



Grade 7 Science – Course 2

Unit # 1- Life Science

Topic 5 Populations, Communities, and Ecosystems – 18 Days

Unit Overview Students will understand and apply scientific concepts, principles, and theories pertaining to the living environment setting and recognize the historical development/multicultural involvement of the ideas in science. Main ideas include: living things are alike yet different, structures in living things are related to their function and living things interact with their environment. Students consider systems and how they interact as they investigate cell function and cellular processes as well as exploring the human body as a system model, driven by the flow of energy and the cycling of matter. This leads to the study of reproduction and the plant and animal structures that support it. Students consider stability and change as a core concept in the biosphere.

Topic Essential Question: How do living and nonliving things affect one another?

Lessons

- Topic Launch/Quest Kickoff
- Lesson 1 Interactions in Ecosystems
- Lesson 2 Dynamic and Resilient Ecosystems
- Lesson 3 Biodiversity
- Lesson 4 Ecosystem Services
- Topic Close –Assessment, Quest Findings

NYSSLS Performance Expectations

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms in a variety of ecosystems. [Clarification Statement: Emphasis is on predicting patterns of interactions such as competition, predation, mutualism, and parasitism in different ecosystems in terms of the relationships among and between organisms.]

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy associated with the ecosystem, and on defining the boundaries of the ecosystem.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about shifts in populations due to changes in the ecosystem.]

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and protecting ecosystem stability.* [Clarification Statement: Examples of ecosystem protections could include water purification, waste management, nutrient recycling, prevention of soil erosion, and eradication of invasive species. Examples of design solution constraints could include scientific, economic, and social considerations.]

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Topic Opener

PE: MS-LS2-5; ETS 1-1

SEP: Constructing Explanations and Designing Solutions

DCI:

LS4.D – Biodiversity and Humans

- Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)
- (NYSED) Humans impact biodiversity both positively and negatively. (secondary to MS-LS2-5)

ETS1.A – Defining and Delimiting Engineering Problems

- The more precisely a design task’s criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MSETS1-1)

CCC: Cause and Effect

Savvas

Highlighted labs are important to the understanding of the instructional concepts in this lesson and must be completed during Science instructional time.

- Topic Readiness Test
- **uConnect Lab – How Communities Change**
- Quest Kickoff Video – Should an Animal Crossing be Constructed in my Community?

CLRI Connections:

- Article: “[Not just ivory - another threat for Asian elephants?](#)”

For centuries, people have hunted and killed both African and Asian elephants for their ivory. Despite many efforts to protect these animals, elephant populations worldwide are still declining. The rapidly increasing human population on the other hand has led to elephants’ habitat shrinking. Poachers in Myanmar have started to kill elephants for their skin and meat instead of just their ivory. This makes all elephants a target, including females and juveniles, not only the males who have tusks. Myanmar has the largest remaining natural areas suitable for sustaining elephant populations, so a rapid decline in their populations there would pose a great risk to their global populations.

<p><u>Lesson 1 – Interactions in Ecosystems</u> PE: MS-LS2-1; MS-LS2-2 SEP: Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions DCI: LS2.A – Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1) Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2) <p>CCC: Patterns; Cause and Effect</p> <p>zSpace Activities (code) Camouflage: Nature’s Disguise (A520) Camouflage: Nature's Disguise - Teacher Activity Plan In this activity, students will learn how natural selection has enabled successive generations of animals to develop different types of camouflage that helps them to survive in their particular environments. Camouflage: Nature's Disguise - Student Worksheet 1 Camouflage: Nature's Disguise - Student Worksheet 2 Camouflage: Nature's Disguise - Student Worksheet GoogleDoc</p> <p>Peppered Moth (A065) Peppered Moth - Teacher Activity Plan Students will create models and a presentation demonstrating their understanding of adaptations and how organisms survive in certain environments. Peppered Moth - Student Worksheet 1 Peppered Moth Student Worksheet 2 Peppered Moth - Student Worksheet GoogleDoc</p> <p>Adaptations to Ecosystems (A292) Adaptations to Ecosystems - Teacher Activity Plan In this activity, students will construct an explanation of how genetic variations of traits can increase an organism’s chance of surviving and reproducing. Adaptations to Ecosystems - Student Worksheet Adaptations to Ecosystems - Student Worksheet GoogleDoc</p>	<p>Savvas Guiding Objectives:</p> <ul style="list-style-type: none"> Students will analyze and interpret data to predict the cause and effect of: The amount and availability of a given resource on its population; resource availability on competition. Students will identify and describe evidence that predatory interactions and symbiotic relationships influence population size. Students will construct explanations using reasoning that predict similar patterns of competitive, predatory, and symbiotic interactions across ecosystems. <p>Literacy Connection</p> <ul style="list-style-type: none"> Determine Central Idea <p>Vocabulary</p> <ul style="list-style-type: none"> niche competition predation symbiosis commensalism mutualism parasitism <p>Academic Vocabulary</p> <ul style="list-style-type: none"> Interactions <p>Connect - TE/SB p.236</p> <ul style="list-style-type: none"> Connect It! Quest Connection Write: Competition in Daily Life <p>Investigate - TE/SB pp.237-243</p> <ul style="list-style-type: none"> Investigate Lab – Competition and Predation Video – Interactions in Ecosystems Interactivity – Symbiotic Relationships Interactivity – Life on the Reef Model It! (p.240) Literacy Connection (p.242) Reading Checks (pp.238; 241) Math Toolbox (p.241) <p>Synthesize - TE/SB pp. 244-245</p> <ul style="list-style-type: none"> Interactivity: Shared Interactions Quest Check-In Interactivity – Research Animal Crossings Quest Check-In Reading Check (p.244) <p>Demonstrate – TE/SB p.245</p> <ul style="list-style-type: none"> Lesson 1 Check Lesson Quiz 1
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Lesson 2 – Dynamic and Resilient Ecosystems

PE: MS-LS2-1; MS-LS2-2; MS-LS2-4

SEP: Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions; Engaging in Argument from Evidence

DCI:

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)
- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

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)

CCC: Patterns; Cause and Effect; Stability and Change

Savvas

Guiding Objectives:

- Students will construct an argument supported by physical evidence that explains how changes to physical or biological components of an ecosystem affect organisms and populations.
- Students will construct explanations that predict patterns of relationships between changes in the components of an ecosystem and changes in populations.
- Students will analyze and interpret data to predict the cause and effect of human impacts on ecosystems.

Literacy Connection

- Write Arguments

Vocabulary

- succession
- pioneer species

Academic Vocabulary

- colonize
- dominate

Connect - TE/SB p. 246

- Connect It!
- Quest Connection
- Class Discussion: Ecosystem Disruptions

Investigate - TE/SB pp. 247-250

- Video – Ecosystems: Dynamic and Resilient
- **Investigate Lab – Primary or Secondary**
- Interactivity – Succession in an Ecosystem
- Reading Check (pp.248; 250)
- Model It! (p.248)

Synthesize – TE/SB pp. 251-252

- Interactivity – A Butterfly Mystery
- Quest Check-In Interactivity – Community Opinions
- Quest Check-In

Demonstrate – TE/SB p.252

- Lesson 2 Check
- Lesson 2 Quiz

Lesson 3: Biodiversity

PE: MS-LS2-4; MS-LS2-5

SEP: Engaging in Argument from Evidence

DCI:

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)
- (NYSED) Biodiversity describes the variety of species found in Earth’s ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)

LS4.D – Biodiversity and Humans

- Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)
- (NYSED) Humans impact biodiversity both positively and negatively. (secondary to MS-LS2-5)

ETS1.B – Developing Possible Solutions

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2),(MS-ETS1-3)

CCC: Stability and Change

Savvas

Guiding Objectives:

- Students will cite textual evidence to describe: Direct and indirect values of biodiversity; the need to protect biodiversity globally.
- Students will determine central ideas to identify factors that affect biodiversity.
- Students will use ration reasoning to explain how human population density affects biodiversity.

Literacy Connection

- Cite Textual Evidence

Vocabulary

- biodiversity
- keystone species
- extinction
- invasive species

Academic Vocabulary

- value
- economic

Connect - TE/SB p.254

- Connect It!
- Quest Connection
- Class Discussion: Biodiversity and Humans

Investigate - TE/SB pp. 255-262

- **Investigate Lab – Modeling Keystone Species**

- Video - Biodiversity
- Interactivity – Biodiversity in the Amazon
- Question It! (p.259)
- Reading Check (pp.256; 257; 259; 262)
- Math Toolbox (p.260)
- Literacy Connection (p.256)

Synthesize - TE/SB pp. 263-265

- Interactivity – Human Impacts on Biodiversity
- Quest Check-In Lab – Design and Model a Crossing
- Quest Check-In
- Reading Check (p.264)

Demonstrate – TE/SB p.265

- Lesson 3 Check
- Lesson 3 Quiz

<p><u>Lesson 4: Ecosystem Services</u> PE: MS-LS2-3; MS-LS2-5 SEP: Engaging in Argument from Evidence DCI: LS4.D – Biodiversity and Humans</p> <ul style="list-style-type: none"> Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5) (NYSED) Humans impact biodiversity both positively and negatively. (secondary to MS-LS2-5) <p>CCC: Stability and Change</p>	<p>Savvas Guiding Objectives:</p> <ul style="list-style-type: none"> Students will write arguments that: Cite textual evidence on the role of a healthy ecosystem; support a position on the importance of maintaining healthy ecosystems. Students will explain which supporting services are necessary for all other ecosystems. Students will explain which supporting services are necessary for all other ecosystems. Students will cite textual evidence for the impact of biodiversity on ecosystem services. <p>Literacy Connection</p> <ul style="list-style-type: none"> Write Arguments <p>Vocabulary</p> <ul style="list-style-type: none"> ecosystem services natural resources sustainability ecology conservation ecological restoration <p>Academic Vocabulary</p> <ul style="list-style-type: none"> regulation <p>Connect - TE/SB p.268</p> <ul style="list-style-type: none"> Connect It! Quest Connection Write: Diverse Systems <p>Investigate - TE/SB pp. 269-275</p> <ul style="list-style-type: none"> Investigate Lab – Ecosystem Impacts* Video – Ecosystem Services Interactivity – Maintaining Healthy Ecosystems Interactivity: Preventing Soil Erosion Design It! (p.275) Reading Check (pp.271; 272; 274; 275) Math Toolbox (p.271) Literacy Connection (p.275) <p>Synthesize - TE/SB pp. 275-276</p> <ul style="list-style-type: none"> Interactivity – Walk this Way or That Way <p>Demonstrate – TE/SB p.276</p> <ul style="list-style-type: none"> Lesson 3 Check Lesson 3 Quiz <p>* Denotes accompanying lab video</p>
<p>Topic Close</p> <ul style="list-style-type: none"> Topic 5 Assessment and Remediation TE/SB pp. 278-281 Quest Finding and Reflection TE/SB p. 281 	<p><u>Topic 5 Enrichment</u></p> <p>Topic 5 - Lesson 1 Enrichment</p> <ul style="list-style-type: none"> Enrichment – Analyzing Predator-Prey Interactions <p>Topic 5 - Lesson 2 Enrichment</p> <ul style="list-style-type: none"> Virtual Lab – The Icy World of Polar Bears Enrichment – Monitoring Succession After the Eruption of Krakatau Careers – Field Biologist (p.253) Career Video – Field Biologist: Marine Biology <p>Topic 5 - Lesson 3 Enrichment</p> <ul style="list-style-type: none"> Enrichment – Biodiversity Case Study – The Dependable Elephant(pp.266-267) <p>Topic 5 - Lesson 4 Enrichment</p> <ul style="list-style-type: none"> Enrichment – Commercial Fishing Design Challenge – Building a Dome (p.277)

<p>English Language Learners (ELL) Enhancements</p> <p>To access hyperlinked material, you must be logged into your BPS Google Drive</p>	<p><u>Listening</u></p> <ul style="list-style-type: none"> ● <u>Cross- Linguistic Practices</u>: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates). ● <u>Activating Prior Knowledge</u> Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content. ● <u>Visuals</u> - GIFs, pictures- will assist students in understanding what they are listening to. Use <u>visual thinking strategies</u> to set the lens for learning. ● Video to review or introduce a topic – use <u>closed captioning</u> to help students see the words and pronunciations while they listen to the content. ● <u>Word stretching / Vowel stretching</u> when instructing allows students to listen closely to the pronunciation of the word. ● <u>Performance Level Descriptors</u> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. Scroll for grade 7.
	<p><u>Speaking</u></p> <ul style="list-style-type: none"> ● <u>Sentence Stems/Frames</u> - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i> ● <u>Academic Conversation Starters</u>: Have a visual of a list of academic sentence starters that students can refer to in a discussion. ● <u>Choral Reading</u> - To build fluency, self-confidence and motivation with reading/speaking. ● Create <u>movement</u> to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning. ● <u>Performance Level Descriptors</u> This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grade 7.
	<p><u>Reading</u></p> <ul style="list-style-type: none"> ● Supplementary Text to help reinforce concepts. ● <u>Visual Aids</u> - Pictures or models to support vocabulary words and concepts ● Video to review or introduce a topic - use <u>closed captioning</u> to help students read along while they listen to the content. ● <u>4 Square / Frayer models</u> to help students gain a deeper understanding of vocabulary. ● <u>Highlighting</u> important text to assist students in answering questions after the reading. ● <u>Chunking</u>-Break reading of text into chunks or paragraphs ● <u>Vocabulary Morphology</u>- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary. ● <u>Performance Level Descriptors</u> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grade 7.
	<p><u>Instructional Accommodations (depending on the student’s needs)</u></p> <ul style="list-style-type: none"> ● Extended time for tests in class, projects and assignments ● Directions read. Broken down as necessary ● Model how to complete the activity in the lesson ● Oral simplification of directions or questions ● Translated version of test when available. Student may have both version English and native language version ● Use of <u>approved bilingual glossaries</u> from NYS in each subject
	<p><u>Instructional</u></p> <ul style="list-style-type: none"> ● Pre-teach vocabulary

<p>Special Education Modifications</p> <p>Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<ul style="list-style-type: none"> ● Use picture vocabulary ● Scaffold Depth of Knowledge questions ● Provide copy of notes/notes in “cloze” form ● Use of Think, Pair, and Share strategy to help process information ● Scaffold written assignments with the use of graphic organizers ● Allow for multiple ways to respond (verbal, written, response board) ● Provide model of performance task ● Modify informational text to fit the needs of the students ● Provide a digital or paper interactive notebook ● Present complex tasks in multiple ways ● Provide mnemonic strategies for scientific concepts <p>Technology:</p> <ul style="list-style-type: none"> ● Audio reading of text ● Text to type functions ● Videos to clarify/visualize science concepts ● Record class lecture/discussions and make accessible to student ● Nearpod- interactive presentations of notes <p>In Class Assessments</p> <ul style="list-style-type: none"> ● Provide multiple options for projects ● Use of timer in class ● Break all complex tasks into chunks
<p>Step Up to Writing</p> <p>Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder □ Grade 5 Resources □ Grade 5 SUTW materials</p>	<ul style="list-style-type: none"> ● Easy Two-Column Notes ● Breaking Down Definitions ● Paragraph Frame- What I Learned ● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing.
<p>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</p>	<ul style="list-style-type: none"> ● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications ● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population ● All students are given an opportunity to engage in science discourse ● Teacher demonstrates high expectations for all students