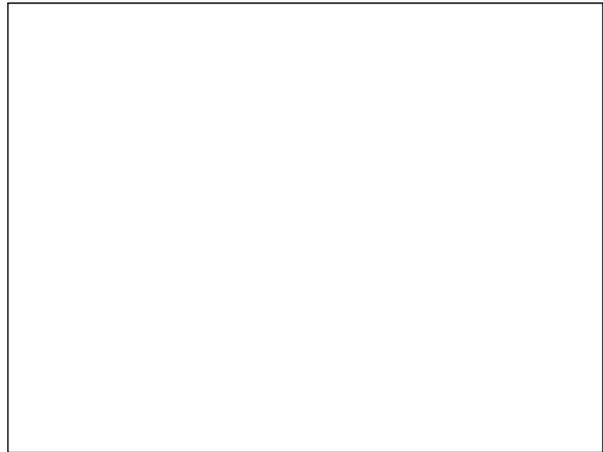
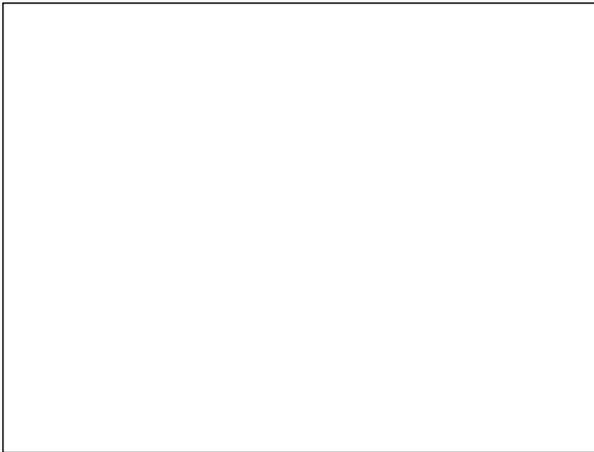
Where do animals get the energy they need to live and grow?

I wonder where animals get the energy they need to live and grow.
.....

Where do animals get the energy they need to live and grow?

Lesson 5.1B Picture Story Panels

What I _____.



Lesson 5.2 Wonder Journal Labels

I wonder why dead plants and animals don't pile up in natural places.
.....

Why don't dead plants and animals pile up in natural places?

I wonder why dead plants and animals don't pile up in natural places.
.....

Why don't dead plants and animals pile up in natural places?

I wonder why dead plants and animals don't pile up in natural places.
.....

Why don't dead plants and animals pile up in natural places?

I wonder why dead plants and animals don't pile up in natural places.
.....

Why don't dead plants and animals pile up in natural places?

Lesson 5.2 Question Set

1. *Do soil bacteria and earthworms live in the same place? (Yes.) Where do they live? (In the soil.)*
2. *Do soil bacteria and earthworms “eat” some of the same foods? (Yes.) What are those foods? (Dead plants and animals.)*
3. *What happens to the extra nutrients soil bacteria absorb? (They get released into the soil.)*
4. *What happens after dead plants and animals pass through an earthworm’s digestive system? (The earthworm poops in the soil.)*
5. *How is an earthworm’s poop, or cast, similar to the materials soil bacteria release into the soil? (They both contain nutrients.)*
6. *Do you think earthworms are decomposers? (Yes.) Explain your rationale.*
7. *What are two ways earthworms help plants? (Plants can use nutrients in earthworm poop to stay healthy. Earthworms loosen the soil, giving plants better access to the water and air they need to grow.)*

Lesson 5.2 Decomposer Handout

Soil bacteria and earthworms live _____.

Soil bacteria and earthworms eat some of the same foods. They are _____

_____.

Soil bacteria release extra nutrients _____.

An earthworm uses nutrients from dead plants and animals to live and

grow. The materials an earthworm doesn't use becomes _____

that ends up _____.

An earthworm's poop is similar to the materials soil bacteria release

because _____.

I think earthworms are decomposers because _____

_____.

Earthworms help plants in two ways. They are _____

_____.

Lesson 5.3 Wonder Journal Labels

I wonder how matter moves among living things and the environment.
.....

How does matter move among living things and the environment?

I wonder how matter moves among living things and the environment.
.....

How does matter move among living things and the environment?

I wonder how matter moves among living things and the environment.
.....

How does matter move among living things and the environment?

I wonder how matter moves among living things and the environment.
.....

How does matter move among living things and the environment?

Lesson 5.3 Question Set

- *According to the text on this page, what do plants need to make food? (Energy from the sun plus air, water, and nutrients from the soil.)*
- *Which of these are matter—anything that takes up space as a solid, liquid, or gas? (Air, water, and nutrients.)*
- *What is this process of converting air and water into food called? (Photosynthesis.)*
- *Why do we eat plant roots, leaves, stems, seeds, and fruits? (That's where plants store the food they make during photosynthesis, so those plant parts give us the energy **and matter** we need to live and grow.)*

Lesson 5.3 Wetland Creature Ovals

Bulrushes

Blackbird

Frog

Cattails

Heron

Muskrat

Duck

Snake

Mink

Coot

Bass

Lesson 5.3 MISSION Cards

MISSION 1: Add three new drawings to your original visual model. They should show the role bacteria play in cycling matter through a garden ecosystem.

MISSION 2: Using one of your original drawings and three new ones, show the role earthworms play in cycling matter through a garden ecosystem as they eat.

MISSION 3: Using one of your original drawings and four new ones, show the role earthworms play in cycling matter through a garden ecosystem as they tunnel through the soil after eating.

Lesson 5.4 Wonder Journal Labels

I wonder how living things depend on their environment for survival.
.....

How do living things depend on their environment for survival?

I wonder how living things depend on their environment for survival.
.....

How do living things depend on their environment for survival?

I wonder how living things depend on their environment for survival.
.....

How do living things depend on their environment for survival?

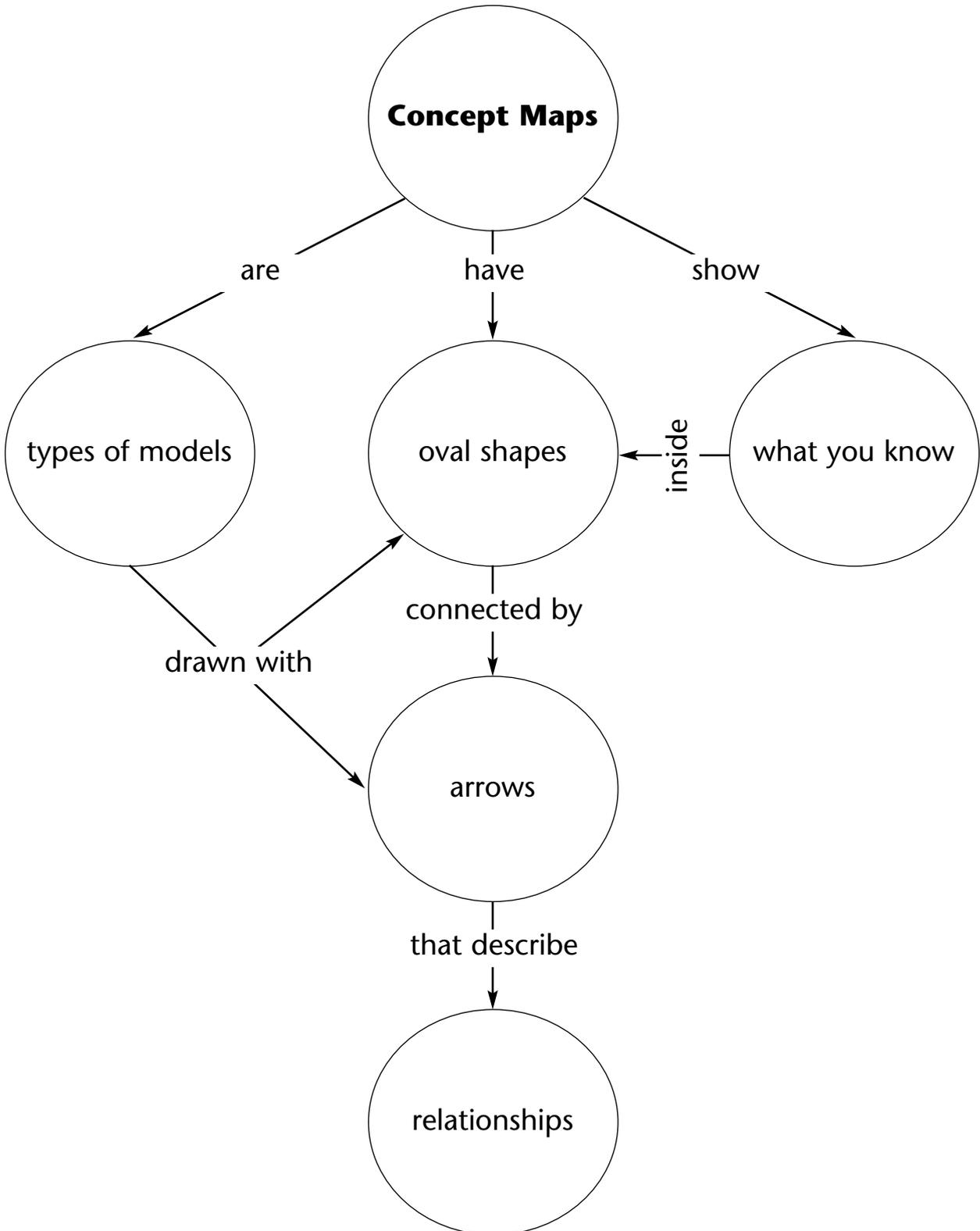
I wonder how living things depend on their environment for survival.
.....

How do living things depend on their environment for survival?

Lesson 5.4 How Depend on Environment Card Sheet

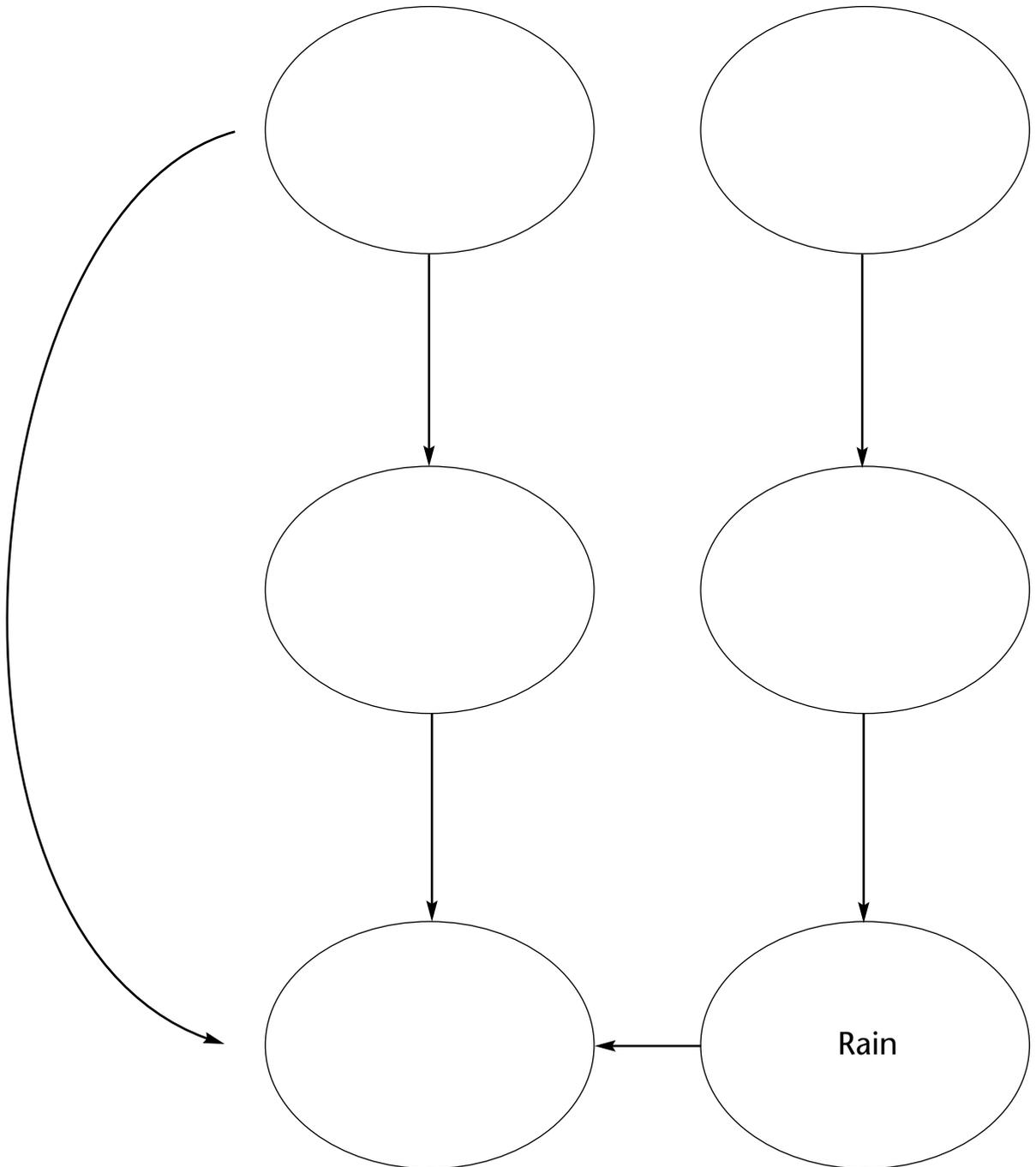
Sip water that drips from leaves	Lives between bromeliad's wet leaves, skin stays moist
Lays eggs in water held by bromeliad	Raises chick in dry tree hole
Tadpoles stay moist in wet leaves and pool of water in bromeliad	Sip rainwater, sleep on moss
Eats ants	Eats fig
Hunts mice	Raise aphids in cecropia tree, eat honeydew aphids make
Use cecropia juices to make food for themselves and ants	Is protected by ants
Use leaves to grow fungus that they eat	Absorbs rotting material for food
Eats fruit	Sips fruit juices
Hunts capuchin monkeys	Eats orchid leaves
Needs rain to bloom, absorbs water through roots	Use rain-forest plants for medicine

Lesson 5.4 Concept Map

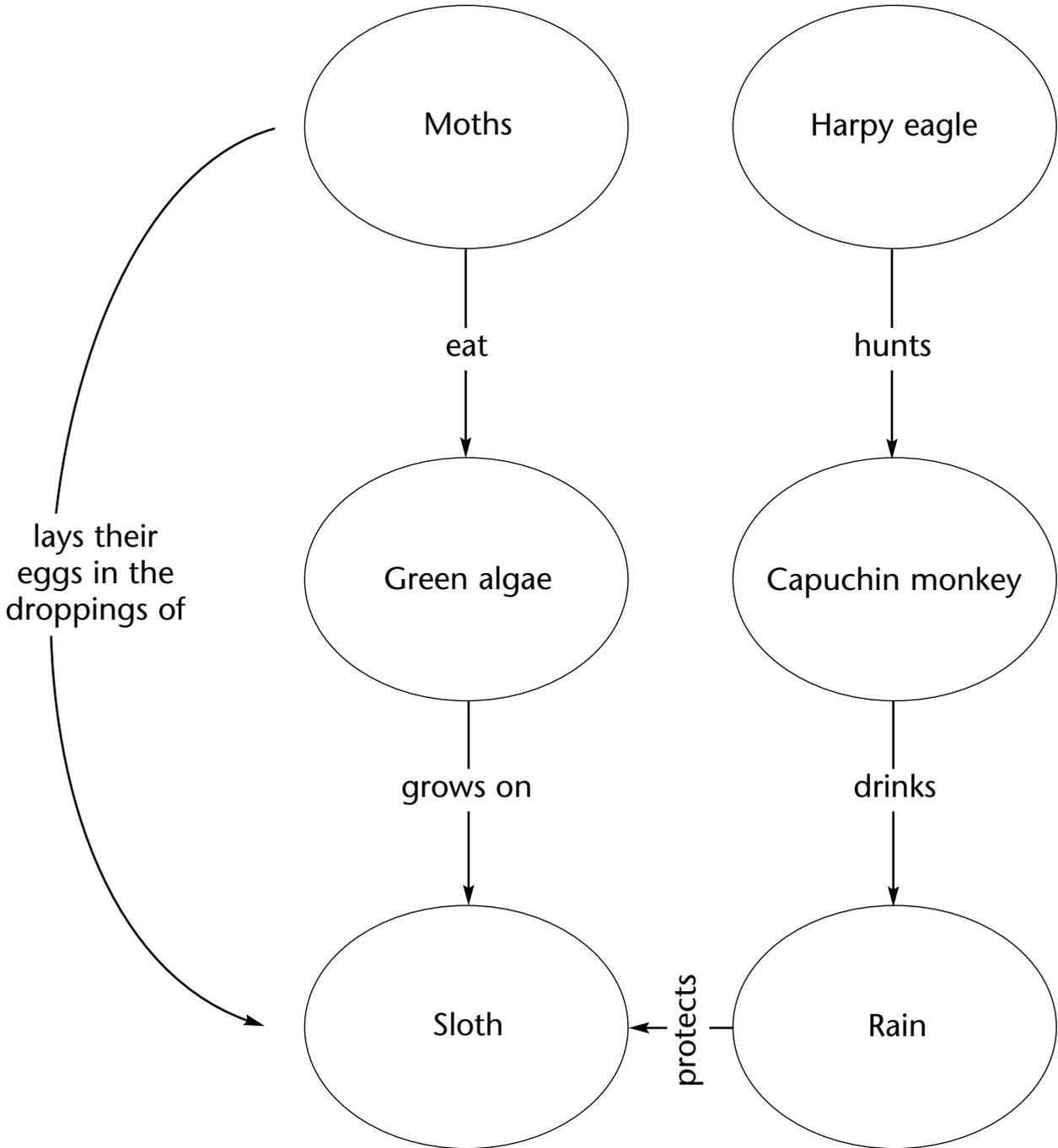


Lesson 5.4 Mystery Rain-Forest Concept Map

Directions: Use information from the How Rain-Forest Creatures Depend on Their Environment data table to complete this concept map. Be sure to use each piece of information only once.



Lesson 5.4 Mystery Rain-Forest Answer Key



Lesson 5.5 Wonder Journal Labels

I wonder how newly introduced plants and animals can affect an ecosystem.

.....
How can newly introduced plants and animals affect an ecosystem?

I wonder how newly introduced plants and animals can affect an ecosystem.

.....
How can newly introduced plants and animals affect an ecosystem?

I wonder how newly introduced plants and animals can affect an ecosystem.

.....
How can newly introduced plants and animals affect an ecosystem?

I wonder how newly introduced plants and animals can affect an ecosystem.

.....
How can newly introduced plants and animals affect an ecosystem?

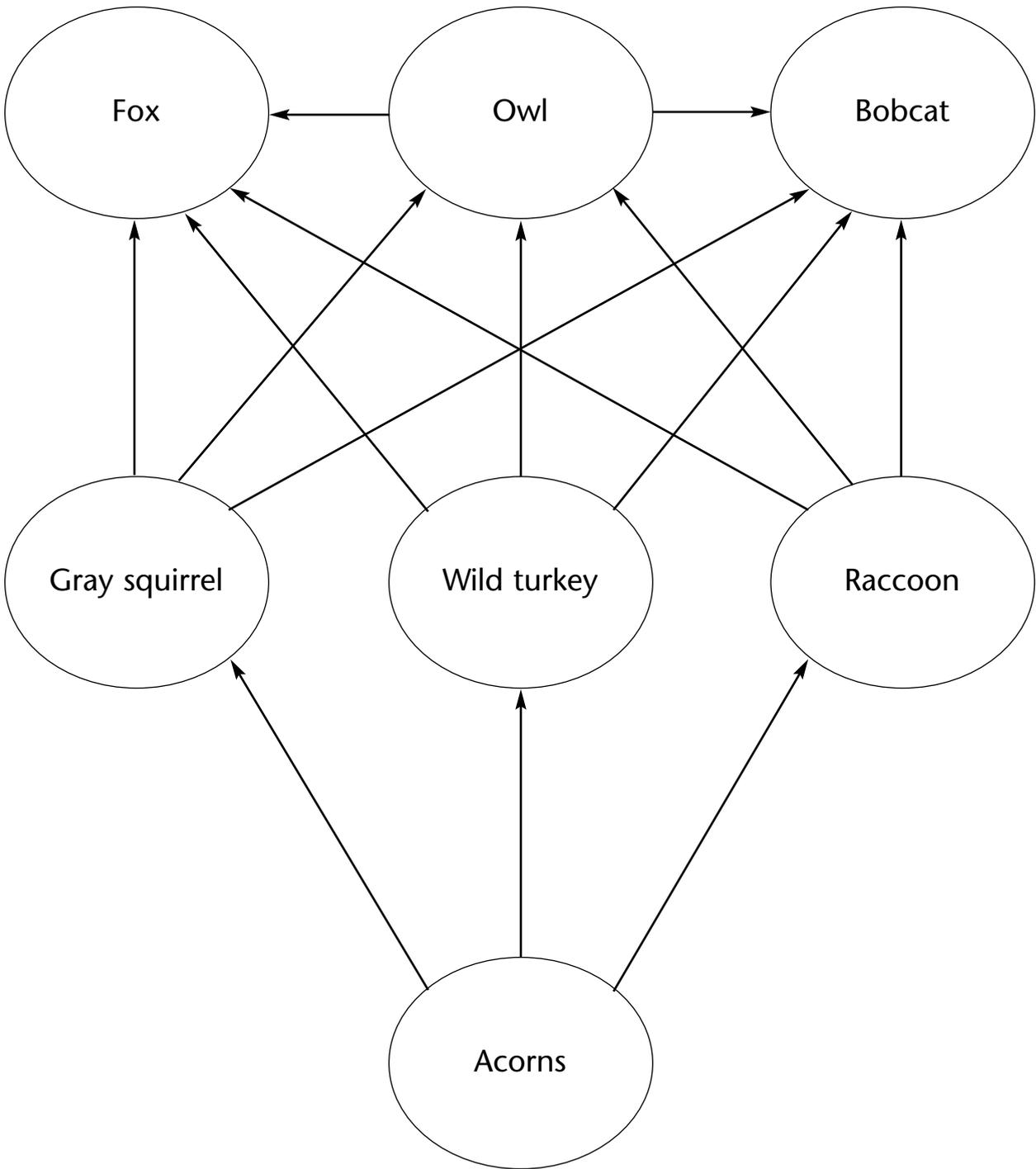
Lesson 5.5 Story-Building Chart

Group	A. Think of an environment where _____ live.	B. Imagine a new _____ coming into that environment.	C. What _____ effect might the new addition have on the environment?
1	people	person	positive
2	animals	person	positive
3	people	animal	positive
4	animals	animal	positive
5	people	person	negative
6	animals	person	negative
7	people	animal	negative
8	animals	animal	negative

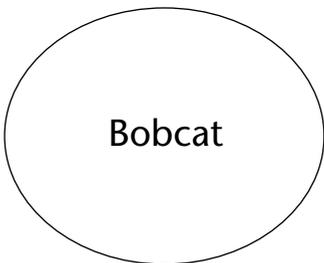
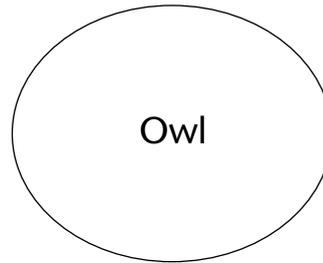
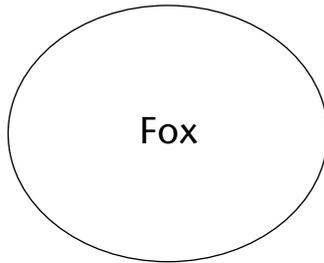
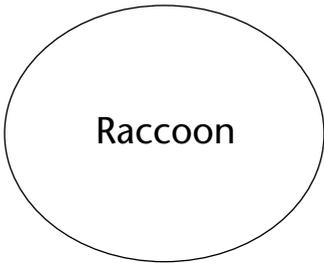
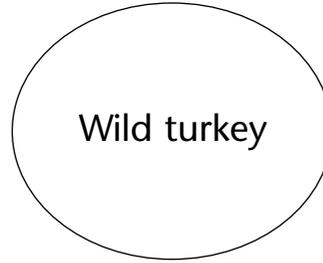
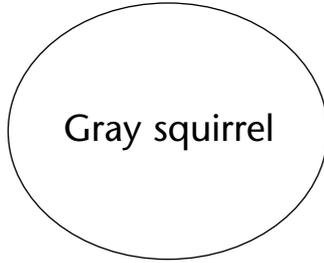
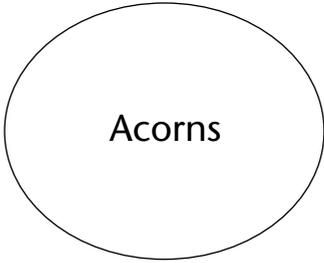
Lesson 5.5 Story-Building Card Set

<p>GROUP 1</p> <ul style="list-style-type: none"> A. Think of an environment where people live. B. Imagine a new person coming into that environment. C. What positive effect might the new addition have on the environment? 	<p>GROUP 2</p> <ul style="list-style-type: none"> A. Think of an environment where animals live. B. Imagine a new person coming into that environment. C. What positive effect might the new addition have on the environment?
<p>GROUP 3</p> <ul style="list-style-type: none"> A. Think of an environment where people live. B. Imagine a new animal coming into that environment. C. What positive effect might the new addition have on the environment? 	<p>GROUP 4</p> <ul style="list-style-type: none"> A. Think of an environment where animals live. B. Imagine a new animal coming into that environment. C. What positive effect might the new addition have on the environment?
<p>GROUP 5</p> <ul style="list-style-type: none"> A. Think of an environment where people live. B. Imagine a new person coming into that environment. C. What negative effect might the new addition have on the environment? 	<p>GROUP 6</p> <ul style="list-style-type: none"> A. Think of an environment where animals live. B. Imagine a new person coming into that environment. C. What negative effect might the new addition have on the environment?
<p>GROUP 7</p> <ul style="list-style-type: none"> A. Think of an environment where people live. B. Imagine a new animal coming into that environment. C. What negative effect might the new addition have on the environment? 	<p>GROUP 8</p> <ul style="list-style-type: none"> A. Think of an environment where animals live. B. Imagine a new animal coming into that environment. C. What negative effect might the new addition have on the environment?

Lesson 5.5 New England Forest Food Web



Lesson 5.5 New England Forest Creature Ovals



Lesson 5.6 Wonder Journal Labels

I wonder how communities of people can protect Earth's natural resources and environments.

.....

How can communities of people protect Earth's natural resources and environments?

I wonder how communities of people can protect Earth's natural resources and environments.

.....

How can communities of people protect Earth's natural resources and environments?

I wonder how communities of people can protect Earth's natural resources and environments.

.....

How can communities of people protect Earth's natural resources and environments?

Lesson 5.6 Subway Car–Ocean Life Chart

	What We Think
1. Dumping old subway cars into the Atlantic Ocean will help ocean life.	
2. Dumping old subway cars into the Atlantic Ocean will hurt ocean life.	
3. Dumping old subway cars into the Atlantic Ocean will neither help nor hurt ocean life.	

Lesson 5.6 Subway Car–People Chart

	What We Think
<p>1. Dumping old subway cars in the Atlantic Ocean will help people living in New York City.</p>	
<p>2. Dumping old subway cars in the Atlantic Ocean will hurt people living in New York City.</p>	
<p>3. Dumping old subway cars in the Atlantic Ocean will neither help nor hurt people living in New York City.</p>	

Lesson 5.6 Question Set

- *According to this sidebar, what are five things people can do to reduce the amount of energy they use? (Build more efficient heaters and coolers; design more efficient buildings; make cars, trucks, and machines that waste less energy; use public transportation; ride a bike.)*
- *According to Subway Story, which of these things do many people in New York City do every day? (Use public transportation.)*
- *How does riding the subway cut down on energy use? (It takes less energy to power a subway train than dozens of individual cars.)*