Grade 7
Module C Dimensions
Ecology

New Jersey Student Learning Standards

Established	2016-2017
Revised	2017-2018
Revised	2018-2019
Revised	2019-2020
Revised	2020-2021
Revised	2022-2023

Marking Period	Unit Title	Recommended Instructional Days
4	**Ecology and the Environment**	**35 Days**

NJSLS - Science: *Title*	NJSLS - Science: *Performance Expectations*	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
Ecosystems: Interactions, Energy and Dynamics	**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. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an	**Essential Question/s:** 1. How do organisms obtain and use matter and energy? 2. How do matter and energy move through an ecosystem? 3. How do organisms compete for resources? 4. In what ways do organisms interact within ecosystems? 5. What types of relationships exist in an ecosystem? 6. How do food chains, food webs, and energy pyramids demonstrate how matter and energy are transferred in ecosystems? 7. What factors contribute to the need for organisms to compete for resources? 8. How does biodiversity contribute to the success of an ecosystem? **Activity Description:** ❖ Unit Phenomenon: Can you explain it? ❖ Hands-on Lab: Investigate Decomposition

	ecosystem affect populations. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	❖ Take It Further: Chemotrophs ❖ Hands-On Lab: Investigate the Effect of Sunlight on Elodea ❖ Take It Further: Fermentation ❖ Virtual Lab: Observing Photosynthesis ❖ Virtual Lab: What Affects Photosynthesis Rate ❖ Hands-On Lab: Model Energy Flow in an Ecosystem ❖ Hand-Ons Lab: Investigate Your Schoolyard ❖ Hands-Ons Lab:Investigate Effects of Limited Resources ❖ Hands-On Lab: Simulate Feeding Relationships ❖ Virtual Lab: Changes in Ecosystems ❖ Virtual Lab: Competing for Resources ❖ Hands-On Lab: Measure Biodiversity ❖ Hands-On Lab: What Factors Influence a Population Change ❖ Hands-On Lab: Model Habitat Fragmentations
From Molecules to Organisms: Structures and Processes	**MS-LS1-6** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. **MS-LS1-7** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	
Engineering Design	**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	**Lab and engineering activities will incorporate these skills:** ● Planning and Organization ● Critical Thinking ● Communication in a group ● Decision Making ● Reflection on activity and participation **Spotlight on scientists and their accomplishments** Ex. Richard Summerbell - Mycologist

	possible solutions. **MS-ETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3.** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **MS-ETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process	Lauren Esposito - Arachnologist George Washington Carver- Botanist/Ecologist Human Impacts on Earth Human activity can cause disturbances in ecosystems. HMH: Book C Unit 3 Lesson 2 - Changes in Ecosystems **<u>Interdisciplinary Connection: Content: (NJSLS#)</u>** **<u>Connections to Math:</u>** ● Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. **(6.EE.C.9)** ● Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. **(6.SP.A.2)** ● Summarize numerical data sets in relation to their context. **(6.SP.B.4)** **<u>Connections to Language Arts:</u>**
FOUNDATION	**FOUNDATION**	

Disciplinary: ***Core Idea***	**Disciplinary:** ***Statement***	
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) Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so	• Cite specific textual evidence to support analysis of science and technical texts. **(RST.6-8.1)** • Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. **(RST.6-8.2)** • Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. **(RI.6.8)** • Write arguments focused on discipline content. **(WHST.6-8.1)** • Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. **(WHST.6-8.2)** • Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. **(WHST.6-8.7)** • Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. **(WHST.6-8.8)** • Draw evidence from informational texts to support analysis, reflection, and research. **(WHST.6-8.9)** • Integrate multimedia and visual displays into presentations to clarify information, strengthen

	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)	claims and evidence, and add interest. **(SL.8.5)**
LS2.B: Cycle 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) Biodiversity describes the variety of species found in Earth's terrestrial and oceanic 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)	
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. (secondary to MS-LS2-5)	
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)	
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)	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Developing and Using Models **Analyzing and Interpreting Data**	Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and	

	causation, and basic statistical techniques of data and error analysis.	
Constructing Explanations and Designing Solutions	Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.	
Engaging in Argument from Evidence	Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Patterns	Patterns can be used to identify cause and effect relationships. (MS-LS2-2)	

Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1)	
Energy and Matter	The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3) 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)	
Stability and Change	Small changes in one part of a system might cause large changes in another part. (MS-LS2-4),(MS-LS2-5)	
Connections to Engineering, Technology, and Applications of		

Science **Influence of Science, Engineering, and Technology on Society and the Natural World**	The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5)	
Connections to Nature of Science **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**	Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)	
Science Addresses Questions About the Natural and Material World	Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)	

Scientific Knowledge is Based on Empirical Evidence	Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4) Science knowledge is based upon logical connections between evidence and explanations. (MS-LS1-6)	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Responsible Decision-Making Relationship Skills Self-Management Social Awareness	● Develop, implement, and model effective problem-solving and critical thinking skills ● Utilize positive communication and social skills to interact effectively with others ● Recognize the skills needed to establish and and achieve personal and educational goals ● Demonstrate an understanding of the need	

Self Awareness	for mutual respect when viewpoints differ. ● Demonstrate an awareness of the expectations for social interactions in a variety of ways. ● Recognize the importance of self-confidence in handling daily tasks and challenges	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: ● Diagnostic tests used to modify teaching and learning activities to improve student attainment	**Benchmarks:** ● District Assessment **Summative Assessments:** ● End of unit/chapter tests/lesson quizzes

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
● **Interactive Worktext** ● **Equipment Kits** ● **Online Simulations** ● **Evidence Notebook**	● Multilingual Glossary ● Sciencesaurus ● Online Science Tools (Scientific Calculator,	● Multilingual Glossary ● Sciencesaurus ● Online Science Tools (Scientific Calculator,	● Online Simulations ● CK 12 ● Virtual Labs ● Webquests

• **Lab Safety Handbook** • **CK 12** • **Virtual Labs** • **Hands on Labs** • **Online Science Tools** • **(Scientific Calculator, Graphing)** • **BrainPop Science** • **IXL Science**	Graphing) • BrainPopEspanol	Graphing) • BrainPop ELL	• PHET • Video-Based Projects • Take It Further • You Solve It! • Unit Performance Tasks • Unit Projects • Online Science Tools (Scientific Calculator, Graphing) • IXL Science • BrainPop Science
Supplemental Resources			
Technology: • **8.1.8.A.1, 8.1.8.A. 2, 8.1.8.A.3, 8.1.8.A. 4, 8.1.8.A. 5** **Other:** • CRP4 Communicate clearly and effectively and with reason. • CRP6 Demonstrate creativity and innovation • CRP7 Employ valid and reliable research strategies • CRP11 Use technology to enhance productivity			
Differentiated Student Access to Content: ***Recommended Strategies & Techniques***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

• **Large group instruction** • **Small group instruction** • **Think Pair Share** • **Peer editing** • **Cooperative group work** • **Multimedia presentations** • **Manipulatives** • **Choice Boards/Learning Menus**	• Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	• Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	• Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: 1.Career Awareness and Planning, 2.Creativity and Innovation, 3.Critical Thinking and Problem Solving, 4.Global and Cultural Awareness 5. Digital Citizenship 6. Information and Media Literacy 7. Technology Literacy**	
	Core Ideas:	**1. There are a variety of resources available to help navigate the career planning process.** **2. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.** **3. Multiple solutions often exist to solve a problem.** **4. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.** **5. Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.** **6. Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.** **7. Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others**
	Performance Expectation/s:	**1. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.** **2. 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).** **3. 9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).** **4. 9.4.8.GCA.2: Demonstrate openness to diverse ideas and**

		perspectives through active discussions to achieve a group goal. 5. 9.4.8.DC.1: Analyze the resource citations in online materials for proper use. 5. 9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8). 6. 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations. 7. 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4). 7. 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
	Career Readiness, Life Literacies, & Key Skills Practices	
	• Act as a responsible and contributing community member and employee. • Demonstrate creativity and innovation. • Utilize critical thinking to make sense of problems and persevere in solving them. • Consider the environmental, social and economic impacts of decisions. • Use technology to enhance productivity, increase collaboration and communicate effectively. • Work productively in teams while using cultural/global competence.	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	X	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*