

Marking Period	Unit Title	Recommended Instructional Days
4	Biological Evolution	40 Days
NJSLS - Science: <i>Title</i>	NJSLS - Science: <i>Performance Expectations</i>	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSL-S within Unit
<p>HS-LS2: Ecosystems: Interactions, Energy, and Dynamics</p> <p>HS-LS4: Biological Evolution: Unity and Diversity</p>	<p>HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.</p> <p>HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.</p> <p>HS-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.</p> <p>HS-LS4-3 Apply concepts of statistics and probability to support explanations that</p>	

	<p>organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.</p> <p>HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</p> <p>HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</p>	
FOUNDATION Disciplinary: <i>Core Idea</i>	FOUNDATION Disciplinary: <i>Statement</i>	
<p>LS2.D: Social Interactions and Group Behavior</p> <p>LS4.A: Evidence of Common Ancestry and Diversity</p>	<p>-Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. (HS- LS2-8)</p> <p>-Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be</p>	<p><u>Essential Question/s:</u></p> <ul style="list-style-type: none"> How do organisms adapt and evolve to survive in an ecosystem? <p><u>Activity Description:</u></p> <ul style="list-style-type: none"> Savvas Realize Modeling Lab- The Role of Group Behavior Students use small, colored objects to model zebra herding behavior and predation in lions. Students draw conclusions about the benefits of group behaviors. Savvas Realize Exploration Lab- Evidence of Evolution Students compare different species using amino acid sequences, homologous body parts, biogeography, and other data. They draw conclusions about evolutionary relationships and common ancestors. Savvas Realize Interactivity- Genetic Change

<p>LS4.B: Natural Selection</p>	<p>inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1)</p> <p>-Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance among individuals. (HS-LS4-2),(HS-LS4-3)</p> <p>-The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (HS-LS4-3)</p>	<p>This digital activity provides an opportunity for students to explore how the environment and allele frequencies can change the phenotype of a population over time.</p> <ul style="list-style-type: none"> ● Savvas Realize Simulation- Bird Beaks <p>This digital activity provides an opportunity for students to simulate the adaptations involved with different bird beaks and how they are used in nature.</p> <ul style="list-style-type: none"> ● Savvas Realize Case Study-How Can Antibiotics Keep Up with Drug Resistant Bacteria <p>Students are to explain how extended use of antibiotics cause bacterial populations to develop resistance, and argue the point of how new antibiotics can be developed and how to prolong the effectiveness of existing antibiotics.</p> <ul style="list-style-type: none"> ● Savvas Realize Analyzing Data- Extinctions Through Time <p>Students analyze data in a graph that shows mass extinction over time.</p> <ul style="list-style-type: none"> ● Investigating Hominoid Fossils- Guided Inquiry <p>In this lab, students will observe how the organisms belonging to the Homo genus have evolved over time. The students will research the family tree of the Homo genus, and identify the different time periods and different species. The students will then use models to measure how the skulls of the Homo genus have changed over time. The students will measure and calculate the supraorbital height index on 2-D and 3-D models. At the conclusion, the students will discuss how the shape and size of the skulls can provide information on the age, size, brain size and capacity, gender and diet of the different species.</p> <ul style="list-style-type: none"> ● Climate Change: Exploring the Changes in the Atmosphere Then and Now <p>Investigate data showing the changes that happened to the atmosphere on Earth as photosynthetic organisms developed and now through the industrial revolution as the human population increases.</p>
<p>LS4.C: Adaptation</p>	<p>-Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an</p>	<p>Interdisciplinary Connections: Content: ;NJSLS#: <u>Connections to NJSLS – English Language Arts</u></p> <ul style="list-style-type: none"> ● RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions

	<p>environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HS-LS4-2)</p> <p>-Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HS-LS4-3),(HS-LS4-4)</p> <p>-Adaptation also means that the distribution of traits in a population can change when conditions change. (HS-LS4-3)</p> <p>-Changes in the physical environment, whether naturally</p>	<p>the author makes and to any gaps or inconsistencies in the account. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4)</p> <ul style="list-style-type: none"> ● RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS4-5) ● WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4) ● WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS4-1),(HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5) ● SL.11-12.4 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. (HS-LS4-1), (HS-LS4-2) <p><u>Connections to NJSL – Mathematics</u></p> <ul style="list-style-type: none"> ● MP.2 Reason abstractly and quantitatively. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5) ● MP.4 Model with mathematics. (HS-LS4-2)
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	<p>occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline—and sometimes the extinction—of some species. (HS-LS4-5)</p> <p>-Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the species' evolution is lost. (HS-LS4-5)</p>	
<p>FOUNDATION Science and Engineering Practices: <i>Core Idea</i></p>	<p>FOUNDATION Science and Engineering Practices: <i>Statement</i></p>	
<p>Engaging in Argument from Evidence Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from</p>	<p>-Evaluate the evidence behind currently accepted explanations to determine the merits of arguments. (HS-LS2-8) (HS-LS4-5)</p>	

<p>current scientific or historical episodes in science.</p> <p>Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence</p> <p>Obtaining, Evaluating, and Communicating Information. Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.</p> <p>Connections to Nature of Science: Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p>	<p>-Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HS-LS2-8)</p> <p>-Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-LS4-1)</p> <p>-A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-LS4-1)</p>	
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<p>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.</p> <p>Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.</p>	<p>-Construct 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. (HS-LS4-2) (HS-LS4-4)</p> <p>-Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HS-LS4-3)</p>	
<p>FOUNDATION Crosscutting Concepts: <i>Core Idea</i></p>	<p>FOUNDATION Crosscutting Concepts: <i>Statement</i></p>	
<p>Cause and Effect</p>	<p>-Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8) (HS-LS4-2) (HS-LS4-4) (HS-LS4-5)</p>	

<p>Patterns</p> <p>Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p>	<p>-Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-LS4-1) (HS-LS4-3)</p> <p>-Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (HS-LS4-1) (HS-LS4-4)</p>	
<p>Social and Emotional Learning: Competencies</p>	<p>Social and Emotional Learning: Sub-Competencies</p>	
<p>Self Awareness</p> <p>Self Management</p>	<p>-Recognize one's feelings and thoughts -Recognize the impact of one's feelings and thoughts on one's own behavior -Recognize one's personal traits, strengths, and limitations -Recognize the importance of self-confidence in handling daily tasks and challenges</p> <p>-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</p>	

Social Awareness	<ul style="list-style-type: none">-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	
Responsible Decision-making	<ul style="list-style-type: none">-Develop, implement, and model effective problem-solving and critical thinking skills-Identify the consequences associated with one's actions in order to make constructive choices-Evaluate personal, ethical, safety, and civic impact of decisions	
Relationship Skills	<ul style="list-style-type: none">-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) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i>		Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i>	
<u>Formative Assessments:</u> <ul style="list-style-type: none">● Savvas Realize Interactivity Assignments● Reading and Study Guide Workbook● Class Discussions and Questioning● eText Notebook Responses		<u>Benchmarks:</u> <ul style="list-style-type: none">● District Assessments● Unit Portfolios if applicable <u>Summative Assessments:</u> <ul style="list-style-type: none">● 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 <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core Resources
<ul style="list-style-type: none">● Authentic Reading Materials● Classroom Supplies● Teacher Computer● Internet Connectivity● Smart Board● Online Learning Platform● Data Analysis Software such as Google sheets● Lab Equipment	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● 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

	<ul style="list-style-type: none"> • Data Analysis Software such as Google sheets • Lab Equipment 	<ul style="list-style-type: none"> • Online Learning Platform • Data Analysis Software such as Google sheets • Lab Equipment 	<ul style="list-style-type: none"> • Lab Equipment
Supplemental Resources			
Technology: <ul style="list-style-type: none"> • Supplemental Videos • Student Chromebooks • Digital Platforms including Schoology and Savvas Realize Other: <ul style="list-style-type: none"> • Safety equipment • Classroom models 			
Differentiated Student Access to Content: Recommended <i>Strategies & Techniques</i>			
Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core
<ul style="list-style-type: none"> • Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> shorter tasks • Guided experiments • Inquiry experiments • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics 	<ul style="list-style-type: none"> • Class discussions • CER activities • Phenomenon • Positive reinforcement • Rubrics 	
NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: <ul style="list-style-type: none"> • Global and Cultural Awareness • Information and Media Literacy 		
	Core Ideas:	<ul style="list-style-type: none"> • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences. • In order for members of our society to participate productively, information needs to be shared accurately and ethically 	
	Performance Expectation/s:	<ul style="list-style-type: none"> • 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). • 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately (e.g., 2.1.12.CHSS.6, S.IC.B.4, S.IC.B.6, 8.1.12.DA.1, 6.1.12.GeoHE.14.a, 7.1.AL.PRSENT.2). • 9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity (e.g., NJSLSA.SL5). 	
	Career Readiness, Life Literacies, & Key Skills Practices		
	Information and Media Literacy Information and Media Literacy empowers learners to access, retrieve and produce well managed resources. This access promotes and fosters inquiry learning as well as a deep understanding of target knowledge, skills or concepts. Information and		

	<p>Media Literacy is the vehicle for learners to pursue and create relevant information using the opportunities of high-quality materials. Information and media literacy also includes a basic understanding of ethical use of information.</p> <p>Consider the environmental, social and economic impacts of decisions. Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.</p>
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New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>		LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>		Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	X	Standards in Action: <i>Climate Change</i>