Marking Period	Unit Title	Recommended Instructional Days
1	**Organic Chemistry and Cycling of Matter**	**20 Days**

NJSLS - Science: *TItle*	NJSLS - Science: *Performance Expectations*	
HS-LS1 From Molecules to Organisms: Structure and Processes	**HS-LS1-5** Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy**.** **HS-LS1-6** Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. **HS-LS1-7** Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. **HS-LS2-3** Construct and revise an explanation based on evidence for the cycling of matter and flow of	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit**

HS-LS2 Ecosystems: Interactions, Energy and Dynamics	energy in aerobic and anaerobic conditions. **HS-LS2-4:** Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. **HS-LS2-5:** Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	
FOUNDATION Disciplinary: ***Core Idea***	**FOUNDATION Disciplinary:** ***Statement***	
LS1.C: Organization for Matter and Energy Flow in Organisms	-The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5) -The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled	**Essential Question/s:** ● What are the basic chemical principles that affect living things? ● How is matter and energy transferred and or/ transformed in living systems? **Activity Description**: ● **Lab Safety Introduction** Students will participate in lab safety lessons during the first few weeks of school. The science teacher will review safe practices in the lab setting. Students must take and pass a lab safety test in order to participate in lab activities for the year. ● **Savvas Realize Case Study- From Harmless Algal Bloom to Toxic Menace** The wrap up for this case study summarizes the primary causes of recent toxic algal blooms. Students explain how human activities

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems	into larger molecules (such as proteins or DNA), used for example to form new cells. (HS-LS1-6) -As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HS-LS1-6),(HS-LS1-7) -As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HS-LS1-7) -Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HS-LS2-3)	contribute to these blooms and conduct research to pose possible solutions. ● **Savvas Realize Engineering Interactivity and Worksheet- Construct a Wetland** This digital activity provides an opportunity for students to apply engineering skills to design a constructed wetland. The activity is accompanied with a digital engineering activity worksheet. ● **Savvas Realize Interactivity- A Model of Photosynthesis** This digital activity provides an opportunity for students to examine what happens during the different stages of photosynthesis. ● **Savvas Realize Interactivity- Cellular Respiration** This digital activity provides an opportunity for students to examine the events that occur during the different stages of cellular respiration. **Interdisciplinary Connections: Content: ;NJSLS#:** *Connections to NJSLS – English Language Arts* ● **RST.11-12.1** Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS1-1), (HS-LS1-6) ● **WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) ● **WHST.9-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) ● **WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self- generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3) ● **WHST.11-12.8** Gather relevant information from multiple authoritative print and digital sources, using advanced searches

	-Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (HS-LS2-4) -Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical,	effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3) ● **WHST.9-12.9** Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1), (HS-LS1-6) ● **SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2), (HS-LS1-4), (HS-LS1-5), (HS-LS1-7) *Connections to NJSLS – Mathematics* ● **MP.4** Model with mathematics. (HS-LS1-4)**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) ● **HSF-BF.A.1** Write a function that describes a relationship between two quantities. (HS-LS1-4) ● **MP.2** Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) ● **HSS-IC.B.6** Evaluate reports based on data. (HS-LS2-6) ● **HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)

PS3.D: Energy in Chemical Processes	physical, geological, and biological processes. (HS-LS2-5) -The main way that solar energy is captured and stored on Earth is through the complex chemical process known as photosynthesis. (secondary to HS-LS2-5)	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.	-Use a model based on evidence to illustrate the relationships between systems or between components of a system.	
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student- generated sources of evidence consistent with scientific ideas, principles, and theories.	-Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	
Connections to Nature of Science		

Scientific Knowledge is Open to Revision in Light of New Evidence **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.	-Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. -Use mathematical representations of phenomena or design solutions to support claims.	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	

Energy and Matter	Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. -Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. -Energy drives the cycling of matter within and between systems.	
Systems and System Models	-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows—within and between systems at different scales.	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Self Awareness	-Recognize one's feelings and thoughts -Recognize the impact of one's feelings and thoughts on one's own behavior	

Self Management Social Awareness Responsible Decision-making	-Recognize one's personal traits, strengths, and limitations -Recognize the importance of self-confidence in handling daily tasks and challenges -Understand and practice strategies for managing one's own emotions, thoughts, and behaviors -Recognize the skills needed to establish and achieve personal and educational goal -Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals -Recognize and identify the thoughts, feelings, and perspectives of others -Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds -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 settings -Develop, implement, and model effective problem-solving and critical thinking skills	

Relationship Skills	-Identify the consequences associated with one's actions in order to make constructive choices -Evaluate personal, ethical, safety, and civic impact of decisions -Establish and maintain healthy relationships -Utilize positive communication and social skills to interact effectively with others -Identify ways to resist inappropriate social pressure -Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways -Identify who, when, where, or how to seek help for oneself or others when needed	

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:***
<u>Formative Assessments:</u> ● Savvas Realize Interactivity Assignments ● Reading and Study Guide Workbook ● Class Discussions and Questioning ● eText Notebook Responses	**<u>Benchmarks:</u>** ● District Assessments ● Unit Portfolios if applicable **<u>Summative Assessments:</u>** ● Chapter Tests ● Claim Evidence Reasoning Tasks ● Case Study Wrap Ups ● Lab Reports/Skills Worksheets
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**
• Authentic Reading Materials • Classroom Supplies • Teacher Computer • Internet Connectivity • Smart Board • Online Learning Platform • Data Analysis Software such as Google sheets • Lab Equipment	• Alternate reading materials • Home copy of text • Copy of Teacher notes • USe of models • Authentic Reading Materials • Classroom Supplies • Teacher Computer • Internet Connectivity • Smart Board • Online Learning Platform • Data Analysis Software such as Google sheets • Lab Equipment	• Translator • English translator dictionary • Alternate reading materials • Copy of Teacher notes • Use of models • Authentic Reading Materials • Classroom Supplies • Teacher Computer • Internet Connectivity • Smart Board • Online Learning Platform • Data Analysis Software such as Google sheets • Lab Equipment	• Increased inquiry based labs • Independent Research • Authentic Reading Materials • Classroom Supplies • Teacher Computer • Internet Connectivity • Smart Board • Online Learning Platform • Data Analysis Software such as Google sheets • Lab Equipment
Supplemental Resources			
Technology: • Supplemental Videos • Student Chromebooks • Digital Platforms including Schoology and Savvas Realize **Other:** • Safety equipment • Classroom models			
Differentiated Student Access to Content: Recommended *Strategies & Techniques*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**

• Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics	• Extended time/retakes on assessments • Modified Assessment • Written, visual and oral directions • multisensory during instruction • Alternate instruction such as visual, kinetic, and auditory. • Preferential seating if needed • Review activities • Study guides • Break assignments into shorter tasks • Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics	• Read aloud test • Modified Assessments • Written, visual and oral directions • multisensory during instruction • Alternate instruction such as visual, kinetic, and auditory. • Preferential seating if needed • Review activities • Study guides • Break assignments into shorter tasks • Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics	• Further depth of content • Example of realistic scenarios • Research opportunities • Design own experiments • Enhanced set of introductory activities • Extension activities • Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:** • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities. • Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.

	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization. **Utilize critical thinking to make sense of problems and persevere in solving them.** Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.	

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