Grade 7
Trimester 2
Unit 5 The Chemistry of Materials
Unit 3 Matter and Energy in Living Systems
Unit 4 Ecosystem Dynamics

New Jersey Student Learning Standards

Established	2016-2017
Revised	2017-2018
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Marking Period	Unit Title	Recommended Instructional Days
Trimester 2	Unit 5 The Chemistry of Materials, Unit 3 Matter and Energy in Living Systems, and Unit 4 Ecosystem Dynamics	**60 Days**

NJSLS - Science: *Title*	NJSLS - Science: *Performance Expectations*	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
Matter and Its Interactions **From Molecules to Organisms: Structures and Processes** **Ecosystems: Interactions, Energy and Dynamics**	**MS-PS1-3** Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. **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. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on	**Essential Question/s:** **Unit 5 The Chemistry of Materials** 1. How do the properties of synthetic materials compare to the properties of the starting materials? 2. How do society and the environment influence the design, manufacture, use, and disposal of synthetic materials? **Unit 3: Matter and Energy in Living Systems** 3. How do matter and energy obtained by an organism move through an ecosystem? 4. How does resource availability affect individuals and populations in an ecosystem? 5. How do food chains, food webs, and energy pyramids demonstrate how matter and energy are transferred in ecosystems? 6. In what ways do organisms interact within ecosystems?

	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 ecosystem affect populations. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **MS-ETS1-2** Evaluate competing	**Unit 4: Ecosystem Dynamics** 7. How does biodiversity contribute to the success of an ecosystem? 8. How do changes at different scales within the ecosystem affect its populations? 9. How do identifying problems within an ecosystem lead to finding solutions to maintain the health of the ecosystem? **Activity Description:** ❖ Lesson Phenomenon ❖ Unit Opener: Can you Explain it? ❖ "Take it Further" activities **Unit 5 The Chemistry of Materials** ❖ Hands on Lab: Make a Synthetic Material ❖ Hands on Lab: Sort Synthetic Materials Using Properties **Unit 3: Matter and Energy in Living Systems** ❖ Hands on Lab: Investigate the Effect of Sunlight on Elodea ❖ Hands on Lab: Investigate Effects of Limited Resources ❖ Hands on Lab: The Predator-Prey Game ❖ Hands on Lab: Investigate Decomposition ❖ Hands on Lab: Model Energy Flow in an Ecosystem

	design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	❖ Virtual Lab: Observing Photosynthesis **<u>Unit 4: Ecosystem Dynamics</u>** ❖ Hands on Lab: Measure Biodiversity ❖ Hands on Lab: Identify Factors That Influence a Population Change ❖ Hands on Lab: Bridging Alligator Alley ❖ Virtual Lab: Changes in Ecosystems **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** Example: Richard Summerbell - Mycologist Lauren Esposito - Arachnologist George Washington Carver- Botanist/Ecologist Rodolfo Dirzo, Terrestrial Ecologist Charles Elton, Ecologist Geerat Vermeij, Evolutionary Biologist and Paleobiologist **Human Impacts on Earth**
FOUNDATION **Disciplinary:** ***Core Idea***	**FOUNDATION** **Disciplinary:** ***Statement***	
PS1.A Structure and Properties of Matter	Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2), (MS-PS1-3) Gases and liquids are made of molecules or inert atoms that are moving about relative to each	

PS1.B Chemical Reactions	other. (MS-PS1-4) In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1) The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4) Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules,	*Human activity can cause disturbances in ecosystems. **<u>Interdisciplinary Connection: Content: (NJSLS#)</u>** **<u>Connections to Mathematics:</u>** ● Reason abstractly and quantitatively. **(MP.2)** ● Model with mathematics. **(MP.4)** ● Use ratio and rate reasoning to solve real-world and mathematical problems. **(6.RP.A.3)** ● Analyze proportional relationships and use them to solve real-world and mathematical problems.**(7.RP.A)** ● Summarize numerical data sets in relation to their content. **(6.SP.B.5)** ● Solve unit rate problems including those involving unit pricing and constant speed.**(6.RP.A.3.b)** ● Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities **(6.RP.A.3.d)** **<u>Connections to Language Arts:</u>** ● Cite specific textual evidence to support analysis of science and technical texts. (**RST.6-8.1)** ● 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

	and these new substances have different properties from those of the reactants. (MS-PS1-2), (MS-PS1-3), (MS-PS1-5) The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5) Some chemical reactions release energy, others store energy. (MS-PS1-6)	standard format for citation. **(WHST.6-8.8)** ● Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. **(SL.8.4)** ● Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. **(SL.8.5)** ● 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)** ● Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **(RST.6-8.7)** ● Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **(WHST.6-8.2)** ● Draw evidence from informational texts to support analysis, reflection, and research. **(WHST.6-8.9)** ● Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (**RI.7.8)** ● Write arguments focused on content. **(WHST.6-8.1)**
ESS3.C Human Impacts on Earth Systems **ETS1.A Defining and Delimiting Engineering Problems**	Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be	

LS2.A Interdependent Relationships in Ecosystems	successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) 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	

LS1.C Organization for Matter and Energy Flow	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) 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)	

LS2.B Cycle of Matter and Energy Transfer in Ecosystems	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) 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)	

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. 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.	
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)	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Planning and Carrying Out Investigations	Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and	

	progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.	
Developing and Using Models	Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena design systems.	
Analyzing and Interpreting Data	Analyzing data in 6–8 builds on K–5 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	

Engaging in Argument from Evidence	sources of evidence consistent with scientific ideas, principles, and theories. 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 worlds.	
Obtaining, Evaluating, and Communicating Information	Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-PS1-3)	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Cause and Effect	Cause and effect relationships may be used to predict phenomena	

	in natural or designed systems. (MS-LS2-1)	
Scale, Proportion, and Quantity	Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-PS1-1)	
Structure and Function	Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS1-3)	
Systems and System Models	Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems. (MS-PS3-2)	
Stability and Change	Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.	

	(MS-ESS2-1)	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Responsible Decision-Making Relationship Skills Self-Management Social Awareness 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 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** ● **Lab Safety Handbook**	● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing)	● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing)	● Online Simulations ● Virtual Labs ● Webquests ● Video-Based Projects ● Take It Further ● You Solve It ! ● Unit Performance Tasks ● Unit Projects

			• Online Science Tools (Scientific Calculator, Graphing)

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: Career Education

- 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**	• Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional	• Extend time requirements, preferred seating, positive reinforcement, check often for understanding/revie	• Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate

• **Multimedia presentations** • **Choice Boards/Learning Menus** • **Manipulatives**	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.	w, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	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*