Lower Cape May Regional School District
Life Science

Interdisciplinary Connections

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

RL.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

Integration of Technology

9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.
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).
9.4.8.TL.3: Select appropriate tools to organize and present information digitally.
9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).
9.4.8.TL.5: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration. •
9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

21st Century Skills

9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, 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).
9.4.8.CI.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
9.4.8.CI.3: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries.
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).
9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.

9.4.8.DC.1: Analyze the resource citations in online materials for proper use.
9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.
9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure. •
9.4.8.DC.6: Analyze online information to distinguish whether it is helpful or harmful to reputation.
9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.
9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).
9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a). •
9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.
9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.
9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.
9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations. •
9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.
9.4.8.IML.6: Identify subtle and overt messages based on the method of communication.
9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH.IPRET.8).
9.4.8.IML.8: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).
9.4.8.IML.9: Distinguish between ethical and unethical uses of information and media (e.g., 1.5.8.CR3b, 8.2.8.EC.2).
9.4.8.IML.10: Examine the consequences of the uses of media (e.g., RI.8.7).
9.4.8.IML.11: Predict the personal and community impact of online and social media activities.
9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
9.4.8.IML.13: Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).
9.4.8.IML.14: Analyze the role of media in delivering cultural, political, and other societal messages. •
9.4.8.IML.15: Explain ways that individuals may experience the same media message differently.

Career Education

9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.
9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.

9.2.8.CAP.5: Develop a personal plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.
9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.
9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.
9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.
9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
9.2.8.CAP.13: Compare employee benefits when evaluating employment interests and explain the possible impact on personal finances.
9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options.
9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills.
9.2.8.CAP.17: Prepare a sample resume and cover letter as part of an application process.
9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level
9.2.8.CAP.20: Identify the items to consider when estimating the cost of funding a business.

Lower Cape May Regional School District (Physical Science) Curriculum	
Content Area: Science	
Course Title: Life Science	**Grade level: 8th**
Unit 1: Foundations **● Nature of Science Inquiry** **● Observations and Measurement** **● Experiments and Communicating Results**	**Dates for Units: 30 days and year-long application**
Unit 2: Structure and Function of Living Things	**Dates for Units: 40 days**
Unit 3: Ecosystems: Interactions, Energy, and Dynamics	**Dates for Unit: 40 days**
Unit 4: Heredity: Inheritance and Variation of Traits	**Dates for Unit: 35 days**

Unit 5: Biological Evolution: Unity and Diversity	Dates for Unit: 35 days

Lower Cape May Regional School District (8th grade Science) Curriculum Unit 1 Overview		
Content Area: Science		
Unit Title: Foundations of Science		
Target Course/Grade Level: Life Science 8th		
Unit Summary: **● This unit explores the nature of science and the scientific method of discovery.** **● This unit also describes how scientists use models and mathematics to describe the world around them.** **● Science skills, mathematics, and units of measurement focusing on The Standard International Units of Measurement and the use of the Metric system.** **● The different ways data is organized and presented to others is covered.** **● The knowledge and skills gained in this chapter will serve as a foundation for the study of science throughout the year.**		
Learning Targets		
CPI #	**Cumulative Progress Indicators (CPI) for Unit**	
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.	
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 such that an optimal design can be achieved.	
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts

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. Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2)	**ETS1.B: Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6) **ETS1.C: Optimizing the Design Solution** Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (secondary to MS-PS1-6) The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (secondary to MS-PS1-6) **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 is likely to limit possible solutions. (secondary to MS-PS3-3) **ETS1.B: Developing Possible**	**Patterns** Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2) Cause and Effect **Cause and effect** relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4) **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) ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3) Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS1-2)

	Solutions A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (secondary to MS-PS3-3)	
Unit Enduring Questions: ● What are the branches of Life? ● How does science take place? ● Differentiate between scientific theory and scientific law. ● How do we use scientific method? ● What are science skills? ● Why do scientists use scientific notation and SI units. ● Why is the metric system used as international units of measurement?		**Unit Enduring Understandings:** ● Science takes place through observation, descriptions, and experimentation. ● Scientific methods guides our thinking and actions when learning about natural phenomena. ● The metric system is a base ten system of measurement used by scientists all around the world.
Unit Objectives: ***Students will know….*** ● How branches of science is organized. ● Students will know that science takes a systematic and an interdisciplinary approach to learning about the world around them. ● Science skills include ability to observe, make measurements, infer connections, and present information in a universal manner.		**Unit Objectives:** ***Students will be able to…...*** ● Describe how science takes place. ● Identify and classify the main branches of science and explain the interdisciplinary nature of science. ● Design experiments to solve hypothetical problems. Confirm results by designing and repeating experiments. ● Interpret data from graphs; determine trends and draw predictions, hypotheses, and draw conclusions. ● Organize and display data in tables, graphs, and charts.

Lower Cape May Regional School District (8th grade Science) Curriculum
Unit 2 Overview

Content Area: Life Science

Unit Title: Structure and Function of Living Things

Target Course/Grade Level: Life Science 8th

Unit Summary:

- Cell structure & function: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]
- Levels of organization (cells to organisms): Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.
- Body systems and their interactions: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.
- Photosynthesis & cellular respiration: Emphasis is on tracing movement of matter and flow of energy.

Learning Targets

CPI #	Cumulative Progress Indicators (CPI) for Unit
MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

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.	
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
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 and design systems. **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. **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	**LS1.A: Structure and Function** All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) **LS1.B: Growth and Development of Organisms** Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)	**Patterns** Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2) **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4) **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) **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) **Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes. (MS-PS1-5) The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS1-6)

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 worlds. **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.	Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4) Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5) **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	**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) ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3) **Influence of Science, Engineering and Technology on Society and the Natural World** The uses 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-PS1-3) ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations.

	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-LS17)	(MS-PS1-2) **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5)
Unit Enduring Questions: **What does it mean to be alive?** ● How do scientists define life and distinguish between living and nonliving things? **How do the structures within organisms enable them to survive, grow, and reproduce?** ● Why do different organisms have different structures? ● How does structure relate to function in biological systems? **How do cells contribute to the function of living organisms?** ● What happens if cells stop working properly? **How do plants and animals get the energy they need to live?** ● Why is the sun the ultimate source of energy for life on Earth? **How do the systems of the human body work together to keep us alive?** ● What are the consequences when systems fail or are damaged? **How do organisms maintain homeostasis in a changing environment?** ● What internal and external factors affect biological balance?		**Unit Enduring Understandings:** All living things are made of cells, which carry out essential life functions. Multicellular organisms have systems of specialized cells that interact to perform necessary life processes. Organisms grow and survive by getting energy and matter from their environment. Plants use sunlight to make food through photosynthesis, forming the base of most food chains. Body systems work together to transport materials, break down food, and eliminate waste. Energy flows and matter cycles through biological systems in predictable ways.
Unit Objectives: ***Students will know….*** **All living organisms are composed of cells**, the basic units of structure and function in living things. **Cellular structures (organelles)** have specific functions that support life processes (e.g., nucleus, mitochondria, cell membrane, chloroplast).		**Unit Objectives:** ***Students will be able to…...*** **Develop and use models** to describe the structure and function of cells and organelles. **Construct explanations** for how the body's systems work together to maintain life.

Multicellular organisms have specialized cells that work together to form tissues and organ systems. **Body systems interact to perform essential functions**, including digestion, respiration, circulation, and waste elimination. **Plants capture energy from sunlight through photosynthesis** to produce sugars, which are used for energy and growth. **Animals obtain energy and matter** by consuming plants or other organisms. **Food provides molecules** needed for body repair, growth, and energy. **The flow of energy and cycling of matter** are critical to organism survival.	**Analyze and interpret data** to provide evidence that plants use sunlight to produce food. **Use models to illustrate** how food molecules are rearranged through chemical reactions to release energy. **Compare and contrast unicellular and multicellular organisms** in terms of structure and function. **Communicate scientific information** about how organisms obtain and use energy. **Design an investigation** to explore how environmental conditions affect photosynthesis or respiration. **Explain the relationship** between structure and function in cells, tissues, organs, and systems.

Lower Cape May Regional School District (8th grade Science) Curriculum
Unit 3 Overview

Content Area: Science

Unit Title: Ecosystems - Interactions, Energy, and Dynamics

Target Course/Grade Level: Life Science 8th

Unit Summary:

- Food webs & trophic levels: 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.

- Energy flow in ecosystems: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.

- Biotic and abiotic factors: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.
- Symbiosis, competition, and predation: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.
- Human impact on ecosystems: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.

Learning Targets		
CPI #	**Cumulative Progress Indicators (CPI) for Unit**	
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 ecosystem affect populations.	
MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables and clarifying arguments and models.	**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)	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3), (MS-PS2-5) **Systems and System Models** Models can be used to represent systems and their interactions— such as inputs, processes and outputs—and energy

Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds from grades 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 from grades 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.	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 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.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	and matter flows within systems. (MS-PS2-1), (MS-PS2-4), **Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2) **Patterns** Graphs and charts can be used to identify patterns in data. (MS-PS4-1) **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-PS4-2) Structures can be designed to serve particular functions. (MS-PS4-3) ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS2-2), (MS-PS2-4) **Influence of Science, Engineering, and Technology on Society and the Natural World** Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations. (MS-PS4-3)

	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)	
Unit Enduring Questions: How do organisms interact with each other and with their environment? What factors affect ecosystem stability? How can one explain and predict interactions between objects and within systems of objects? What happens to ecosystems when the environment changes? How does energy flow through an ecosystem? Why is biodiversity important in ecosystems? How do matter and nutrients cycle through ecosystems? What limits the number and types of organisms that can live in an ecosystem? How do human activities affect the health and stability of ecosystems?		**Unit Enduring Understandings:** ● Ecosystem interactions (competition, predation, mutualism, etc.) ● Ecosystem stability, resilience, human impact, invasive species ● Food chains, food webs, energy pyramids, producers/consumers/decomposers ● Species roles, interdependence, conservation ● Carbon cycle, nitrogen cycle, decomposers, photosynthesis, respiration ● Carrying capacity, limiting factors (food, water, space, etc.) ● Pollution, climate change, habitat descruction, restoration ecology
Unit Objectives: ***Students will know….*** 1. **Ecosystem Interactions:** ○ Organisms depend on one another and on their environment for survival. ○ Relationships among organisms (e.g., predator-prey, mutualism, competition) affect populations and		**Unit Objectives:** ***Students will be able to…...*** 1. Develop and Use Models: Create food webs and energy pyramids to model energy flow and matter cycling in ecosystems.

ecosystems. 2. **Energy Flow:** ○ Energy flows through ecosystems in one direction—from producers (like plants) to consumers (like animals) and decomposers. ○ The role of photosynthesis in transforming solar energy into chemical energy used by organisms. 3. **Matter Cycling:** ○ Matter cycles among the air, water, soil, and organisms. ○ Decomposers play a key role in breaking down dead organisms and recycling matter. 4. **Population Dynamics:** ○ Populations are affected by the availability of resources, environmental changes, and biological interactions. ○ Carrying capacity limits the size of populations based on resource availability. 5. **Human Impact:** ○ Human activities can disrupt ecosystem dynamics (e.g., pollution, habitat destruction, climate change).	Illustrate how changes in one part of an ecosystem affect the whole system. 2. Analyze and Interpret Data: Use population data to infer relationships among organisms. Analyze changes in ecosystems due to natural events or human activity. 3.Construct Explanations: Explain how resource availability affects individual organisms and populations. Describe how organisms interact with both biotic and abiotic components of ecosystems. 4.Engage in Argument from Evidence: Support claims about ecosystem dynamics with evidence (e.g., impact of invasive species, effects of deforestation). 5.Ask Questions and Define Problems: Formulate questions about ecosystem changes or environmental impacts. Investigate potential solutions to human impacts on ecosystems.

Content Area: Science

Unit Title: Heredity - Inheritance and Variation of Traits

Target Course/Grade Level: Life Science 8th

Unit Summary:

- **Structure and function of DNA: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.**
- **Genes, chromosomes, and traits: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.**
- **Punnett squares and probability: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.**
- **Dominant and recessive traits: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.**
- **Mutations and their role in variation: Emphasis is on the changes in genes can result in the changes in proteins which affect the structure and function of the organism.**

Learning Targets		
CPI #	**Cumulative Progress Indicators (CPI) for Unit**	
MS-LS3-1	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	
MS-LS3-2	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 6–8	**LS1.B: Growth and Development of Organisms**	**Patterns** Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

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. Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2) **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. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) 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. (MS-ESS1-4) **Developing and Using Models** Modeling in 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. Develop and	Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MSLS3-2) **LS3.A: Inheritance of Traits** Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1) Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2) **LS3.B: Variation of Traits** In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical	(MS-PS1-2) Cause and Effect **Cause and effect** relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4) **Systems and System Models Models** can be used to represent systems and their interactions. (MS-ESS1-2) **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) **Energy and Matter** Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4) **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) ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3)

use a model to describe phenomena. (MS-ESS2-1), (MS-ESS2-6) Develop a model to describe unobservable mechanisms. (MS-ESS2-4) **Planning and Carrying Out Investigations** Planning and carrying out investigations in in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5) **Asking Questions and Defining Problems** Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables and clarifying arguments and models. Ask questions to identify and clarify evidence of an argument. (MS-ESS3-5)	or may differ from each other. (MS-LS3-2) In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)	**Influence of Science, Engineering, and Technology on Society and the Natural World** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ESS3-1), (MS-ESS3-4) The uses 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 regionto region and over time. (MS-ESS3-2), (MS-ESS3-3) ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS1-2) **Scientific Knowledge is Open to Revision in Light of New Evidence** Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3) **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-ESS3-4)
Unit Enduring Questions: How are traits passed from parents to offspring? Why do offspring look similar to their parents but not exactly the same? What is the difference between inherited traits and traits influenced by the environment? How can the same genetic information result in variation among individuals? How do dominant and recessive genes affect the traits we see? What role do mutations play in the inheritance and variation of traits? How can understanding heredity help us make informed decisions in health and science?		**Unit Enduring Understandings:** ● Traits are passed from parents to offspring through genes, which are units of heredity. ● Each parent contributes half of the genetic material to their offspring, resulting in variation. ● Some traits are determined by genes alone, while others are influenced by environmental factors. ● Genetic variation is essential for the survival and evolution of a species. ● Mutations can lead to new traits and can be beneficial, harmful, or neutral. ● Understanding heredity helps scientists and society make informed decisions about health, agriculture, and conservation.
Unit Objectives: ***Students will know….*** ● Genes are segments of DNA that determine inherited traits. ● Each parent contributes one set of chromosomes to their offspring. ● Traits can be dominant, recessive, or influenced by multiple genes.		**Unit Objectives:** ***Students will be able to…...*** ● Develop and use models to describe how genetic information is inherited from parents (MS-LS3-1). ● Analyze and interpret data to provide evidence for the role of genetics and environment in

● Organisms inherit traits through sexual and asexual reproduction, affecting genetic variation. ● Inherited traits are different from acquired (environmental) traits. ● Genetic variation can occur through mutations, which may be beneficial, harmful, or neutral. ● Environmental factors can influence the expression of certain traits.	trait development (MS-LS3-2). ● Distinguish between inherited and acquired traits in different organisms. ● Use Punnett squares or other models to predict the probability of traits appearing in offspring. ● Explain how sexual reproduction increases genetic variation compared to asexual reproduction. ● Describe how mutations can affect the structure and function of an organism's traits. ● Communicate scientific information about heredity in written or visual formats (e.g., diagrams, posters, presentations).

Lower Cape May Regional School District (8th grade Science) Curriculum Unit 5 Overview
Content Area: Science
Unit Title: Biological Evolution: Unity and Diversity
Target Course/Grade Level: Life Science 8th
Unit Summary: ● **Cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.** ● **Understanding that cells form tissues and tissues form organs specialized for particular body functions.** ● **Explain how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.**

- **Use scientific explanation to explain how environmental and genetic factors influence the growth of organisms.**
- **Tracing movement of matter and flow of energy.**
- **Describe how molecules are broken apart and put back together and that in this process, energy is released.**

Learning Targets	
CPI #	**Cumulative Progress Indicators (CPI) for Unit**
MS-LS4-2	Apply scientific ideas to construct an explanation for the anatomical similarities among modern organisms and between modern and fossil organisms.
MS-LS4-3	Analyze displays of pictorial data to compare patterns of similarities in embryological development across species.
MS-LS4-4	Construct an explanation based on evidence that describes how genetic variation affects survival and reproduction.
MS-LS4-5	Gather and synthesize information about technologies that have changed how humans influence the inheritance of desired traits.
MS-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases or decreases in specific traits in populations over time.

Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables and clarifying arguments and models. **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds from grades K–5 experiences and progresses to include constructing explanations and	**LS4.A: Evidence of Common Ancestry and Diversity** Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. (MS-LS4-2) Comparison of the embryological development of different species also reveals similarities that show	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3), (MS-PS2-5) **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-PS2-1), (MS-PS2-4), **Stability and Change** Explanations of stability and change in natural or designed systems can be constructed

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 from grades 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.	relationships not evident in the fully-formed anatomy. (MS-LS4-3) **LS4.B: Natural Selection** Natural selection leads to the predominance of certain traits in a population, and the suppression of others. (MS-LS4-4) In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring. (MS-LS4-5) **LS4.C: Adaptation** Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. (MS-LS4-6)	by examining the changes over time and forces at different scales. (MS-PS2-2) **Patterns** Graphs and charts can be used to identify patterns in data. (MS-PS4-1) **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-PS4-2) Structures can be designed to serve particular functions. (MS-PS4-3) ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS2-2), (MS-PS2-4) **Influence of Science, Engineering, and Technology on Society and the Natural World** Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations. (MS-PS4-3)
Unit Enduring Questions: How do scientists know that life on Earth has changed over time? What evidence supports the theory that all species share a common ancestry? How do genetic variation and natural selection lead to the		**Unit Enduring Understandings:** ● The fossil record and anatomical evidence support the theory of evolution and suggest that all species share common ancestry. ● Biological evolution is driven by

evolution of species? Why do some traits become more common in a population over time? How do environmental changes affect the survival of species? In what ways can humans influence the evolution and traits of organisms? How are unity and diversity both reflected in the living world?	natural selection, which acts on genetic variation within populations. ● Genetic variations increase the likelihood that some individuals will survive and reproduce in changing environments. ● Over long periods, evolutionary processes result in the emergence of new species and the extinction of others, leading to the diversity of life observed today. ● Human activity and technology can influence the traits of organisms and the process of evolution (e.g., artificial selection, genetic engineering).
Unit Objectives: ***Students will know….*** Similarities in anatomy and embryology among species suggest common ancestry. Natural selection is a process where advantageous traits become more common in a population. Genetic variation among individuals is essential for natural selection to occur. Environmental pressures can influence which traits are beneficial. Humans can influence evolution through artificial selection and genetic technology. Evolution explains both the diversity and unity of life on Earth.	**Unit Objectives:** ***Students will be able to…...*** Analyze and interpret data from fossils, anatomical diagrams, and embryological development. Construct explanations using evidence from various sources (e.g., fossil record, comparative anatomy). Develop and use models to represent the process of natural selection. Use mathematical and graphical representations to explain changes in population traits over time. Gather and synthesize information about human impact on heredity and evolution. Engage in argument from evidence to support or refute evolutionary claims.

Assessments

Summative Assessment

- **End of unit test: may include, but not limited to: consists of multiple choice, matching, fill in the blank, open-ended questions, reading and interpreting data**
- **Final projects: Research project, poster display**

Formative Assessments

- **Exit Tickets**
- **Labs**
- **Mini Quizzes**
- **Homework**
- **Classwork**

Benchmark Assessments

- **Quarterly exams (STAR)**

Alternative Assessments

- **Self-assessments, peer review, optional retakes/test corrections,problem based learning, modified lab reports, oral presentations**

Modifications for ELL's

Speak slowly, clearly, and use gestures
Simplify language; avoid idioms, slang, and sarcasm
Pair student with a buddy
Give preferential seating
Maintain routines with consistent signals
Write clearly and legibly
Provide a graphic organizer in advance of a new topic/vocabulary/chapter
Present information in a variety of ways (pictures, videos, manipulatives)
Rephrase questions, directions, and explanations
Have tests read orally
Highlight or bold key words in classwork, homework, and tests
Allow extra time for assignments

Modifications for Special Education

Provide a lab partner.
Allow extra time for set up and completion of lab work.
Use a combination of written, verbal, and pictorial instructions with scaffolding.
Demonstrate procedures and allow students to practice. (modeling)
Build-in frequent brief breaks.
Give preferential seating to avoid distractions.

Written and verbal instructions
Highlighr or bold key words in classwork, homework, and tests
Provide graphic organizers
Chunk larger assignments

Modifications for 504

Provide a lab partner.
Allow extra time for set up and completion of lab work.
Use a combination of written, verbal, and pictorial instructions with scaffolding.
Demonstrate procedures and allow students to practice. (modeling)
Build-in frequent brief breaks.

Modifications for Gifted and TalentedM Students:

- Teacher tutoring
- Peer tutoring
- Cooperative Learning Groups

Gifted And Talented

- Provide advance reading level books
- Provide opportunities for Project-based learning
- Extended learning opportunities when classroom assignments are finished early

At Risk of Failure

- Opportunity to make up missing work
- Opportunity to retest
- Parent/Teacher Log

Project-based Learning Tasks:

- A debate, speech, social media campaign, or multimedia presentation on a current science topic

Vocabulary:

- In-text vocabulary should be incorporated into every unit. Word journals, vocabulary walls, and/or various other activities should be utilized by the instructor to teach vocabulary.

The Research Process:

- The research process must be integrated within each course curriculum. Students will be provided with opportunities to investigate issues from thematic units of study. As the NJSLS indicate, students will develop proficiency with MLA or APA format as applicable.

Technology:

- Students must engage in technology applications integrated throughout the curriculum. Applicable technology utilized in this curricula are included below:

- Books online (CK-12)
- Laptops/Chromebooks
- Ipads/Ipods as per IEP
- Mimio/Smartboard
- Internet
- Safari Montage
- Brain Pop
- History Channel
- CNN – Student News
- PBS
- You Tube/Netflix/Hulu
- ICivics
- Google Classroom/Zoom/Google Meet
- Additional resources will be utilized as needed
- We the People
- Eagle Eye
- Google Earth
- Google Culture
- Gizmo's

Resources:

- Ancillary resources and materials used to deliver instruction are included below:
  - Founding documents: Declaration of Independence, Constitution, Bill of Rights and the Articles of Confederation.
  - Teacher created materials
  - Media Center resources (books/videos)
  - Safari Montage
  - Various internet sites for informational text, online museums, webquests, pictures, maps, and videos
  - Teachers Pay Teachers
  - School/Teacher owned activity books

Curriculum development Resources/Supplemental Instructional Materials:

List or Link Ancillary Resources and Curriculum Materials Here:

- VCR/DVD, You Tube, BrainPop
- Gizmos
- Lab materials
- Text-support materials (tests, quizzes …)
- Teacher Generated Materials (worksheets, tests, projects, activities (independent & group, internet research, note taking, and scavenger hunts).
- Current Events and online resources as needed within curriculum topics

Board of Education Approved Text(s)/Core Material

Science Explorer Pearson