CCPS Science Unit Plan

Grade	7th grade	**Subject**	Science	**Unit #**	4
Unit Name	Ecology and the Interdependence of Living Things: Harmony in Habitats: Exploring Ecology		**Timeline**	Seven weeks	
How to use the Framework	This Framework should be used to implement daily science instruction. The resources and instructional strategies reflected in the Framework will provide a foundation for effective implementation and student mastery of standards. Please see the hyperlinked abbreviation document to ensure understanding of all abbreviations used with this framework.				
Unit Overview	The final unit of 7th grade science will synthesize material learned throughout the year and allow students to develop an understanding on how living things are interdependent on each other and their environment. After understanding what life is, how it is classified, and how it evolves, students are now posed to tackle how life interacts with the Earth. The guiding questions throughout this unit are, "What do living things need to survive?" and "How do living things interact with each other?" This unit will lead students in understanding that the sun is the primary source of energy, and that organisms depend on one another as well as their environment for survival. Students will be able to use and create a food web to demonstrate that matter and energy is transferred and recycled among organisms and their environment. Students will also create an ecological plan to combat an invasive species. • Relationships and interactions between organisms • Transfer and recycling of matter and energy • Environmental conditions/ characteristics • Biomes • Human Impact on Ecosystems				
Lesson Plan guidance document and template	CCPS Lesson Plan Template Day View Lesson Plan Template Week View Department of Science Guidance Document				

3Dimensional Instruction

GSE	Science and Engineering Practices	Crosscutting Concepts
S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. ***(Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)***	Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7)

	b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. ***(Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)*** c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). ***(Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)***		Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6) The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3) **Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2)
NGSS Alignment	NGSS Alignment to Disciplinary Core Ideas **PS3.D: Energy in Chemical Processes and Everyday Life** The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to MS-LS1-6) Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to MS-LS1-7) **LS1.C: Organization for Matter and Energy Flow in Organisms** Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6) Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7)		

LS2.A: Interdependent Relationships in Ecosystems

Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)

In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1)

Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)

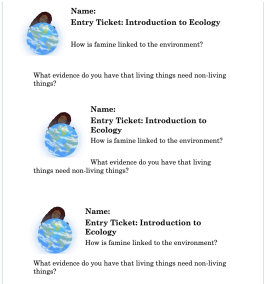
Week 1	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. (Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.) b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)	**Focused Concept: Ecology is the study of the relationships among living organisms, including humans, and their physical environment. Ecology considers organisms at the individual, population, community, ecosystem, and biosphere levels.**

SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Obtaining, evaluating, and communicating information	**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Scale, Proportion, and Quantity** Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2)

Phenomenon: Ecology and Famine in Somalia.mp4	**DQ: How do organisms interact in their environment?** **How do different organisms get energy?**

Learning Target:	Day 1	Day 2	Day 3	Day 4	Day 5
The students will be able to (SWBAT)	**SWBAT investigate the relationships among organisms, populations, communities, ecosystems, and biomes.**	**SWBAT investigate the relationships among organisms, populations, communities, ecosystems, and biomes.**	**SWBAT identify and describe the three main parts of a food chain: producers, consumers, and decomposers.**	**SWBAT model the relationships in a food chain.**	**SWBAT explain how changes in a food web affect organisms within it.** **SWBAT dissect an owl pellet and analyze its contents to construct a food chain.**
Opening	(The lesson material including video and vocabulary activity Day one: Introducti…) The teacher will show the video available here As	The teacher will show a video available here The video is an overview of ecology and review of the previous day's lesson. Exploring Our Wo…	The teacher will have students study the photo on page 27 of the student textbook. The teacher will ask "How do these bears and this fish get energy	The teacher will open the lesson with a short review of food chains and food webs.	The teacher will show a short video of an owlet producing an owl pellet. **Barred Owl Chick …** The teacher will discuss

	students are watching the video, students should answer the following questions: What evidence do you have that living things need non-living things? How is famine linked to the environment? The questions will serve as an entry ticket to class. The teacher can use the form below as entry tickets for students. Three answer documents were placed on a page to aid in printing limitations that may exist in schools. Entry Ticket: Intro… The teacher will show the video available here As students are watching the video, students should answer the following questions: What evidence do you have that living things need non-living things? How is famine linked to the environment? The questions will serve as an entry ticket to class. The teacher can use the form below as entry tickets for students. Three answer documents were placed on a page to aid in printing limitations that may exist in schools. https://docs.google.com/document/d/1tV-8AB8zM5nHefZkpT26sxmLTTcHQZeGhcGxjvZ-Z78/edit?usp=sharing	The teacher will say "If the earth were an apple (or orange), what part of the apple would be biosphere? Explain." As a review of the content covered in the previous lesson, Intro to Ecology, students will be asked to consider which part of an apple (or orange) would be the biosphere and explain their answer. *Teacher note: having apples or oranges available as prizes for students' correct answers would be engaging.*	from the environment?' The video below shows the bears in action and can be played as well. Grizzly Bears Catchi… As students study the picture or watch the video, students should complete the Encounter the Phenomenon activity on page 27 of the student textbook. **The teacher will inform the students that the previous lesson focused on how photosynthesis and cellular respiration are important components from the cycling of energy. Today's focus is how the energy that is transformed through the process of photosynthesis and cellular respiration are cycled through ecosystems.**	The teacher can also engage students with a short video (YouTube has a variety of short videos to choose from) showing different organisms in a variety of ecosystems. The teacher can ask students to write down what they observe and any questions they may have about the interactions among organisms.	the day's lesson agenda and activity. A lab safety tool talk will be given as well as the expectations for the lab activity. (***Teacher note: The Carolina Science website has great lab safety tips for using owl pellets in the science classroom.*** https://www.carolina.com/teacher-resources/Interactive/owl-pellets-in-the-classroom-safety-guidelines/tr11086.tr

	 Teacher note: After copying the form, you can edit the Bitmoji to suit your classroom.				
Guided Practice/Transition	Continuing with the theme of Africa, the lesson will begin by watching the "Circle of Life" song clip from "Lion King. The song clip will be used to "hook" the students into the ecology discussion that will follow. After the song ends, the teacher will tell students that today's lesson is an Introduction to Ecology. Teacher will explain that the Lion King is an accurate reflection of ecological concepts that we will discuss in the Ecology unit. As part of the explicit instruction process, The teacher will present the new vocabulary terms: ecology, biosphere, ecosystem, biotic, abiotic. Students will complete a vocabulary map during the independent practice portion of the lesso	The teacher will transition students to the next portion of the lesson activity. Students will complete a Gizmo Activity: Plants and Snails Before starting the activity, the teacher will use Bromothymol blue's ability to indicate the presence of carbon dioxide in a solution. The teacher will place about 10 mL of bromothymol blue solution (inexpensive and available from major science supply shops) into a test tube. Then place a straw into the solution and blow gently through the straw. BE CAREFUL NOT TO INHALE! BTB IS POISONOUS. After a few minutes of blowing, the solution should begin to turn yellow, indicating the presence of carbon dioxide.	Before having students engage in a class note-taking activity, students will model the energy flow in an ecosystem. Within the teacher resources there is Encounter the Phenomenon: Flow of Energy worksheet presentation. You can also go online and pull images of organisms in a food web and the Sun. Students will use the images to model the movement of energy in an ecosystem. The teacher will guide students' thinking and help students make connections between organisms and the movement of energy. The teacher will then transition students to a note-taking activity. Students will complete a note-taking activity "Food Chain and Food Webs". Food Chains and Fo…	To cement student understanding of food chains and food webs, Students (with teacher guidance), will complete the Modeling Energy Flow lab activity on page 34 of the student textbook. Students will model the relationships that exist in a food chain. Instructions on how to facilitate the activity are located on page 34 of the teacher textbook.	The teacher will conduct a short lesson on owls and owl pellets. Owl-Pellet-Pre-Lab Students will complete a Virtual Owl Pellet dissection (students will "dissect" an owl pellet to investigate the feeding relationships that exist in a deciduous forest) S7L4a: Virtual Ow… If owl pellets are available, students will complete an owl pellet dissection. In person: owl pelle… ***Teacher note: Inform students that they will first dissect their owl pellets, and then they will use a dichotomous key to identify the bones of the prey species found in the pellet.*** ***Go over the steps of the dissection procedure, following the steps***

		(Teacher note: if BTB is unavailable, YouTube has several videos that demonstrate this phenomenon. The goal of this portion of the lesson is demonstrate the production of Carbon Dioxide gas) The teacher will assign students to computers (if students have ChromeBooks, no need to assign). The teacher will assign the Gizmo worksheet via Canvas or provide students with a hardcopy. The teacher and students will complete the Prior Knowledge and Warm-up questions together. The warm up activity will allow students to practice with the Gizmo with teacher guidance.	Students will compare and contrast food chains and food webs.		***outlined in the Owl Pellets Dissection worksheet. Make sure students understand what they will be doing at each point.*** ***Inform students that these pellets have been heat-treated to sterilize them. However, to be on the safe side, they will have to wash their hands and clean their work area after the dissection. They should not eat, drink, or put their hands in their mouths during the activity.*** ***Give students 30 to 45 minutes to dissect their owl pellets, either in partners or individually. Educator Tip: Student's excitement over the first bones that are uncovered can lead to distraction from the dissection. Encourage students to stay organized, follow the procedure, and keep careful track of what they find.*** ***Circulate throughout the classroom to answer questions and help with the dissection.*** ***Educator Tip: During the time that students are dissecting their owl pellets, you can draw the class data table and "Percentage of Prey***

					Species Found in Owl Pellets" graph from the What do owls eat? worksheet on the board.
Independent Practice	Students will complete a vocabulary map during the mini lesson. The teacher will distribute 8 ½ x 11 paper or foldable template, scissors, colored pencils and markers for the activity and provide verbal and written instructions to explain how to complete the foldable. Project instructions will be projected as well as explained to students. **Introduction Ecolo…** ***(Teacher note: students should complete Activity A and B; Activity C can be assigned as homework or as an extension. Modify the Gizmo worksheet to fit your classroom.)***	Students can work individually or in small groups. Have them work through the Student Exploration with the help of the Gizmo. Walk around to check student progress and answer questions as students work. Alternatively, teachers can use a projector and do the Exploration as a teacher-led activity.	To enhance learning, students will view a short episode of Wild Kratts. The Wild Kratts Food Chain Game provides students with additional knowledge of food chains and food webs. Wild Kratts Food Ch… Below is a worksheet you can have students complete as they watch the video: WildKrattsFoodChai… Below is a Quizizz created based on the Wild Kratts episode and Food Chain notes. https://quizizz.com/admin/quiz/5e99ff71484114001b6592a3?source=quiz_share	Pictures for Visual … Visual Literacy Te… Students will complete a visual literacy activity. Students will receive a picture cut up in quadrants. Students will be asked to generate two facts, two inferences, and two questions about each quadrant. The purpose of the activity is to generate student conversation and provide background information for the topic. (*Teacher notes: The pictures should be cut into quadrants and numbered 1-4. See the example for how the pictures should be numbered* 	Students will complete the lab analysis questions. **Students can also complete a CER for the lab activity.** **Owl Pellet Lab Cla…**
Assessment/Summary		The teacher will engage students in a short discussion of the following questions: Do plants breathe (exchange gasses) in the same way that animals do? What is an "indicator" and how are they useful to scientists? Do plants create more oxygen than they use?	Closing: 3-2-1 (students and teacher will review the learning target)	Closing: 3-2-1 (students and teacher will review the learning target)	Closing: 3-2-1 (students and teacher will review the learning target)

		How do you know?			
Small Group Tasks (TBA)					

Week 2	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. **a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem.** **(***Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)* **b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem.** *(Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)*	**Focused Concept: All organisms, including humans, depend on, interact with and affect the environments in which they live and other organisms that live there.**
SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Structure and Function**

			Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) **Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7) Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6) The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3)		
Phenomenon: Available in opening activities			**DQ: How are interacting populations of organisms affected by changes to ecosystems?**		
Learning Targets	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
The students will be able to (SWBAT)	**SWBAT** develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem.	**SWBAT** refine and develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem.	**SWBAT** analyze and interpret data to explore how organisms interact with abiotic and biotic factors.	**SWBAT** investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	**SWBAT** analyze and interpret data on a graph to explore the relationship between population size and carrying capacity.
Opening	The teacher will start the lesson with a question: "What makes up an ecosystem?" The teacher will then show a short video (5-7 minutes) on ecosystems to highlight biotic and abiotic components. ***The link below contains a short video made by Georgia PBS on ecosystems. Let's Go Enviro is a digital video series that***	The teacher will open the day's lesson with a quick review of the previous day's activities. The teacher will explain that today's lesson will focus on two items: 1. Refining Models**:** Students will reflect and improve their models from the previous day. The teacher will	Students will complete the Science Probe (Populations and Communities) on page 69	*Teacher note: The introductory lesson on day one introduced students to the levels of ecosystem vocabulary words. Today's lesson is a review and reteach opportunity.* The teacher will show the picture below and ask students the following questions:"what do you notice? What do you think?" and "why do you think animals live in groups?"	The teacher will review the previous day's activity on limiting factors by using the Pika Predicaments activity on page 78 of the student textbook. To make it easier for students to complete the activity, the teacher can use a document camera or the electronic copy to project page 76.

	teaches environmental science through phenomena, project-based learning, and Georgia's diverse ecosystems. **https://gpb.pbslearningmedia.org/resource/intro-flow-energy-cycling-matter-ecosystem-video/lets-go-enviro/** **Discuss key concepts: ecosystems, biotic components (plants, animals, microorganisms), and abiotic components (water, soil, air, sunlight).**	conduct a short mini-lesson on matter cycling and energy flow to provide students with additional information to include within the refined models. 2. STEM Challenge Throughout the next few weeks, students will work on a STEM Challenge. The challenge is found on page 68 of the student textbook. The teacher will introduce the challenge and review the directions and rubric the students. *Teacher note: page 68 of the teacher textbook has some discussion questions that can be used to engage student's thinking and ideas.* ***Pages 123-127 of the teacher's textbook provide an outline for teachers to use for the Module Project planning and implementation. The project will take place over two to three weeks.***		Day Four Opening … 	
Guided Practice/ Transition	**Ecosystem Exploration (30 minutes)** The teacher will divide students into groups and assign each group a specific ecosystem (e.g., forest, desert, ocean, grassland). Research Task: Each group	**Refining Models (30-45 minutes)** Reflect and Improve: Groups will refine their models from the previous day. The teacher will introduce digital tools for those who wish to create a digital version.	After discussing the science probe, the teacher will introduce the Encounter the Phenomenon activity on page 71 of the student textbook. The teacher will link the activity back to the introductory video on day	The teacher will lead an exploration of the school yard (weather permitting) and will complete the There's No Place Like Home activity on page 75. During the nature walk, students were able to see	The teacher will present the interactive presentation covering carrying capacity and limiting factors. Carrying Capacity … After the mini lesson, students will complete the

	researches their assigned ecosystem, identifying its biotic and abiotic components, and how they interact. Provide printed diagrams and online resources for research.	The teacher will discuss key points for accurate models: • Energy flow: solar energy, photosynthesis, trophic levels (producers, primary consumers, secondary consumers, decomposers) • Matter cycling: water cycle (evaporation, condensation, precipitation), nutrient cycle (carbon, nitrogen, phosphorus)	one. The teacher will have students study the photo of the animals at the watering hole. The teacher will play the video "Down at the Watering Hole" video (available in the teacher resources or this video available on YouTube At the Watering Hol…) and students will complete the Encounter the Phenomenon worksheet. The teacher will use the guiding questions on page 71 to guide a short discussion on populations, communities, and the interactions in ecosystems.	examples of living and non-living things. The teacher will then transition to the effect of abiotic factors on biotic factors. Specifically, how does resource availability affect populations? Students will complete the Fishy Population Changes activity on page 76 of the student textbook as an independent practice activity. *(Teacher Note: The teacher textbook pages 76-77 contains information on how to facilitate the lab activity.)*	Carrying Capacity review worksheet.
Independent Practice	**Model Creation:** Using chart paper and markers, the groups create a visual model of their ecosystem, showing the flow of energy (with arrows) and cycling of matter (nutrients, water, carbon, etc.) among components. Emphasize the importance of accurate representation of energy flow (sun -> producers -> consumers -> decomposers) and matter cycling (water cycle, nutrient cycle).	The teacher will assign each group to focus on a specific cycle (carbon, nitrogen, water) within their ecosystem. Students will be tasked to research and integrate the new information into their models. **Research and Integrate:** Groups research how this specific cycle operates within their ecosystem and integrate detailed aspects into their model. The teacher will give students 30 minutes to complete this portion of the activity. Teachers can have students use the Biogeochemical-Cycles Worksheet to provide a framework for their research.	Students will complete the Explain the Phenomenon activity on page 72 of the student textbook. Students will complete a visual literacy activity. Students will receive a picture cut up in quadrants. Students will be asked to generate two facts, two inferences, and two questions about each quadrant. The purpose of the activity is to generate student conversation and provide background information for the topic. (*Teacher notes: The pictures should be cut into quadrants and numbered 1-4. See the example for how the pictures should be*	Students will model exponential growth of a population of fish with the mini-lab activity. Students will complete Fishy Population Changes on page 76 of the student textbook in learning pairs.	Students will complete the Carrying Capacity and Limiting Factors worksheet. Carrying Capacity a…

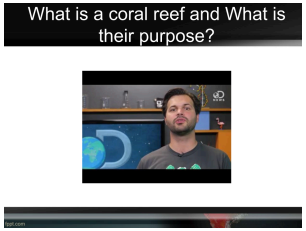
		Presentation: The teacher will lead students into the next phase of the activity; Groups present their final, refined models to the class, highlighting the flow of energy and cycling of matter with the added depth from their specific cycle research.	 *numbered*		
Assessment Summary	**Presentation and Peer Review (15 minutes)** Group Presentations: Each group presents their model to the class. Peer Feedback: The teacher will encourage other students to ask questions and provide constructive feedback.	**Class Discussion:** Reflect on what was learned. ***Teacher note: To aid in the discussion, use questions like:*** ***How do biotic and abiotic components interact in an ecosystem?*** ***Why is the cycling of matter important for ecosystem stability?*** ***How does energy flow through an ecosystem, and why is it unidirectional?***	The teacher will review the CER activity and provide clarification, if needed.	The teacher will review the term "limiting factor" and ask students "what other limiting factors can you think of?	**S**tudents will complete the lesson review and Three Dimensional Thinking activities on pages 82 and 83 of the student textbook.
Small Group Tasks (TBA)					

Week 3	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. **a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem.** **(***Clarification statement: The interactions include, but are not limited to, predator-prey*	**Focused Concept:** Living things in ecosystems interact in different ways. Some animals eat plants for food, while other animals eat those plant-eating animals. This interaction forms a balance in the ecosystem. For example, bees interact with flowers by pollinating them, helping plants reproduce. Every living thing has a role to play in maintaining the health and balance of an ecosystem.

relationships, competition, mutualism, parasitism, and commensalism.) **b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem.** *(Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)*	

SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) **Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7) Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6) The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3)
Phenomenon: Available in the opening activities	**DQ:** How do organisms interact in symbiotic and nonsymbiotic relationships?

Learning Targets	**Day 11**	**Day 12**	**Day 13**	**Day 14**	**Day 15**
The students will be able to (SWBAT)	**SWBAT** classify relationships	**SWBAT** • define and give	**SWBAT**	**SWBAT**	**SWBAT**

	within an ecosystem as competitive or symbiotic.	examples of living (biotic) and non-living (abiotic) things within an ecosystem.	• describe the feeding relationships between 10 important organisms in a simplified model of a Caribbean reef ecosystem.	• research, model, and present the symbiotic relationships in a coral reef community.	• research, model, and present the symbiotic relationships in a coral reef community.
Opening	**Science Probe: What's the relationship?** Students will complete the science probe located on 85 of the student textbook. The teacher will discuss the probe and clarify any misconceptions students may have. To jump start the lesson and transition to the lesson, the teacher will play the Symbiosis- Mutualis… video. This video is also located in the Ecological Interactions presentation located in the Guided Practice portion of today's lesson plan. As students watch the video, have students notate the ways organisms interact with each other in ecosystems.	The teacher will show the Amazing Symbiosis: Ant Army Defends Tree | National Geographic video. As students watch the video, the teacher will ask What do you notice? What do you wonder? **Amazing Symbiosis:…** The video will be used to open the day's lesson and jump start learning.	10 Most Stunning Coral Reefs in the World The teacher will navigate to the website above to show students pictures of various coral reefs. The pictures will provide context for the day's lesson. The teacher will explain that today's lesson will involve them traveling to a coral reef via the Explore Learning site. Students will complete the Coral Reefs 1 Gizmo. ***Teacher Note: You can use the Coral Reef Gizmo presentation to help facilitate the lesson. Feel free to make a copy of the presentation and make modifications based on your classroom.***	 The teacher will play the video from the Coral Reef Gizmo activity to jump start the lesson.	The teacher will have students complete the Ecology quiz #1 Ecology Quiz #1 The quiz consists of a short reading passage and five questions based on the passage. There is a reflection portion of the quiz that can be taken off and used as a closing activity for today's lesson.
Guided Practice/Transition	Students will engage in a short note-taking exercise covering interactions in ecology. Ecological Interactions After completing the note taking activity, students will transition to the Encounter the Phenomenon: What sort of relationship do the cleaner shrimp and the moray eel have? Worksheet located	The teacher will review key vocabulary terms: • Ecosystem: A community of living organisms in conjunction with the nonliving components of their environment. • Competitive Relationship: When two or more organisms	Pass out the Student Exploration sheets and ask students to complete the Prior Knowledge Questions. The teacher will discuss student answers as a class. Complete the Gizmo warmup questions together as a class.	The teacher will review the student exploration activities from the previous day. Students and the teacher can complete the five question assessment as a review (if not used the previous day as an assessment). The teacher will explain the lesson focus for the day: What are different types of symbiotic relationships?	The teacher will provide feedback on Coral Colleagues activity work. Students will present their research in the independent portion of the day's lesson. The teacher will review the requirements and expectations of the activity.

	on page 87 of the student textbook.	compete for the same resource, such as food or territory. • Symbiotic Relationship: A close and long-term biological interaction between two different species. The teacher will provide examples of competitive and symbiotic relationships within an ecosystem. The teacher will discuss how these relationships impact the organisms involved and the ecosystem as a whole.		The teacher will introduce the activity Coral Colleagues. This activity is located on pages 92-93. ***Teacher note: There are various suggestions given in the teacher textbook on how to implement the activity in the classroom to choose from. This activity will be completed over the next two class periods.***	
Independent Practice	Students will complete the Explain the Phenomenon activity located on pages 88-89. The notes and opening activities should provide students with evidence to support their claim of the relationship that exists between moray eels and cleaner shrimp.	Students will complete the Relationships in Communities activity (page 90) and Mutually Bene-fish-al activity (page 91). The teacher will give students 15 minutes for each activity, monitoring students as they work through the activity. The goal of the activities is for students to understand that different types of relationships in ecosystems have different outcomes and benefits.	Students will complete the Explore Learning virtual lab activity: Coral Reef. Students will make predictions, understand the role each type (consumer, producer, decomposer) plays in the carbon cycle, determine the feeding relationships in a coral reef ecosystem and interpret pictographs and line graphs. Students will complete the lab worksheet and assessment questions to guide their understanding of the learning target.	Students will complete the Coral Colleagues activity. Students will research, model, and present on the symbiotic relationships within a coral reef. The teacher will give each learning pair a symbiosis card (available from the online teacher resources). Students will use a Chromebook to complete the activity based on teacher instructions and the student worksheet located on pages 92-93.	Students will present their Coral Colleagues activity results to their classmates.
Assessment/Summary	The teacher will remind students of the unit project discussed the previous week. The teacher should address any difficulties	Students will complete a 3-2-1 activity covering the day's lesson.	So what? What takeaways from the lesson will be important to know three years from now? Why?	Students and the teacher will complete the closing activity: The teacher will discuss and review the learning target and the	The teacher could give a brief quiz covering symbiotic relationships or have students complete a

	students may have on their learning journey. Students will complete a 3-2-1 activity covering the day's lesson. ***Teacher note: Because of the popularity of "FInding Nemo", most students are familiar with the mutualistic relationship that exists between Clownfish and Sea Anemones. The book, <u>Weird Friends: Unlikely Allies in the Animal Kingdom</u> by Jose Aruego, details a host of mutualistic relationships that the teacher can use to enhance the discussion of ecology. The book may be hard to find; YouTube has a reading of the book available.*** *WEIRD FRIENDS U…*			teacher will informally assess the class's journey toward standard mastery.	KWL chart for the day's lesson. Students will provide updates on the Module project. The teacher should direct students to the Planning after Lesson 2 section of the Module Project at the end of the module to continue working on their Science Challenge.Remind students that the Module project is a project grade and information regarding the project is located on page 68 of the student textbook.
Small Group Tasks (TBA)					

Week 4	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.) c. Analyze and interpret data to provide evidence for how	**Focused Concept: Ecosystems are communities of living (biotic) and nonliving (abiotic) organisms in particular places and the chemical and physical factors that influence them. Ecosystems also have processes of energy flow and community dynamics, which is the change in composition and structure of an ecosystem following a disturbance.**

resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.					
SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information			**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)		
Phenomenon: Available in the opening activities			**DQ: How do natural and human disruptions to physical and biological components of ecosystems result in shifts in populations?**		
	Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Learning Targets **The students will be able to (SWBAT)**	**SWBAT** recognize and explain patterns and processes of species in communities.	**SWBAT** explain land ecosystems change.	**SWBAT** compare and contrast primary and secondary succession.	**SWBAT** explore how succession might affect a local ecosystem.	**SWBAT** describe how aquatic ecosystems change over time.
Opening	**Explain the day's lesson focus and activity. The teacher will show students the picture of a burning tree located below and ask students to answer the questions located on the embedded worksheet.** **Burning Tree Visual …**  ***Teacher note: if students are interested in the phenomenon, the Weather Channel explains what***	**The teacher will show the video below and ask students What do you notice? How does today's video compare to yesterday's opening?** **Evacuations issued f…** **The teacher will review the learning target and learning focus for the day.** **Today's lesson focuses on ecological succession.**	 **The teacher will show the picture above and ask students and ask students to answer the questions located on the embedded worksheet.** **Ecological Successi…**	 The teacher will have students view the above picture. The teacher will ask students 'What do they notice? and What do they wonder?' ***Teacher note: The Hurricane, a 100-foot-tall (30m) wooden roller coaster, was the main attraction at Boomers! Park in Dania Beach. It was the longest wooden roller coaster in Florida when it first opened in 2000 and, although it was***	The teacher will open the day's lesson by having students complete the three dimensional thinking activity on page 112. Students will use their visual literacy skills to construct an explanation on how soil can change a lake ecosystem.

	happened and why to the tree. ***https://weather.com/storms/severe/video/tree-on-fire-after-lightning-strike*** The teacher will explain the next two weeks' lesson focus and the elements that make up the lessons. In the cells and human body unit, students were asked to imagine a world without plants. Today, students will complete the Science Probe located on page 103 entitled “No More Plants”. The teacher can have students complete the probe separately or as a Think Pair Share activity.			***part of the Boomers! Park, it was owned and operated independently. It was shut down by its operators in 2011 with the owners citing "business reasons". It's thought the humid climate in Florida made maintaining the roller coaster unviable.The rest of the park stayed open, attracting visitors to its colorful mini-golf course and arcades until April 2015, when the park was closed to make way for development.***	
Guided Practice/Transition	The teacher will have students study the picture located on page 105 of their student textbook. The teacher will then ask students the Encounter the Phenomenon question, “How are populations affected by changes to a forest ecosystem when it is destroyed by fire?” The teacher will use the guiding questions on page 105 to facilitate a brief class discussion. The teacher will then show the Mountain Ash video that is included in the teacher resources.	The teacher will introduce the concept of land ecosystems, defining them as the interactions between living organisms and their environment on land. Key vocabulary words like ecosystem, biotic, abiotic factors, succession, and adaptation reintroduced and explained. Students (under teacher guidance) will complete the Change in Communities on page 108. Students will read the Changing Ecosystems text (available within the teacher textbook resources).	The teacher will introduce the concept of Ecological Succession (this topic is found on pages 109-111) ***(Teacher note: Teachers can use the embedded Ecological Succession notes to guide the class discussion on ecological succession. The first slide contains the opening picture and there are a variety of media within the presentation to facilitate student understanding.)***	The teacher will review primary and secondary succession and ask students what they think their neighborhood would look like in 500 years. This discussion will allow for the transition to Class is Dismissed activity located on page 111 of the student textbook. The teacher will divide students in small groups (no more than four students a group) and provide the following questions to guide groups to come up with a list of questions on how succession could impact the school and neighborhood. ***Teacher note: The teacher textbook has suggestions for implementing this activity in the classroom.***	As students are completing the visual literacy activity, ask students what changes are occurring to the aquatic ecosystem in the visual? The teacher could also ask “How does the final ecosystem differ from the initial one?” After students provide their insights, the teacher will show the Animation: Aquatic Succession (available in the teacher resources). The video provides a transition for the Lab activity on page 113.

				Those suggestions are located on page 111 of the teacher textbook.	
Independent Practice	Students will complete the Explain the Phenomenon activity on page 106 of the student textbook. Students can work together in pairs or alone. The teacher will set a timer (for at least 20 minutes) for students to complete the activity. Students will have an opportunity to revise their claims during the closing portion of the lesson.		**Students will complete the Ecological Disturba… The worksheet can be colored as well.**	As students are completing the activity, the teacher will circulate and provide support groups as they are working through Class is Dismissed.	The purpose of the activity is to model sediment runoff in aquatic ecosystems and think about how that affects aquatic ecosystems.
Assessment/Summary	Students and the teacher will complete the closing activities: review the learning target and teacher will informally assess class's journey toward standard mastery.	Students and the teacher will complete the closing activities: review the learning target and teacher will informally assess class's journey toward standard mastery.	Students and the teacher will complete the closing activities: Explain: How is primary succession like a homemade meal? How is secondary succession like leftovers?	The History Channel has a great series entitled Life After People. Students will watch the first five minutes from the episode linked below and link Class is Dismissed with succession. Life After People: T…	Students and the teacher will complete the closing activities: students will complete the Summarize It on page 120.
Small Group Tasks (TBA)					

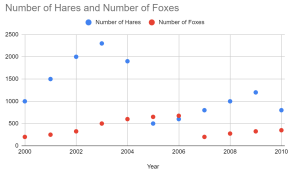
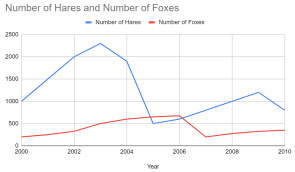
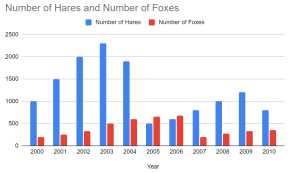
Week 5	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)	**Focused Concept: Ecosystems also have processes of energy flow and community dynamics, which is the change in composition and structure of an ecosystem following a disturbance.**

c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.	

SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**CCC:** **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)
Phenomenon: **Available during the opening activities**	**DQ: How do natural and human disruptions to physical and biological components of ecosystems result in shifts in populations?**

	Day 21	Day 22	Day 23	Day 24	Day 25
Learning Targets **The students will be able to (SWBAT)**	**SWBAT** ● describe how eutrophication and water pollution affect ecosystems.	**SWBAT** ● determine how invasive species impact biological communities.	**SWBAT** ● determine how invasive species impact biological communities.	**SWBAT** ● explore the impacts of invasive species on a Caribbean reef ecosystem.	**SWBAT** ● investigate the relationships among organisms, populations, communities, ecosystems, and biomes.
Opening	The teacher will ask students what might cause a natural disruption in an ecosystem? The teacher will then show a brief video What is eutrophicati… The teacher will ask students what they observed in the video. Write down their observations on the whiteboard.	The teacher will review the previous day's lesson. Specifically, water pollution and its effects on ecosystems. The teacher will then turn student's attention to invasive species and their effects on ecosystems.	Students will be introduced to Vin (the USDA mascot of invasive species). The 60-second PSA, "A Lot of Mouths to Feed," from the Hungry Pests website will be played to expose students to Vin's menacing ways. Afterward, students will share their reactions to Vin Vasive and make predictions about the kinds of damage he might bring to agriculture and the environment, as well as the	The teacher will open the day's lesson with a five minute recap of the previous day's learning. (***Teacher note: You can review the previous day through a brief quiz, Think-Pair-Share, or any other method).*** The teacher will show students a picture of the Lionfish and ask the student if they have seen this fish or know what type of fish it is.	Today's lesson is a synthesis of the previous week's activities. Students will complete the Fox and the Hare STEM Module Project. This project was assigned during the first week of the Ecology unit. To begin the lesson, the teacher will show students a short video of the tundra and the animals that live there. Fox and Hare: A Tundra

			problems he might cause for people.	 The teacher will then transition into the day's activity and explain the class agenda. ***Teacher note: Lionfish are native to the Indo-Pacific, but are now established along the southeast coast of the U.S., the Caribbean, and in parts of the Gulf of Mexico.*** ***How did the fish get to the Atlantic? While the exact cause is unknown, it's likely that humans provided a helping hand. Experts speculate that people have been dumping unwanted lionfish from home aquariums into the Atlantic Ocean for more than 25 years.*** ***Since lionfish are not native to Atlantic waters, they have very few predators. They are carnivores that feed on small crustaceans and fish, including the young of important commercial fish species such as snapper and grouper.)***	Tale. Foxes & Hares: A T…
Guided Practice/Transition	The teacher will present a short lesson highlighting:	The teacher will complete a brief lesson covering	The opening provided an introduction to the day's	The teacher will pass out the Student Exploration	The teacher will review students' graphs of the data

	1. Define Eutrophication: Explain eutrophication, emphasizing the role of nutrient overload (mainly nitrogen and phosphorus) in water bodies. 2. Causes: Discuss the primary sources of these nutrients, including agricultural runoff, wastewater discharge, and industrial pollution. 3. Stages of Eutrophication: Nutrient Enrichment: Excess nutrients enter the water. Algal Bloom: Rapid growth of algae due to nutrient availability. Oxygen Depletion: Decomposing algae consumes oxygen, leading to hypoxic conditions. Dead Zones: Aquatic life suffers due to lack of oxygen. 4. Effects on Ecosystems: Highlight the impacts on aquatic life, water quality, and human activities. Page 117 of the student textbook highlights three other ways humans impact ecosystems. Today's lesson will only focus on pollution	invasive species. Invasive Species les…	lesson focus. The teacher will provide feedback on project completion.	sheets (or push them through Canvas) and ask students to complete the Prior Knowledge Questions. The teacher will discuss student answers as a class. Complete the Gizmo warmup questions together as a class. Student Exploration:…	on page 123. The data should be completed as a line graph, bar graph, or scatter plot. The Fox and the Har…   .  The teacher will then break students up into groups of four. Groups will exchange information from Lesson 1, 2, and 3 and begin working on the Construct Your Explanation on page 128. The teacher will circulate the room providing feedback and suggestions for groups. When students are finished with this section of the activity, students will move on to the summary statement portion of the activity.

	(specifically water pollution). The teacher will transition the lesson to the effects of water pollution on ecosystems. ExploreLearning Wa… The teacher will pass out the Student Exploration sheets (or push the worksheet through Canvas) and ask students to complete the Prior Knowledge Questions. Discuss student answers as a class. Complete the Gizmo warmup questions together as a class.				
Independent Practice	Students will complete Activity A and B of the Water Pollution Gizmo. The teacher will circulate and provide support to struggling students. Students can work in groups or pairs.	Students will complete the Invasive Species reading activity. Invasive Species Re… Students will be introduced to the in-class project covering invasive species. Students will be given the following instructions: ASSIGNMENT You will create an UNWANTED POSTER (digital or on paper) for an invasive species currently found in Georgia. Your poster must include ALL of the information from the checklist provided to you in class. Begin by collecting information on your invasive species using the Internet. Then use the project rubric to track your progress as you create your Unwanted Poster. Students will begin work on their invasive species	Students will continue work on their invasive species in-class project. Ecology Unit: INVA… Students will present the posters to the class for peer review.	Students will complete the Explore Learning virtual lab activity: Coral Reef.Biotic Factors: Students will make predictions, and determine the impact of invasive species on a coral reef ecosystem and interpret pictographs and line graphs. Students will complete the lab worksheet and assessment questions to guide their understanding of the learning target.	Students will complete the Module Wrap-Up Revisit the Phenomenon as an independent practice assessment. The teacher will have students share their answers for the Revist the Phenomenon activity on page 131. After completing this portion of the activity, the teacher will engage the students in a short class discussion of the activity and what students learned over the past three weeks. Students should be challenged to think of the ways organisms interact with each other in ecosystems and how each activity provided evidence for their claim-evidence-reasoning activity located on pages 88-89.

		in-class project. Ecology Unit: INVA… Students will have the following day to work on their projects. Teacher note: Use the following website to provide students with a list of invasive species in Georgia. https://www.invasive.org/species/list.cfm?id=2			
Assessment/Summary	The teacher will discuss the following question with students: What type of pollution is likely to lead to excessive growth of algae? What type(s) of pollution leads to death, disease, and birth defects? Why is sediment pollution a problem? How are bacteria helpful in fighting pollution? How are some bacteria harmful?	Students and teachers will complete the closing question: Why is Kudzu called the vine that ate the South?	Students will reflect upon the impact invasive species can have on them personally by writing a journal entry in response to the prompt: "I care about invasive species because…." Students will be required to include text references from the research they did	Closing: 3-2-1 (students and teacher will review the learning target)	**S**nowstorm: Students write down what they learned on a piece of scratch paper and wad it up. Given a signal, they throw their paper snowballs in the air. Then each learner picks up a nearby response and reads it aloud. ***Teacher note: You can modify this activity by having students throw their paper in a plastic bin, empty trash can, or other container. The teacher will then pull the notes out and read them.***
Small Group Tasks (TBA)					

Week 6	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components	**Focused Concept:Biodiversity is all the different kinds of life you'll find in one area—the variety of animals, plants, fungi, and even microorganisms like bacteria that make up our natural world. Each of these species and organisms work together in ecosystems, like an intricate web, to maintain balance and support life.** **The biodiversity of biomes and ecosystems are of importance to all living things. A biome is a different form of an ecosystem in which a large land area with a distinct climate and plants and animal species exist. The ecosystem is an interaction of the living and non- living components in an environment. It comprises a large**

of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.) c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)	**geographical area covering a vast distance.**
SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

Phenomenon: Available in the opening activities			**DQ: Why is biodiversity important?**		
Learning Target:	**Day 26**	**Day 27**	**Day 28**	**Day 29**	**Day 30**
The students will be able to (SWBAT)	**SWBAT** understand relationships and interactions between species.	**SWBAT** examine the importance of protecting and conserving biodiversity.	**SWBAT** determine how biodiversity differs between ecosystems.	**SWBAT** investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	**SWBAT** identify the location of different biomes on a world map and explain the interrelationship between environmental factors and the plants and animals within a biome.
Opening	The teacher will have students study the image of	The teacher will have students study the picture	The teacher will conduct a brief recap of the previous	Before starting the day's lesson, the teacher will	The teacher will open the lesson by asking students

	the gray wolf on page 133 of the student textbook. The teacher will ask students what they notice about the picture? (The goal is to have students observe the image). After a few students have responded, the teacher will ask "What can be done to protect the endangered gray wolf and its ecosystem in Yellowstone National Park?" (Some students may not know where Yellowstone is; show students where it is on a map). After asking "What can be done to protect the endangered gray wolf and its ecosystem in Yellowstone National Park?", ask students why they think protecting the wolves is important? The teacher will then play the video "How Wolves Change Rivers" As students are watching the video or shortly afterwards, students can complete the nine question worksheet How Wolves Chang…	on page 137 and answer the Encounter the Phenomenon. The teacher will lead students into a short discussion into why students believe it is important that Madagascar has so many species. The teacher will introduce the term biological hot spot and relate it to biodiversity. ***What makes a biodiversity hotspot?*** ***Biodiversity Hotspots*** ***What are biodiversity hotspots? To qualify as a biodiversity hotspot, a region must meet two strict criteria: It must have at least 1,500 vascular plants as endemics — which is to say, it must have a high percentage of plant life found nowhere else on the planet. A hotspot, in other words, is irreplaceable.*** The video below provides a summary of why Madagascar is considered a biological/biodiversity hotspot. Biodiversity hotspot…	day's lesson. The teacher will then show an opening video entitled "Biomes". Introduction to Bio… The teacher will have students share their thoughts on the video. The teacher will then transition the lesson with the lesson questions: How does biodiversity differ between ecosystems? and "How is ecology related to geography?"	share the top five words shared at the close of the previous day's lesson. After sharing, the teacher will conduct a Study Jams review: Biomes. https://studyjams.scholastic.com/studyjams/jams/science/ecosystems/biomes.htm Teacher will show the above video and ask a series of questions to jumpstart learning.	"What characteristics make up a biome?". The question serves to assess student's understanding of the week's lesson and clear up misconceptions that still may linger. Teachers can also give students a short assessment of the week's lesson material.
Guided Practice/Transition	Students will be introduced to the Deer Predation Lab. This lab is based on a true story of wolves in Isle Royale (Keweenaw County, Michigan). Deer Predation and … ***(Teacher note: You may have to model how to graph the data for the***	The teacher will transition the lesson into the Explain the Phenomenon activity on pages 138-139. The teacher will ask students to describe the animals of Madagascar after playing the Animal Life in Madagascar video (available within the teacher resources). Teacher note: ***Do not be surprised***	The teacher will conduct a note-taking session entitled Biomes and Ecosystems. Teacher can use the lesson material presentation available below to facilitate the lesson: **Ecology Unit: BIO…** The textbook also has suggestions for teaching students about biomes and	The teacher will start the lesson by introducing the STEM case students will complete via the ExploreLearning website. Students will transition to the role of a National Park Ranger. As a national park ranger, students must restore the ecosystem of a park back to normal. They interact with populations of	The teacher will remind students to return to the Claim Evidence Reasoning graphic organizer on the Explain the Phenomenon on pages 138-139. The teacher will ask students "what are some examples of benefits humans receive from healthy ecosystems?". Students will complete a One-Minute Paper

	activity; students often reverse the x-axis and y-axis) The video below is a presentation that can be used to provide guided instructions on the day's activity. ***Deer Predation Lab…***	***if students mention the Madagascar movies. They are great examples of biodiversity especially Madagascar 2-although the movie is set more in the African savanna than the rainforest of Madagascar).*** ***DreamWorks Madag…*** The teacher will then transition the students to the Explain the Phenomenon activity. Students will be tasked with developing a claim for the following question on why it is important that so many species exist or live in an ecosystem? Students should use Madagascar as a framework. Students will then be introduced to the meaning of biodiversity.Students will be separated into small groups to discuss the photos on page 140 of the textbook. The teacher will have students record their ideas about biodiversity on page 140. The teacher will define biodiversity and the three types of biodiversity. The teacher will then have students examine the graph on page 141 of the student textbook and ask which group has the greatest amounts of biodiversity?	ecosystems located on pages 152-158.	many organisms including wolves, deer and bees. Students learn the importance of food chains and webs, and how human factors can impact the health of an environment. The teacher guide for the STEM case provides more background information and how the STEM case will progress. This information can help students who are struggling or need more support.	answering the question. ***Teacher note: One-minute papers are short written responses where students summarize their learning in one minute. This technique encourages students to reflect on their understanding of a topic.***

Independent Practice	Students will complete the lab activity "Deer: Predation or Starvation". Students will explore the relationship that exists between predator and prey and formulate an opinion for the balance of nature hypothesis that exists in ecology.	To reinforce the day's lesson, students will complete the Biodiversity reinforcement worksheet. Biodiveristy reinforc…	To reinforce the day's lesson students will complete the Biomes reinforcement worksheet. Biomes of the World…	Students will complete the Explore Learning STEM case: Ecosystems. Students will complete the STEM case assessment questions to guide their understanding of the learning target.	**Biome Map Coloring Worksheet** Students will use information read and in their interactive notebook, to identify and annotate on a world map where the major biomes of the world are located. Students will use coloring devices to assist their work.
Assessment/Summary	So what? What takeaways from the lesson will be important to know three years from now? Why?' ***Teacher note: Students may be interested in what happened to the wolves from the lab activity. National Geographic has a great documentary about the wolves and ramifications of a warming climate.*** Wolves of Isle Roya…	Students will be asked to answer this question as a closing: Predict the effects of changes in an ecosystem caused by living organisms.	Before leaving the room, students must think of one word that summarizes the lesson for themselves, then share the word with the teacher before exiting. This closing can be digitally and using Post-It notes.	Students will complete a Group Analysis activity: After completing the case, groups work on answering these questions. Student groups will use the Student Guide: Ecos… ***Teacher note: Students may be interested in being a park ranger as a career. The video link has an interview with a park ranger of Yosemite National Park. It is only 6 minutes but very interesting.*** Yosemite Ranger Tal…	The teacher will ask students "What biome would you like to visit and why?" Students will complete and discuss closing activities. Activity will serve as an informal assessment for student learning.
Small Group Tasks (TBA)					

Week 7	
GSE: S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. c. Analyze and interpret data to provide evidence for how	**Focused Concept: Biodiversity holds ecological and economic significance for humans. The benefits people obtain from ecosystems include:** **provisioning services such as food and water;** **regulating services such as flood and disease control;** **cultural services such as spiritual, recreational, and cultural benefits**

resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)	**supporting services such as nutrient cycling that maintain the conditions for life on Earth.**
SEP: Asking questions (for science) and defining problems (for engineering) Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information	**CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

Phenomenon: Available in opening activities			**DQ: How do humans benefit from biodiversity?**		
Learning Target:	**Day 31**	**Day 32**	**Day 33**	**Day 34**	**Day 35**
The students will be able to (SWBAT)	**SWBAT** construct an argument based on evidence about the impact that human activity has on marine ecosystems.	**SWBAT** describe and explain the ecosystem services that humans rely on.	**SWBAT** describe the benefits of biodiversity.	**SWBAT** describe the benefits of biodiversity.	**SWBAT** describe the benefits of biodiversity. Students will define a design problem and create a solution.
Opening	The teacher will show a physical geography map of Georgia and ask students if they have ever visited Savannah or one of the barrier islands of Georgia (From north to south along Georgia's 100-mile-long coast, the barrier islands are Tybee, Little Tybee, Wassaw, Ossabaw, St.	The teacher will complete a brief review of the previous day's lesson. The goal of this activity is to identify learning gaps and content progression. The teacher will transition to the day's learning target and lesson focus.	Today's lesson is a summation of the previous two week's lessons. Students will be assessed on their understanding of biodiversity and the role humans have on it. The teacher will open the lesson by revisiting the Encounter the Phenomenon		

	Catherines, Blackbeard, Sapelo, Wolf, Little St. Simons, St. Simons, Sea, Jekyll, Little Cumberland, and Cumberland.) The teacher will then ask students why they think they are called the "barrier islands"? ***(Teacher note: Barrier islands are called "barrier islands" because they create a barrier between the mainland and the ocean. They shelter and protect the mainland from the powerful forces of wind, waves, tides, currents and the ravages of storms and hurricanes. They shelter the estuaries that form behind the barriers.)*** The teacher will then explain that students are "traveling"to the barrier islands of Georgia to a salt-water marsh to learn the role marshes play in protecting the coastline. The teacher will stream the 8-minute video available via Let's Go Enviro via Georgia PBS. gpb.pbslearningmedia.org/resource/introduction-changes-earths-ecosystems/unit-2-stability-and-change-in-ecosystems-lets-go-enviro/?student=true&focus=true		question: Why is it important that so many species exist in the rain forests of Madagascar? By asking this question, students should be able to articulate "Why is biodiversity important?" Students will complete the Three Dimensional Thinking prompt located on page 165-166 of the student textbook as Learning Check-in. Students can also be assigned the lesson check available in the teacher online resources.		
Guided Practice/Transition	Students will complete The Value of Biodiversity in Ecosystems learning activity. The teacher will assign students a specific ecosystem or allow students to choose an	The teacher will hand out a hardcopy of the poem with the analysis questions. The teacher will read and/or play the poem, A World Without Plants.	The teacher will transition the students to the STEM Module Project. The teacher will read the introduction for Good "Greef"The Corals are Dying! on page 185 of the		

	ecosystem and provide students with the directions below: *Select a specific ecosystem. It can be one local to your community or from far away. Then, identify a keystone species, an invasive species, a native species, an endemic species, a threatened or endangered species, and an indicator species that can be found within this ecosystem. In the box next to the species, write at least one way the species impacts that ecosystem. Then, write at least one way humans impact each species.* **LGE_What-Can-Be-…**	Imagine a World Wit… Students will complete the Poem Analysis Questions assigned by the teacher. After allowing students time to complete the poem analysis questions, the teacher will allow students to share their answers to the analysis questions. The teacher will then transition to the day's lesson focus: Biodiversity and Humans: Ecosystem Services Essential question: How can we protect and sustain biodiversity and ecosystem services? The lesson presentation slides are available here Ecological Serivces … The teacher will hand out the Ecosystem Services worksheet to students. ecosystem_services.… ***Teacher note: The last two pages of the worksheet contain the card sort activity cards. Please make a copy of pages 5-7 for each group, not students.*** Students will complete two activities (one guided and one independent practice): 1. Ecosystem Services Jigsaw Students will be placed in groups of four and assigned	students textbook. Students and teachers will work through the requirements of the project with students completing the Planning After Lesson 1. The teacher will remind students that the information from previous lessons will serve them well with the STEM Module project.		

		one ecosystem service to take notes on. Each member of the expert group will be assigned a number 1-4. For the second part of the jigsaw each member of the expert group will join their number group members. Example: go to join the 1s, 2s, 3s, etc. groups and share your Expert group notes with your new group members. http://www.fao.org/ecosystem-services-biodiversity/en/			
Independent Practice	Students will construct a letter to the Environmental Protection Agency and its Environmental Justice Unit with research about the ecosystem identified during the Guided Practice portion of the lesson. Students will use the tools below to help construct their argument. • Persuasion Map: This tool helps students break down their argument into reasons and supporting details, which will help them write their letter. • Letter Generator: Students can use this tool to identify the different parts of a letter, and use the sample provided	The second activity will be conducted as an independent practice group activity. Students will complete a card sort activity. The following instructions will be given to students: 1. As you work through the following steps, complete the table on the next page. 2. Set out the "Ecosystem Service" cards on your table. 3. Match the "Example Cards" to the "Ecosystem Service" cards. 4. Match the "Disruption Card(s)" with the ecosystem service. Read the scenario and discuss with your group how this disturbance would impact the services provided by the ecosystem. 5. Propose a solution(s) that can be implemented to minimize the impact of the	Students will complete Planning After Lesson 2 on page 187 of the student textbook in learning pairs or triads. The teacher will have a class discussion of some factors that threaten biodiversity in coral reefs. The teacher will remind groups that a measure of success of their design is the amount of biodiversity on their reef.		

	as a model for writing their own letters.	disturbance on the ecosystem service provided.			
Assessment/Summary	Students will share their letters with peers and the teacher. The teacher will conduct a short review of the learning target and gauge the student's understanding of the learning target and the standard.	So what? What takeaways from the lesson will be important to know three years from now? Why?	The teacher will close the lesson with a review of the rubric of the STEM Module. Students will use the next two class days to complete the STEM Module Challenge.		
Small Group Tasks (TBA)					

Week 8					
GSE:		**Focused Concept:**			
SEP:		**CCC:**			
Phenomenon:			**DQ:**		
Learning Target:	**Day**	**Day**	**Day**	**Day**	**Day**
The students will be able to (SWBAT)	**SWBAT**	**SWBAT**	**SWBAT**	**SWBAT**	**SWBAT**
Opening					
Guided					

Practice/Transition					
Independent Practice					
Assessment/Summary					
Small Group Tasks (TBA)					

Assessment Prep

Prepare students for assessment by reviewing the following Assessment Prep Presentation.

Unit Four Assessment Prep

Ecology Assessment review questions (Teachers may use these questions to create short exit tickets, quizzes, or summative tests. The correct answers are in **BOLD. Please make a copy of the document and unbold the correct answers before using with students).**

Provide the following guidance:

Ask the students to use what they know about the tasks completed to answer the provided assessment prep question.

- What is the question asking you?
- What do you know about the vocabulary or concept in the question?
- Is this question similar to any investigations or tasks we've completed?
- How can what you've done help you answer this question?
- Just view the assessment question: What is the question asking you?

Guide students to think about how their experience connects to the question.

Using the answer choices provided, ask the students the following:

- Identify a wrong answer: How do I know this answer is incorrect?
- Identify the right answer: How do we know this answer is correct?

Allow the students time to discuss in collaborative groups.

TEACHER NOTE: If students struggle with the question, review it the next day. Do not rush to the next question; instructional time is the only time they have to prepare for the end-of-year assessment.

Labs / Investigations		
Mandatory Labs	**Explore Learning Gizmo**	**Pivot Interactives/Phet**
ADI Lab:	**Water Pollution** **Coral Reefs-Abiotic Factors** **Coral Reefs-Biotic Factors**	

Lab 9: Population growth: what factors limit the size of a population of yeast? **Lab 10: Predator-prey relationships: how is the size of a predator population related to the size of a prey population? (The Deer Predation Lab activity can be done instead)** **Lab 11: Food webs and ecosystems: which member of the ecosystem would affect the food web the most is removed? (could be part of a performance task)**	**Forest Ecosystems** **Food Chains**	

Additional Resources/Tasks	
Supplemental Resources	Introduction to Characteristics of Living Things Lesson Needs of Living things lesson material and video Characteristics of Living Things quiz Cell Theory Review Worksheet ADI Life Science Resource Book Amoeba Sisters Youtube Playlist Photosynthesis and Cellular Respiration Worksheet CommonLit