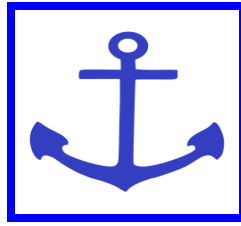


Ocean Academy Charter School
Curriculum Guide
Grade 7 - Science



Original Adoption:	August 2025
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OCEAN ACADEMY CHARTER SCHOOL 7th Grade Science Curriculum	
Content Area: Science	
Course Title: 7th Grade Science	Grade Level: 7th
Unit Title	Pacing Guide in Days
Unit 1: PS: Matter and Its Interactions Climate Change	25 Days
Unit 2: LS: From Molecules to Organisms: Structures and Processes Climate Change	30 Days
Unit 3: Heredity: Inheritance and Variation of Traits Climate Change	30 days
Unit 4: LS: Natural Selection and Adaptations Climate Change	40 Days
Unit 5: LS: Interdependent Relationships in Ecosystems Climate Change	25 days
Unit 6: ES: Human Impacts Climate Change	30 days

OCEAN ACADEMY CHARTER SCHOOL Unit 1 Overview	
Content Area: Science	Target Course/Grade Levels: 7
Unit 1: Matter and Its Interactions	Duration: 25 Days
Introduction/Unit Focus:	
<p>In this unit, students deepen their understanding of matter by exploring how it changes at the molecular level. They will investigate how substances exist in different states: solid, liquid, and gas and explain how changes between these states occur based on the motion and energy of particles. Students will also study chemical reactions, learning that these reactions involve the breaking and rearranging of atomic bonds to form new substances with different properties.</p> <p>As part of their learning, students will examine how atoms are not lost or gained during chemical reactions but are instead rearranged into new molecular structures. They will use models and real-world examples to represent and explain these atomic-level changes. In addition, students will apply engineering concepts by analyzing and designing optimized systems for chemical processes, helping them understand how science and engineering are interconnected in solving real-world problems.</p> <p>This unit is framed by the crosscutting concept of energy and matter, which helps students track how energy flows and how matter changes during physical and chemical processes. Throughout the unit, students will engage in key science and engineering practices such as developing and using models, analyzing and interpreting data, designing solutions, and obtaining, evaluating, and communicating information. These practices will support students in constructing evidence-based explanations and building a solid foundation in the core ideas of physical science.</p>	
Disciplinary Content for the Unit	
<p>Standard 9.1 Personal Financial Literacy This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.</p> <p>Standard 9.2 Career Awareness, Exploration, Preparation and Training This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p> <p>Standard 9.4 Life Literacies and Key Skills</p>	

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A:52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
- (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
- (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLs) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 1 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLs-Science.pdf>

Students who demonstrate understanding can:

MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

- [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.] [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete depiction of all individual atoms in a complex molecule or extended structure.]

MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

- [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]

MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

- [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]

MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

- [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]

MS-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

- [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]

MS-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

- [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Developing and Using Models</p> <p>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</p> <ul style="list-style-type: none"> ➤ Develop a model to predict and/or 	<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> ➤ Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) ➤ Each pure substance has characteristic physical and chemical 	<p>Patterns</p> <ul style="list-style-type: none"> ➤ Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> ➤ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4)

<p>describe phenomena. (MS-PS1-1), (MS-PS1-4)</p> <ul style="list-style-type: none"> ➤ Develop a model to describe unobservable mechanisms. (MS-PS1-5) <p>Analyzing and Interpreting Data</p> <p>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</p> <ul style="list-style-type: none"> ➤ Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2) <p>Constructing Explanations and Designing Solutions</p> <p>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 knowledge, principles, and theories.</p> <ul style="list-style-type: none"> ➤ Undertake a design project, engaging in the design cycle, to construct and/or implement a solution 	<p>properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2), (MS-PS1-3)</p> <ul style="list-style-type: none"> ➤ Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4) ➤ In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) ➤ Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1) ➤ The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4) <p>PS1.B: Chemical Reactions</p> <ul style="list-style-type: none"> ➤ Substances react chemically in characteristic ways. In 	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> ➤ 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) <p>Energy and Matter</p> <ul style="list-style-type: none"> ➤ 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) <p>Structure and Function</p> <ul style="list-style-type: none"> ➤ 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) <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Interdependence of Science, Engineering, and Technology</p>
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<p>that meets specific design criteria and constraints. (MS-PS1-6)</p> <p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods.</p> <ul style="list-style-type: none"> ➤ Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-PS1-3) 	<p>a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2), (MS-PS1-3), (MS-PS1-5)</p> <ul style="list-style-type: none"> ➤ The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5) ➤ Some chemical reactions release energy, others store energy. (MS-PS1-6) <p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> ➤ The term “heat” as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. (secondary to MS-PS1-4) ➤ The temperature of a system is proportional to the average 	<ul style="list-style-type: none"> ➤ 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) <p>Influence of Science, Engineering and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> ➤ 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) <p><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ➤ Science knowledge is based upon logical and conceptual connections between evidence and
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	<p>internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material.</p> <p>Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. (secondary to MS-PS1-4)</p> <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none">➤ 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) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none">➤ Although one design may not perform the best across all tests, identifying the	<p>explanations. (MS-PS1-2)</p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none">➤ Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5)
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	<p>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)</p> <p>➤ 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)</p>	
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[Supporting and Additional Standards Unit 1](#)
[New Jersey Student Learning Standards-Mathematics](#)
[New Jersey Student Learning Standards-ELA](#)
<https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf>

ELA/Literacy -

Connections to NJSLS - English Language Arts

RI.CR.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text. (MS-PS1-2), (MS-PS1-3)

RI.MF.7.6. Compare and contrast texts to analyze the unique qualities of different mediums, including the integration of information from multiple formats and sources to develop deeper understanding of the concept, topic or subject and resolve conflicting information. (MS-PS1-1), (MS-PS1-2), (MS-PS1-4), (MS-PS1-5)

W.WR.7.5. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

(MS-PS1-6)

W.SE.7.6. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-PS1-3)

Connections to NJSL - Mathematics

MP.2 Reason abstractly and quantitatively. (MS-PS1-1), (MS-PS1-2), (MS-PS1-5)

MP.4 Model with mathematics. (MS-PS1-1), (MS-PS1-5)

6.RP.A. Understand ratio concepts and use ratio reasoning to solve problems

3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
 - a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
 - b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
 - c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means times the quantity); solve problems involving finding the whole, given a part and the percent.
 - d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (MS-PS1-1), (MS-PS1-2), (MS-PS1-5)

6.NS.C. Apply and extend previous understandings of numbers to the system of rational numbers

5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-PS1-4)

8.EE.A. Work with radicals and integer exponents

3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as and the population of the world as and determine that the world population is more

than 20 times larger. (MS-PS1-1)

6.SP.B. Summarize and describe distributions

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (MS-PS1-2)

6.SP.B. Summarize and describe distributions

5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (MS-PS1-2)

Unit 1 New Jersey Student Learning Standards Connections: Career Readiness, Life Literacies, and Key Skills

Disciplinary Concepts: Career Awareness and Planning (9.2)

Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
An individual's strengths, lifestyle goals, choices, and interests affect employment and income	<p>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.</p> <p>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.</p>
Early planning can provide more options to pay for postsecondary training and employment.	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.

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There are a variety of resources available to help navigate the career planning process.	9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.	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.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level
Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Multiple solutions often exist to solve a problem.	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).
Disciplinary Concepts: Digital Citizenship (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one’s own work.	9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations	9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)

<p>Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.</p>	<p>9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).</p>
<p>Unit 1 New Jersey Student Learning Standards: Computer Science and Design Thinking 8.1 Page 26 8.2</p>	
<p>Disciplinary Concepts: Computing Systems</p>	
<p>Core Ideas</p>	<p>Performance Expectations</p>
<p>Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.</p>	<p>8.1.8.CS4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems</p>
<p>Disciplinary Concepts: Impacts of Computing</p>	
<p>Core Idea</p>	<p>Performance Expectations</p>
<p>Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings.</p>	<p>8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. 8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.</p>
<p>Disciplinary Concepts: Data and Analysis</p>	
<p>Core Idea</p>	<p>Performance Expectations</p>
<p>People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.</p>	<p>8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.</p>
<p>Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.</p>	<p>8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.</p>

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The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Disciplinary Concepts: Engineering Design	
Core Idea	Performance Expectations
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
Disciplinary Concepts: Interaction of Technology and Humans	
Core Idea	Performance Expectations
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.	8.2.8.ITH.2: Compare how technologies have influenced society over time
New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
A solution needs to be tested, and then modified on the basis of the test	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

<p>results, in order to improve it.</p> <p>Models of all kinds are important for testing solutions.</p> <p>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.</p>	<p>can be achieved.</p>
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Unit 1 Evidence of Student Learning

Performance Tasks/Use of Technology:	Other Assessments
<p>Explain the Law of Conservation of Mass through lab activity and PBL (using Gizmos, PHET Interactive, various websites)</p> <p>Identify pure substances by their physical and chemical properties (lab investigations)</p> <p>Describe how atoms are regrouped into different molecules during chemical reactions (lab activities, Gizmo, Phet Interactives)</p> <p>Undertake a design project to construct, test, and modify a device that releases or absorbs energy through chemical processes</p>	<p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning) <p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams ➤ Final Exams ➤ Performance Assessment <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model

Unit 1 Knowledge and Skills	
Unit 1 Learning Targets Objectives	
<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ➤ Explain the arrangement and behavior of particles in solids, liquids, and gases. ➤ Describe how matter changes between states by using molecular-level explanations. ➤ Illustrate how atoms are rearranged during chemical reactions to form new substances. ➤ Provide molecular-level accounts of how chemical reactions involve the regrouping of atoms. 	
Unit 1 Enduring Understandings	Unit 1 Essential Questions
<p><i>Students will know:</i></p> <ul style="list-style-type: none"> ➤ During chemical reactions, molecules break apart and rearrange to form new substances. ➤ Matter is conserved in chemical reactions; atoms are neither created nor destroyed, only rearranged. ➤ The behavior of molecules differs in solids, liquids, and gases, influencing how matter changes state. ➤ Chemical reactions can either absorb or release energy, depending on the nature of the reaction. ➤ Physical and chemical changes can be identified by observing specific signs and reaction outcomes. ➤ The chemical properties of materials influence how they are used in everyday applications and technologies. 	<ul style="list-style-type: none"> ➤ What happens to molecules when substances undergo chemical or physical changes? ➤ How can we identify and predict the outcomes of physical and chemical reactions? ➤ How does the Law of Conservation of Mass apply to reactions in a closed system? ➤ In what ways do the chemical properties of a material determine its usefulness?
Unit 1 Instructional Plan	
Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest 	<ul style="list-style-type: none"> ➤ McGraw Hill, <i>Integrated Science: Course 2</i> ➤ <u>Science World</u> Journals ➤ Online web quests ➤ YouTube links ➤ Nearpod ➤ BrainPop

- Open-ended lab reflections (CER)
- Labs and Engineering based projects

- EdPuzzle
- Colorado PhET
- Gizmos

Suggested Options for Differentiation, Accommodations, and Modifications

Special Education

- Follow all IEP modifications.
 - Use visuals, diagrams, and graphic organizers to support abstract concepts.
 - Pre-teach and review vocabulary and scientific terms.
 - Provide guided notes, outlines, and study guides.
 - Offer leveled texts or simplified resources when needed.
 - Provide small-group or one-on-one instruction.
 - Pair students with supportive lab partners or peer tutors.
 - Read aloud directions and model lab procedures.
 - Offer preferential seating near teacher, board, or lab materials.
 - Allow extended time for labs, projects, and assessments.
 - Accept oral, dictated, or technology-supported responses.
 - Modify workload or adjust the number of test/assignment items.
 - Provide access to large-print, Braille, or digital texts with audio features.
 - Allow scribes or communication devices when required.
 - Incorporate interactive simulations, videos, and multimedia supports.
-

Students with 504 Plans

- Follow the 504 plan.
 - Provide extended time for labs, projects, and assessments.
 - Offer small-group or quiet testing settings.
 - Accept oral, dictated, or typed responses.
 - Provide large-print, Braille, or digital text with assistive technology.
 - Allow use of scribes or communication devices.
-

Students at Risk of School Failure

- Use visuals, models, and real-life examples to explain concepts.
- Pre-teach vocabulary and connect science content to prior knowledge.
- Break labs and projects into smaller, step-by-step tasks.
- Provide frequent teacher check-ins and feedback.
- Offer small-group instruction and structured practice.
- Assign supportive partners during labs or projects.
- Provide preferential seating.

- Scaffold writing tasks (sentence starters, lab report templates).
-

Gifted and Talented

- Ask open-ended, higher-order science questions (evaluate, create, hypothesize).
 - Encourage independent investigations, experiments, or research.
 - Provide enrichment projects, STEM challenges, or cross-curricular connections.
 - Offer advanced science texts, journals, or online resources.
 - Use flexible grouping for inquiry-based labs, projects, and debates.
 - Allow choice in assessments (presentations, research papers, experiments).
 - Incorporate simulations, problem-solving competitions, or design challenges.
 - Provide opportunities to reflect and share findings with authentic audiences.
-

Multilingual Learners

- Collaborate with ESL/MLL teachers.
 - Provide small-group and partner learning opportunities.
 - Pre-teach and revisit science vocabulary using visuals, cognates, and realia.
 - Use bilingual glossaries, labeled diagrams, and picture dictionaries.
 - Scaffold writing with sentence frames, lab templates, and structured outlines.
 - Provide oral response options and extended time.
 - Use digital supports (translation tools, captioned videos, audio readings).
 - Scaffold academic conversations with discussion stems and lab talk routines.
-

Diversity and Inclusion

- Integrate diverse cultural contributions to science.
- Provide alternative formats for projects (oral, digital, hands-on).
- Use visuals, diagrams, and clear academic language.
- Avoid slang and idioms; emphasize precise scientific vocabulary.
- Collaborate with cultural liaisons and support staff.
- Establish inclusive classroom routines and norms.
- Allow sufficient wait time before calling on students.
- Build strong family partnerships and communicate science learning goals.

Core Instructional and Supplemental Materials and Additional Resources

Instructional Materials

- Textbook
- Laboratory manuals and equipment

- OpenSci Ed manuals and instructional material

Supplemental Materials

- Teacher generated presentations
- Science websites (National Geographic, PBS Learning, NewsELA, Next Generation Science, Gizmos, PHET, HHMI, Amoeba Sisters)
- EdPuzzle videos
- NearPod lessons
- Multimedia resources
- Chromebooks
- Station work

Intervention Materials

- Individuals with disabilities Resources
- School databases
- Multimedia Resources
- Online Resources and videos
- LinkIt Data
- MLL translations
- Translation apps
- Graphic organizers, guided notes
- Student- teacher goal setting
- Think, Pair, Share
- Review games
- Tiered assignments

Social and Emotional Learning - New Jersey SEL

Competencies and Sub-Competencies Social and emotional learning (SEL) involves the process through which children and adults acquire and apply the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions. The purpose of the SEL competencies is to provide schools with guidelines for integrating SEL across grades and subject areas.

Self-Awareness

- 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

Self-Management

- Understand and practice strategies for managing one's own emotions, thoughts and behaviors

- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals

Social Awareness

- Recognize and identify the thoughts, feelings and perspectives of others
- Demonstrate 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

- 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

- 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

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL	
Unit 2 Overview	
Content Area: Life Science	Target Course/Grade Levels: 7th Grade
Unit 2: From Molecules to Organisms: Structures and Processes	Duration: 30 Days

Introduction/Unit Focus:

In this unit, students explore how both genetic and environmental factors influence the growth and development of individual organisms. By analyzing data and using conceptual models, students gain an understanding of how traits are expressed and how external conditions such as availability of resources or climate can impact biological development.

Building on this foundation, students investigate how certain behaviors and physical structures contribute to the reproductive success of organisms. They examine how animal behaviors, such as courtship or migration, support reproduction and how some plants rely on animals for pollination or seed dispersal. Through these examples, students collect and use evidence to explain how specific traits or actions increase the chances of survival and reproduction in different species.

This unit emphasizes the crosscutting concepts of cause and effect, and structure and function. These themes help students make connections between observable traits, environmental influences, and biological outcomes. Students engage in science and engineering practices such as analyzing and interpreting data, developing and using models, conducting investigations, and effectively communicating their findings. These practices support a deeper understanding of the core ideas related to biological growth and reproduction.

Disciplinary Content for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A:52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
- (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
- (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLs) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 2 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLS-Science.pdf>

MS-LS1-4 Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

[Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.] •

MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]

MS-LS4-5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]

Science and Engineering
Practices

Disciplinary Core Ideas

Crosscutting Concepts

<p>Developing and Using Models</p> <ul style="list-style-type: none">➤ Modeling in 6-8 builds on K-5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (MS-LS1-2)➤ Develop a model to describe unobservable mechanisms. (MS-LS1-7)➤ Planning and Carrying Out Investigations Planning and carrying out investigations 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. Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1)➤ Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6-8 builds on K-5 experiences and	<p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none">➤ Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)➤ 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) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none">➤ 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	<p>Cause and Effect</p> <ul style="list-style-type: none">➤ Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS3-2)➤ Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4), (MS-LS1-5) <p>Structure and Function</p> <ul style="list-style-type: none">➤ Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS3-1) <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none">➤ Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led
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<p>progresses to include constructing explanations and designing solutions supported by multiple sources of evidence</p>	<p>change traits. (MS-LS3-1)</p> <ul style="list-style-type: none"> ➤ 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) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> ➤ 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 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) 	<p>to the development of entire industries and engineered systems. (MS-LS4-5)</p> <p>Connections to Nature of Science</p> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> ➤ Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3) <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ➤ Science knowledge is based upon logical connections between evidence and explanations. (MS-LS1-6) <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> ➤ Science assumes that objects and events in natural systems occur in consistent ➤ patterns that are understandable through ➤ measurement and observation. (MS-LS4-1, LS4-2)
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	<p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> ➤ 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) 	<p>Science Addresses Questions About the Natural and Material World</p> <ul style="list-style-type: none"> ➤ Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS4-5)
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[Supporting and Additional Standards Unit 2
New Jersey Student Learning Standards-Mathematics
New Jersey Student Learning Standards-ELA
https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf](https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf)

ELA/Literacy -

RI.CR.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.. (MS-LS1-3), (MS-LS1-4), (MS-LS1-5), (MS-LS1-6)

RI.CI.7.2. Determine a central idea in an informational text and explain how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. (MS-LS1-5), (MS-LS1-6)

RI.AA.7.7. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS1-3), (MS-LS1-4)

W.AW.7.1. Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

A. Introduce claim(s) about a topic or issue, acknowledge alternate or opposing claims,

and organize the reasons and evidence logically.

- B. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- C. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
- D. Establish and maintain a formal style/academic style, approach, and form.
- E. Provide a concluding statement or section that follows from and supports the argument presented.. (MS-LS1-3), (MS-LS1-4)

W.IW.7.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

- A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aid in comprehension.
- B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
- C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
- D. Use precise language and domain/ grade-level- specific vocabulary to inform about or explain the topic.
- E. Establish and maintain a formal style academic style, approach, and form.

Provide a concluding statement or section (e.g., sentence, part of a paragraph, paragraph, or multiple paragraphs) that follows the flow of ideas, reflects back on the topic, and supports the information or explanation presented. (MS-LS1-5), (MS-LS1-6)

W.WR.7.5. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation. (MS-LS1-1)

W.SE.7.6. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS1-8) (MS-LS1-5), (MS-LS1-6)

SL.UM.7.5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS1-2), (MS-LS1-7)

Mathematics -

6.EE.C. Represent and analyze quantitative relationships between dependent and independent variables

- 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent

variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation to represent the relationship between distance and time. (MS-LS1-1), (MS-LS1-2), (MS-LS1-3), (MS-LS1-6)

6.SP.A. Develop understanding of statistical variability

2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-4), (MS-LS1-5)

6.SP.B. Summarize and describe distributions

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (MS-LS1-4), (MS-LS1-5)

Unit 2 New Jersey Student Learning Standards Connections: Career Readiness, Life Literacies, and Key Skills

Disciplinary Concepts: Career Awareness and Planning (9.2)

<i>Core Ideas</i>	Performance Expectations (Identified with Standard Number and Statement)
An individual's strengths, lifestyle goals, choices, and interests affect employment and income	<p>9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.</p> <p>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.</p>
Early planning can provide more options to pay for postsecondary training and employment.	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.
There are a variety of resources available to help navigate the career planning process.	<p>9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.</p> <p>9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.</p>
Communication skills and responsible behavior in addition to education,	9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can

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experience, certifications, and skills are all factors that affect employment and income.	determine an individual’s earning power. 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
Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Multiple solutions often exist to solve a problem.	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).
Disciplinary Concepts: Digital Citizenship (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one’s own work.	9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Unit 2 New Jersey Student Learning Standards: Computer Science and Design Thinking	
Disciplinary Concepts: Data and Analysis	
Core Ideas	Performance Expectations

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People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Disciplinary Concepts: Engineering Design	
Core Idea	Performance Expectations
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
Disciplinary Concepts: Interaction of Technology and Humans	
Core Idea	Performance Expectations
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants	8.2.8.ITH.2: Compare how technologies have influenced society over time

<p>may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.</p>	
<p>New Jersey Student Learning Standards: Climate Change Mandate</p>	
<p>Core Ideas</p>	<p>Performance Expectations (Identified with Standard Number and Statement)</p>
<p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.</p>	<p>MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>
<p>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 are likely to limit possible solutions.</p>	<p>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</p>
<p>Unit 2 Evidence of Student Learning</p>	
<p>Performance Tasks/Use of Technology: Animal Behaviors / Changes in genetic materials</p> <ul style="list-style-type: none"> ➤ Peacock spider courtship dance activity and model ➤ Investigate courtship behaviors creating presentation ➤ Pollinator activity/ Design own flower for pollinator (STEM) ➤ Examine data and graphs to use as evidence of courtship behavior ➤ Design a Seed STEM challenge ➤ Asexual and sexual reproduction ➤ Influence of Humans on genetic outcomes ➤ Gene therapy ➤ Simulations ➤ Genetic Variations ➤ Design your own GMO project 	<p style="text-align: center;">Other Assessments</p> <p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning) <p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations

<ul style="list-style-type: none"> ➤ Nonfiction summaries 	<ul style="list-style-type: none"> ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams ➤ Final Exams ➤ Performance Assessments <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model
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Unit 2 Knowledge and Skills

Unit 2 Learning Targets

Students will be able to:

- Explain how reproduction allows genetic traits to be passed from parents to offspring.
- Compare and contrast sexual and asexual reproduction and their outcomes on genetic diversity.
- Analyze the traits, behaviors, and reproductive strategies of plants and animals that increase the likelihood of successful reproduction.
- Investigate how mutations and other changes in genetic material can have beneficial, harmful, or neutral effects on an organism's structure and function.

Unit 2 Enduring Understandings

Unit 2 Essential Questions

Students will know:

- Organisms inherit traits from previous generations through reproductive processes.
- Sexual and asexual reproduction result in different patterns of inheritance and variation.
- Reproductive success in animals and plants is often influenced by specific traits and behaviors.
- Changes in genetic material can impact organisms in multiple ways, influencing how they grow, function, or survive.

- What is heredity, and how are traits passed from one generation to the next?
- How do dominant and recessive traits, along with mutations, contribute to variation in offspring?
- How do reproductive strategies, behaviors, and structures affect the success of reproduction in different organisms?
- How and why do organisms change throughout their life cycle?

Unit 2 Instructional Plan

Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest ➤ Open-ended lab reflections ➤ Labs and Engineering based projects 	<ul style="list-style-type: none"> ➤ McGraw Hill ➤ <u>Science World Journals</u> ➤ Online web quests ➤ Youtube links ➤ Nearpod ➤ BrainPop ➤ EdPuzzle ➤ Google Suite ➤ Gizmos ➤ PHET

Suggested Options for Differentiation, Accommodations, and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, diagrams, and graphic organizers to support abstract concepts.
- Pre-teach and review vocabulary and scientific terms.
- Provide guided notes, outlines, and study guides.
- Offer leveled texts or simplified resources when needed.
- Provide small-group or one-on-one instruction.
- Pair students with supportive lab partners or peer tutors.
- Read aloud directions and model lab procedures.
- Offer preferential seating near teacher, board, or lab materials.
- Allow extended time for labs, projects, and assessments.
- Accept oral, dictated, or technology-supported responses.
- Modify workload or adjust the number of test/assignment items.
- Provide access to large-print, Braille, or digital texts with audio features.
- Allow scribes or communication devices when required.
- Incorporate interactive simulations, videos, and multimedia supports.

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing settings.
- Accept oral, dictated, or typed responses.
- Provide large-print, Braille, or digital text with assistive technology.
- Allow use of scribes or communication devices.

Students at Risk of School Failure

- Use visuals, models, and real-life examples to explain concepts.
 - Pre-teach vocabulary and connect science content to prior knowledge.
 - Break labs and projects into smaller, step-by-step tasks.
 - Provide frequent teacher check-ins and feedback.
 - Offer small-group instruction and structured practice.
 - Assign supportive partners during labs or projects.
 - Provide preferential seating.
 - Scaffold writing tasks (sentence starters, lab report templates).
-

Gifted and Talented

- Ask open-ended, higher-order science questions (evaluate, create, hypothesize).
 - Encourage independent investigations, experiments, or research.
 - Provide enrichment projects, STEM challenges, or cross-curricular connections.
 - Offer advanced science texts, journals, or online resources.
 - Use flexible grouping for inquiry-based labs, projects, and debates.
 - Allow choice in assessments (presentations, research papers, experiments).
 - Incorporate simulations, problem-solving competitions, or design challenges.
 - Provide opportunities to reflect and share findings with authentic audiences.
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Multilingual Learners

- Collaborate with ESL/MLL teachers.
 - Provide small-group and partner learning opportunities.
 - Pre-teach and revisit science vocabulary using visuals, cognates, and realia.
 - Use bilingual glossaries, labeled diagrams, and picture dictionaries.
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Diversity and Inclusion

- Integrate diverse cultural contributions to science.
- Provide alternative formats for projects (oral, digital, hands-on).
- Use visuals, diagrams, and clear academic language.
- Avoid slang and idioms; emphasize precise scientific vocabulary.
- Collaborate with cultural liaisons and support staff.

- Establish inclusive classroom routines and norms.
- Allow sufficient wait time before calling on students.
- Build strong family partnerships and communicate science learning goals.

Core Instructional and Supplemental Materials and Additional Resources

Instructional Materials

- Textbook
- Laboratory manuals and equipment
- OpenSci Ed manuals and instructional material

Supplemental Materials

- Teacher generated presentations
- Science websites (National Geographic, PBS Learning, NewsELA, Next Generation Science, Gizmos, PHET, HHMI, Amoeba Sisters)
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- Multimedia resources
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Intervention Materials

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- LinkIt Data
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- Student- teacher goal setting
- Think, Pair, Share
- Review games
- Tiered assignments

Social and Emotional Learning - New Jersey SEL

Competencies and Sub-Competencies Social and emotional learning (SEL) involves the process through which children and adults acquire and apply the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible

decisions. The purpose of the SEL competencies is to provide schools with guidelines for integrating SEL across grades and subject areas.

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- Recognize one's feelings and thoughts
- Recognize the impact of one's feelings and thoughts on one's own behavior
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Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 3 Overview	
Content Area: Science	
Course Title: 7th Grade Science	Target Course/Grade Levels: 7th
Unit 3: Heredity: Inheritance and Variation of Traits	Duration: 30 days
Introduction/Unit Focus:	
<p>In this unit, students explore how genetic information is passed from one generation to the next and how it contributes to the diversity of life. They will develop and use models to explain how sexual reproduction and gene mutations result in genetic variation among organisms. By examining both sexual and asexual reproduction, students gain a deeper understanding of how different reproductive strategies impact the inheritance of traits and the variation within populations.</p> <p>Students investigate how genetic factors influence the growth and development of individual organisms, and how changes in genetic material such as mutations can lead to differences in structure and function. Through these investigations, students build their understanding of heredity and how traits are inherited across generations.</p> <p>The unit emphasizes two key crosscutting concepts: cause and effect and structure and function. These ideas serve as a framework for understanding how specific genes influence physical and behavioral traits, and how changes at the genetic level can lead to observable differences in organisms. As part of the science and engineering practices, students are expected to demonstrate proficiency in developing and using models to explain their thinking and apply disciplinary core ideas.</p> <p>Through hands-on activities, model creation, and analysis of patterns in inheritance, students strengthen their understanding of how reproduction and genetics shape the living world. This foundational knowledge sets the stage for future study in biology and life sciences.</p>	
Disciplinary Content for the Unit	
<p>Standard 9.1 Personal Financial Literacy</p> <p>This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.</p>	

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A:52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

- (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
- (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 3 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLS-Science.pdf>

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. [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]

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. [Clarification Statement: 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.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models ➤ Modeling in 6-8 builds on K-5 experiences	LS1.B: Growth and Development of Organisms Organisms reproduce, either sexually or asexually, and	Cause and Effect Cause and effect relationships may be used to

<p>and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <p>➤ Develop and use a model to describe phenomena. (MS-LS3-1), (MS-LS3-2)</p>	<p>transfer their genetic information to their offspring. (secondary to MSL3-2)</p> <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none">➤ 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) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none">➤ In sexually reproducing organisms, each parent contributes half of the genes acquired (at random)	<p>predict phenomena in natural systems. (MS-LS3-2)</p> <p>Structure and Function</p> <p>Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS3-1)</p>
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	<p>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 or may differ from each other. (MS-LS3-2)</p> <p>➤ 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)</p>	
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Unit 3

Supporting and Additional Standards

[New Jersey Student Learning Standards-Mathematics](#)

[New Jersey Student Learning Standards-ELA](#)

<https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf>

ELA/Literacy -

L.KL.7.2. Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.

Gather vocabulary knowledge when selecting a word or phrase important to comprehension or expression.

Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy. (MS-LS3-1), (MS-LS3-2)

SL.II.7.2. Analyze the main ideas and supporting details presented in diverse media and

formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. (MS-LS3-1), (MS-LS3-2)

SL.UM.7.5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS3-1), (MS-LS3-2)

Mathematics -

MP.4 Model with mathematics. (MS-LS3-2)

6.SP.B. Summarize and describe distributions

5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered (MS-LS3-2)

Unit 3 New Jersey Student Learning Standards Connections: Career Readiness, Life Literacies, and Key Skills

Disciplinary Concepts: Career Awareness and Planning (9.2)

<i>Core Ideas</i>	Performance Expectations (Identified with Standard Number and Statement)
An individual's strengths, lifestyle goals, choices, and interests affect employment and income	<p>9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.</p> <p>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.</p>
Early planning can provide more options to pay for postsecondary training and employment.	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.

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<p>There are a variety of resources available to help navigate the career planning process.</p>	<p>9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.</p> <p>9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.</p>
<p>Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.</p>	<p>9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.</p> <p>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</p>
<p>Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)</p>	
<p><i>Core Ideas</i></p>	<p>Performance Expectations (Identified with Standard Number and Statement)</p>
<p>Multiple solutions often exist to solve a problem.</p>	<p>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).</p>
<p>Disciplinary Concepts: Digital Citizenship (9.4)</p>	
<p><i>Core Ideas</i></p>	<p>Performance Expectations (Identified with Standard Number and Statement)</p>
<p>Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.</p>	<p>9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).</p>
<p>Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.</p>	<p>9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.</p>

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Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Unit 3 New Jersey Student Learning Standards: Computer Science and Design Thinking	
Disciplinary Concepts: Data and Analysis	
Core Ideas	Performance Expectations
People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Disciplinary Concepts: Engineering Design	
Core Idea	Performance Expectations
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas,	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

<p>choosing the best solution, and making, testing, and redesigning models or prototypes.</p>	<p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p>
<p>Disciplinary Concepts: Interaction of Technology and Humans</p>	
<p>Core Idea</p>	<p>Performance Expectations</p>
<p>Technology interacts with society, sometimes bringing about changes in a society’s economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.</p>	<p>8.2.8.ITH.2: Compare how technologies have influenced society over time</p>
<p>New Jersey Student Learning Standards: Climate Change Mandate</p>	
<p>Core Ideas</p>	<p>Performance Expectations (Identified with Standard Number and Statement)</p>
<p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things.</p>	<p>MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p> <p>MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.</p>
<p>Unit 3 Evidence of Student Learning</p>	
<p>Performance Tasks/Use of Technology:</p> <p>Open SciEd genetic lesson with extra muscled cattle</p> <p>Pocket Mouse mutation of coloring and connection with natural selection</p> <p>Examine examples of mutations in humans and other organisms</p>	<p style="text-align: center;">Other Assessments</p> <p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook

<p>Punnett square practices</p> <p>Online interactives with Punnett squares</p> <p>Fingerprint lab activity</p> <p>Snowman genetics activity/project</p> <p>Switchzoo online project</p> <p>Nonfiction article summaries</p>	<ul style="list-style-type: none"> ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning) <p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams ➤ Final Exams ➤ Performance Assessment <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model
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Unit 3 Knowledge and Skills

Unit 3 Learning Targets

Students will be able to:

- Explain how genetic traits are passed from parents to offspring through reproduction.
- Analyze how changes in genetic material (mutations) can have harmful, beneficial, or neutral effects on an organism's structure and function.
- Use Punnett squares as a model to predict the probability of an offspring inheriting specific traits.
- Interpret patterns of inheritance using models to represent genetic variation and mutation.

Unit 3 Enduring Understandings

Unit 3 Essential Questions

Students will know:

- Heredity explains how traits and genetic information are passed from one generation to the next.
- Mutations can alter DNA and lead to changes in an organism's traits, which may impact its survival or function.
- Sexual reproduction increases genetic

- How do mutations and inherited traits contribute to genetic variation in offspring?
- What is heredity, and how are traits passed from parents to offspring?
- How do organisms' structures and behaviors support successful

<p>diversity by producing offspring with a mix of traits from both parents.</p> <ul style="list-style-type: none"> ➤ Models, such as Punnett squares, help represent and predict how traits are inherited. 	<p>reproduction?</p> <ul style="list-style-type: none"> ➤ How can we use tools like Punnett squares to predict the likelihood of an offspring inheriting a trait?
Unit 3 Instructional Plan	
Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest ➤ Open-ended lab reflections ➤ Labs and Engineering based projects 	<ul style="list-style-type: none"> ➤ McGraw Hill, <i>Integrated Science: Course 3</i> ➤ <u>Science World Journals</u> ➤ Online web quests ➤ Youtube links ➤ Nearpod ➤ BrainPop ➤ EdPuzzle ➤ Google Suite ➤ Colorado PhET ➤ Gizmos ➤ HHMI
Suggested Options for Differentiation, Accommodations, and Modifications	
<p>Special Education</p> <ul style="list-style-type: none"> ➤ Follow all IEP modifications. ➤ Use visuals, diagrams, and graphic organizers to support abstract concepts. ➤ Pre-teach and review vocabulary and scientific terms. ➤ Provide guided notes, outlines, and study guides. ➤ Offer leveled texts or simplified resources when needed. ➤ Provide small-group or one-on-one instruction. ➤ Pair students with supportive lab partners or peer tutors. ➤ Read aloud directions and model lab procedures. ➤ Offer preferential seating near teacher, board, or lab materials. ➤ Allow extended time for labs, projects, and assessments. ➤ Accept oral, dictated, or technology-supported responses. ➤ Modify workload or adjust the number of test/assignment items. ➤ Provide access to large-print, Braille, or digital texts with audio features. ➤ Allow scribes or communication devices when required. ➤ Incorporate interactive simulations, videos, and multimedia supports. <hr style="width: 20%; margin-left: 0;"/>	

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- 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
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Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL
Unit 4 Overview

Content Area: Science

Course Title: 7th Grade Science

Target Course/Grade Levels: 7th

Unit 4: Biological Evolution: Unity and Diversity

Duration: 40 Days

Introduction/Unit Focus:

In this unit, students develop a foundational understanding of natural selection and biological evolution. Through evidence-based reasoning, students construct explanations for how and why certain traits become more or less common in a population over time. They examine how genetic variation within a species contributes to an organism’s ability to survive, reproduce, and pass on advantageous traits to the next generation.

Students explore how environmental pressures influence which traits are favored in a population, and how these patterns of selection shape the diversity of life on Earth. The concepts of patterns and structure and function serve as crosscutting themes that help students make connections between traits, their purpose, and their evolutionary advantages. These concepts guide students as they analyze the relationships between physical features, behaviors, and survival in changing environments.

Throughout the unit, students engage in science and engineering practices such as constructing explanations, obtaining, evaluating, and communicating information, and applying mathematical and computational thinking. These practices help them build a deeper understanding of the disciplinary core ideas related to evolution and heredity. By analyzing data and using evidence to support claims, students gain insight into how species change over time and how the mechanisms of natural selection drive evolutionary processes.

This unit empowers students to think critically about the science of evolution, equipping them with the tools to explain the diversity of life and the role of inheritance and environment in shaping organisms across generations.

Disciplinary Content for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian,

gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
- (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
- (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLs) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 4 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLs-Science.pdf>

MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]

MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]

MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. [Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.]

MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]

MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data Analyzing data in 6-8 builds on K-5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.</p> <ul style="list-style-type: none"> ➤ Analyze displays of data to identify linear and nonlinear relationships. (MS-LS4-3) ➤ Analyze and interpret data to determine similarities and differences in findings. (MS-LS4-1) 	<p>LS4.A: Evidence of Common Ancestry and Diversity</p> <ul style="list-style-type: none"> ➤ The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. (MS-LS4-1) 	<p>Patterns</p> <ul style="list-style-type: none"> ➤ Patterns can be used to identify cause and effect relationships. (MS-LS4-2) ➤ Graphs, charts, and images can be used to identify patterns in data. (MS-LS4-1), (MS-LS4-3) <p>Cause and Effect</p> <ul style="list-style-type: none"> ➤ Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

<p>Using Mathematics and Computational Thinking Mathematical and computational thinking in 6-8 builds on K-5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.</p> <ul style="list-style-type: none"> ➤ Use mathematical representations to support scientific conclusions and design solutions. (MS-LS4-6) <p>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.</p> <ul style="list-style-type: none"> ➤ Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. (MS-LS4-2) ➤ Construct an explanation that includes qualitative or quantitative relationships between variables that 	<ul style="list-style-type: none"> ➤ 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 relationships not evident in the fully-formed anatomy. (MS-LS4-3) <p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> ➤ 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) 	<p>(MS-LS4-4), (MS-LS4-5), (MS-LS4-6)</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> ➤ 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-LS4-5) <p><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ➤ Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-LS4-1) <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> ➤ Science assumes that objects and events in natural systems occur in consistent patterns that are
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<p>describe phenomena. (MS-LS4-4)</p> <p>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.</p> <ul style="list-style-type: none"> ➤ Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS4-5) 	<p>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)</p>	<p>understandable through measurement and observation. (MS-LS4-1), (MS-LS4-2)</p> <p>Science Addresses Questions About the Natural and Material World</p> <ul style="list-style-type: none"> ➤ Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS4-5)
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[Supporting and Additional Standards Unit 4
New Jersey Student Learning Standards-Mathematics
New Jersey Student Learning Standards-ELA
https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf](https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf)

ELA/Literacy -

RI.CR.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text. (MS-LS4-1), (MS-LS4-2), (MS-LS4-3), (MS-LS4-4), (MS-LS4-5)

SL.II.7.2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. (MS-LS4-1), (MS-LS4-3)

RI.MF.7.6. Compare and contrast texts to analyze the unique qualities of different mediums, including the integration of information from multiple formats and sources to develop deeper understanding of the concept, topic or subject and resolve conflicting information..

(MS-LS4-3), (MS-LS4-4)

W.IW.7.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

- A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aid in comprehension.
- B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
- C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
- D. Use precise language and domain/ grade-level- specific vocabulary to inform about or explain the topic.
- E. Establish and maintain a formal style academic style, approach, and form.
- F. Provide a concluding statement or section (e.g., sentence, part of a paragraph, paragraph, or multiple paragraphs) that follows the flow of ideas, reflects back on the topic, and supports the information or explanation presented. (MS-LS4-2), (MS-LS4-4) •

W.SE.7.6. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS4-5) •

RI.AA.7.7. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS4-2), (MS-LS4-4)

SL.PE.7.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
- B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.
- C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.
- D. Acknowledge new information expressed by others and, when warranted, modify their own views

SL.PI.7.4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye

contact, adequate volume, and clear pronunciation. (MS-LS4-2), (MS-LS4-4)

Mathematics -

MP.4 Model with mathematics. (MS-LS4-6)

6.RP.A. Understand ratio concepts and use ratio reasoning to solve problems

1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”(MS-LS4-4), (MS-LS4-6)

SPB. Summarize and describe distributions

5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.(MS-LS4-4), (MS-LS4-6)

6.EE.B. Reason about and solve one-variable equations and inequalities

6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.(MS-LS4-1), (MS-LS4-2)

7.RP.A. Analyze proportional relationships and use them to solve real-world and mathematical problems

2. Recognize and represent proportional relationships between quantities.
 - a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
 - b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
 - c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as
 - d. Explain what a point on the graph of a proportional relationship means in terms

<p>of the situation, with special attention to the points (0, 0) and where the unit rate is. (MS-LS4-4), (MS-LS4-6)</p>	
<p><i>Unit 4 New Jersey Student Learning Standards Connections: Career Readiness, Life Literacies, and Key Skills</i></p>	
<p>Disciplinary Concepts: Career Awareness and Planning (9.2)</p>	
<p><i>Core Ideas</i></p>	<p>Performance Expectations (Identified with Standard Number and Statement)</p>
<p>An individual’s strengths, lifestyle goals, choices, and interests affect employment and income</p>	<p>9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.</p> <p>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.</p>
<p>Early planning can provide more options to pay for postsecondary training and employment.</p>	<p>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.</p>
<p>There are a variety of resources available to help navigate the career planning process.</p>	<p>9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.</p> <p>9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.</p>
<p>Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.</p>	<p>9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual’s earning power.</p> <p>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.</p>

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Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Multiple solutions often exist to solve a problem.	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).
Disciplinary Concepts: Digital Citizenship (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.	9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Unit 4 New Jersey Student Learning Standards: Computer Science and Design Thinking	
Disciplinary Concepts: Data and Analysis	
Core Ideas	Performance Expectations
People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.

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Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Disciplinary Concepts: Engineering Design	
Core Idea	Performance Expectations
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
Disciplinary Concepts: Interaction of Technology and Humans	
Core Idea	Performance Expectations
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.	8.2.8.ITH.2: Compare how technologies have influenced society over time
New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	Performance Expectations (Identified

with Standard Number and Statement)	
<p>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.</p>	<p>MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</p>
<p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things.</p>	<p>MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p> <p>MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.</p>
Unit 4 Evidence of Student Learning	
<p>Performance Tasks/Use of Technology:</p> <p>Pocket Mouse case study- HHMI lesson- video, pictures, patterns, graphing, data collection</p> <p>Peppered Moth online interactive and analysis of data, graphing</p> <p>Galapagos Finches case study- HHMI lesson- video, pictures, patterns, graphing, data collection</p> <p>The Great Fossil Find- bone sorting and reconstruction activity</p> <p>Human evolution project- kleki.com, YouTube Evolution CER</p> <p>Guess the Embryo online interactive</p> <p>Homologous structures as evidence of evolution</p>	<p style="text-align: center;">Other Assessments</p> <p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning) <p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams

	<ul style="list-style-type: none"> ➤ Final Exams ➤ Performance Assessment <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model
Unit 4 Knowledge and Skills	
Unit 4 Learning Targets	
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> ➤ Describe natural selection and explain how genetic variation within a population influences an organism’s chances of survival and reproduction. ➤ Analyze fossil evidence and identify patterns of change over time to explain the history of life on Earth. ➤ Construct explanations for anatomical similarities and differences between modern organisms and fossilized species. ➤ Explain how species diversity develops gradually over long periods through evolutionary processes. ➤ Use mathematical models to represent how environmental changes influence trait distribution in a population over many generations. 	
Unit 4 Enduring Understandings	Unit 4 Essential Questions
<p><i>Students will know:</i></p> <ul style="list-style-type: none"> ➤ Natural selection is a key mechanism of evolution, in which organisms with traits better suited to their environment are more likely to survive and reproduce. ➤ Genetic variation plays a crucial role in determining which traits are passed on in a population. ➤ Over time, traits that are not beneficial to survival and reproduction may decrease or disappear from a population. ➤ Behavioral and physical traits influence an organism’s ability to survive, thrive, and reproduce in specific environments. ➤ Fossil records provide evidence of the gradual changes in life forms over Earth's history 	<ul style="list-style-type: none"> ➤ How does genetic variation among individuals affect the survival and reproduction of organisms within a species? ➤ What role do heredity and environmental conditions play in shaping organisms over time? ➤ How do fossil records and anatomical comparisons help us understand the evolutionary history of life on Earth? ➤ In what ways do physical traits and behaviors impact an organism’s ability to adapt and survive in its environment? ➤ How do organisms grow, develop, and reproduce in response to their surroundings and genetic makeup?

Unit 4 Instructional Plan	
Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest ➤ Open-ended lab reflections ➤ Labs and Engineering based projects 	<ul style="list-style-type: none"> ➤ McGraw Hill, <i>Integrated Science: Course 1</i> ➤ <u>Science World Journals</u> ➤ Online web quests ➤ Youtube links ➤ Nearpod ➤ BrainPop ➤ EdPuzzle ➤ Google Suite ➤ Colorado PHET ➤ Gizmos ➤ HHMI
Suggested Options for Differentiation, Accommodations, and Modifications	
<p>Special Education</p> <ul style="list-style-type: none"> ➤ Follow all IEP modifications. ➤ Use visuals, diagrams, and graphic organizers to support abstract concepts. ➤ Pre-teach and review vocabulary and scientific terms. ➤ Provide guided notes, outlines, and study guides. ➤ Offer leveled texts or simplified resources when needed. ➤ Provide small-group or one-on-one instruction. ➤ Pair students with supportive lab partners or peer tutors. ➤ Read aloud directions and model lab procedures. ➤ Offer preferential seating near teacher, board, or lab materials. ➤ Allow extended time for labs, projects, and assessments. ➤ Accept oral, dictated, or technology-supported responses. ➤ Modify workload or adjust the number of test/assignment items. ➤ Provide access to large-print, Braille, or digital texts with audio features. ➤ Allow scribes or communication devices when required. ➤ Incorporate interactive simulations, videos, and multimedia supports. <hr/> <p>Students with 504 Plans</p> <ul style="list-style-type: none"> ➤ Follow the 504 plan. ➤ Provide extended time for labs, projects, and assessments. ➤ Offer small-group or quiet testing settings. ➤ Accept oral, dictated, or typed responses. ➤ Provide large-print, Braille, or digital text with assistive technology. 	

- Allow use of scribes or communication devices.
-

Students at Risk of School Failure

- Use visuals, models, and real-life examples to explain concepts.
 - Pre-teach vocabulary and connect science content to prior knowledge.
 - Break labs and projects into smaller, step-by-step tasks.
 - Provide frequent teacher check-ins and feedback.
 - Offer small-group instruction and structured practice.
 - Assign supportive partners during labs or projects.
 - Provide preferential seating.
 - Scaffold writing tasks (sentence starters, lab report templates).
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Gifted and Talented

- Ask open-ended, higher-order science questions (evaluate, create, hypothesize).
 - Encourage independent investigations, experiments, or research.
 - Provide enrichment projects, STEM challenges, or cross-curricular connections.
 - Offer advanced science texts, journals, or online resources.
 - Use flexible grouping for inquiry-based labs, projects, and debates.
 - Allow choice in assessments (presentations, research papers, experiments).
 - Incorporate simulations, problem-solving competitions, or design challenges.
 - Provide opportunities to reflect and share findings with authentic audiences.
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Multilingual Learners

- Collaborate with ESL/MLL teachers.
 - Provide small-group and partner learning opportunities.
 - Pre-teach and revisit science vocabulary using visuals, cognates, and realia.
 - Use bilingual glossaries, labeled diagrams, and picture dictionaries.
 - Scaffold writing with sentence frames, lab templates, and structured outlines.
 - Provide oral response options and extended time.
 - Use digital supports (translation tools, captioned videos, audio readings).
 - Scaffold academic conversations with discussion stems and lab talk routines.
-

Diversity and Inclusion

- Integrate diverse cultural contributions to science.
- Provide alternative formats for projects (oral, digital, hands-on).

- Use visuals, diagrams, and clear academic language.
- Avoid slang and idioms; emphasize precise scientific vocabulary.
- Collaborate with cultural liaisons and support staff.
- Establish inclusive classroom routines and norms.
- Allow sufficient wait time before calling on students.
- Build strong family partnerships and communicate science learning goals.

Core Instructional and Supplemental Materials and Additional Resources

Instructional Materials

- Textbook
- Laboratory manuals and equipment
- OpenSci Ed manuals and instructional material

Supplemental Materials

- Teacher generated presentations
- Science websites (National Geographic, PBS Learning, NewsELA, Next Generation Science, Gizmos, PHET, HHMI, Amoeba Sisters)
- EdPuzzle videos
- NearPod lessons
- Multimedia resources
- Chromebooks
- Station work

Intervention Materials

- Individuals with disabilities Resources
- School databases
- Multimedia Resources
- Online Resources and videos
- LinkIt Data
- MLL translations
- Translation apps
- Graphic organizers, guided notes
- Student- teacher goal setting
- Think, Pair, Share
- Review games
- Tiered assignments

Social and Emotional Learning - New Jersey SEL

Competencies and Sub-Competencies Social and emotional learning (SEL) involves the process through which children and adults acquire and apply the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible

decisions. The purpose of the SEL competencies is to provide schools with guidelines for integrating SEL across grades and subject areas.

Self-Awareness

- 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

Self-Management

- Understand and practice strategies for managing one's own emotions, thoughts and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals

Social Awareness

- Recognize and identify the thoughts, feelings and perspectives of others
- Demonstrate 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

- 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

- 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

Teacher Notes:



OCEAN ACADEMY CHARTER SCHOOL Unit 5 Overview	
Content Area: Science	
Course 7th Grade Science	Grade Levels: 7th
Unit 5: Ecosystems: Interactions, Energy, and Dynamics	Duration: 25 days
Introduction/Unit Focus:	
<p>In this unit, students develop a deeper understanding of how matter cycles and energy flows through ecosystems. They explore the interactions between organisms and their environment, examining how energy is transferred through food webs and how matter is conserved as it moves through living and nonliving parts of ecosystems. By analyzing and interpreting data, students investigate patterns in population dynamics, resource availability, and the balance of ecosystems.</p> <p>Students will engage in key science and engineering practices, including developing models, constructing arguments based on evidence, and using data to explain how ecosystems function and respond to change. These practices support students in building meaningful explanations for real-world phenomena such as food chain disruptions, energy transfer, and nutrient cycling.</p> <p>Throughout the unit, students use crosscutting concepts such as matter and energy, systems and system models, patterns, and cause and effect. These concepts provide a framework for understanding how the components of ecosystems are connected, and how changes in one part of the system can affect the whole. By examining ecosystems through this lens, students not only gain a solid understanding of life science concepts but also strengthen their ability to think critically and reason scientifically.</p> <p>This unit lays the foundation for ecological literacy, helping students make informed decisions about environmental issues and understand their role in maintaining the health of our planet.</p>	
Disciplinary Content for the Unit	
Standard 9.1 Personal Financial Literacy This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.	
Standard 9.2 Career Awareness, Exploration, Preparation and Training	

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
- (2) examine the impact that unconscious bias and economic disparities have at both an

individual level and on society as a whole; and
(3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 5 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLS-Science.pdf>

MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: 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.]

MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: 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.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services. [Clarification Statement: 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.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models	LS2.A: Interdependent Relationships in Ecosystems	Patterns

<p>Modeling in 6-8 builds on K-5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> ➤ Develop a model to describe phenomena. (MS-LS2-3) <p>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.</p> <ul style="list-style-type: none"> ➤ Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2) <p>Engaging in Argument from Evidence Engaging in argument from evidence in 6-8 builds on K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).</p>	<ul style="list-style-type: none"> ➤ 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) <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> ➤ Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter 	<p>Patterns can be used to identify cause and effect relationships. (MS-LS2-2)</p> <p>Energy and Matter The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3)</p> <p>Stability and Change Small changes in one part of a system might cause large changes in another part. (MS-LS2-5)</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Science, Engineering, and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> ➤ The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus, technology use varies from region to region and over time. (MS-LS2-5)
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<p>➤ Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5)</p>	<p>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)</p> <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems</p> <p>➤ The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)</p> <p>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)</p> <p>ETS1.B: Developing Possible Solutions There are systematic processes for evaluating solutions with respect to how well they meet the criteria and</p>	<p>Science Addresses Questions About the Natural and Material World</p> <p>➤ Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)</p>
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	constraints of a problem. (secondary to MS-LS2-5)	
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Unit 5 Supporting and Additional Standards

[New Jersey Student Learning Standards-Mathematics](#)

[New Jersey Student Learning Standards-ELA](#)

<https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf>

ELA/Literacy -

RI.CR.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text. (MS-LS4-1), (MS-LS4-2), (MS-LS4-3), (MS-LS4-4), (MS-LS4-5)

SL.II.7.2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. (MS-LS4-1), (MS-LS4-3)

RI.MF.7.6. Compare and contrast texts to analyze the unique qualities of different mediums, including the integration of information from multiple formats and sources to develop deeper understanding of the concept, topic or subject and resolve conflicting information.. (MS-LS4-3), (MS-LS4-4)

W.IW.7.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

- A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aid in comprehension.
- B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
- C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
- D. Use precise language and domain/ grade-level- specific vocabulary to inform about or explain the topic.
- E. Establish and maintain a formal style academic style, approach, and form.
- F. Provide a concluding statement or section (e.g., sentence, part of a paragraph, paragraph, or multiple paragraphs) that follows the flow of ideas, reflects back on the topic, and supports the information or explanation presented.(MS-LS4-2), (MS-LS4-4)

W.SE.7.6. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase

the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS4-5)

RI.AA.7.7. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS4-2), (MS-LS4-4)

SL.PE.7.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- E. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
- F. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.
- G. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.
- H. Acknowledge new information expressed by others and, when warranted, modify their own views

SL.PI.7.4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS4-2), (MS-LS4-4)

Mathematics -

MP.4 Model with mathematics. (MS-LS2-5)

6.RP.A. Understand ratio concepts and use ratio reasoning to solve problems

3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
 - a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
 - b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
 - c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means times the quantity); solve problems involving finding the whole, given a part and the percent.
 - d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (MS-LS2-5)

6.EEC. Represent and analyze quantitative relationships between dependent and independent variables

9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation to represent the relationship between distance and time. . (MS-LS2-3)

6.SP.B. Summarize and describe distributions

5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered (MS-LS2-2)

Unit 5 New Jersey Student Learning Standards Connections: [Career Readiness, Life Literacies, and Key Skills](#)

Disciplinary Concepts: Career Awareness and Planning (9.2)

<i>Core Ideas</i>	<i>Performance Expectations (Identified with Standard Number and Statement)</i>
An individual’s strengths, lifestyle goals, choices, and interests affect employment and income	<p>9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.</p> <p>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.</p>
Early planning can provide more options to pay for postsecondary training and employment.	9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering,

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	apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.
There are a variety of resources available to help navigate the career planning process.	9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.	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.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level
Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Multiple solutions often exist to solve a problem.	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).
Disciplinary Concepts: Digital Citizenship (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.	9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g.,

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	W.6.8).
Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Unit 5 New Jersey Student Learning Standards: Computer Science and Design Thinking	
Disciplinary Concepts: Data and Analysis	
Core Ideas	Performance Expectations
People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.

Disciplinary Concepts: Engineering Design	
Core Idea	Performance Expectations
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.	<p>8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.</p> <p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p>
Disciplinary Concepts Interaction of Technology and Humans	
Core Idea	Performance Expectations
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.	8.2.8.ITH.2: Compare how technologies have influenced society over time
New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem	MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or	MS-LS2-4: Construct an argument supported by empirical evidence

<p>biological component of an ecosystem can lead to shifts in all its populations.</p>	<p>that changes to physical or biological components of an ecosystem affect populations.</p>
<p>All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.</p>	<p>MS-ESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.</p>
<p>Unit 5 Evidence of Student Learning</p>	
<p>Performance Tasks/Use of Technology:</p> <p>Food chain and food web interactives online (Gizmo, Phet interactive)</p> <p>Predator/prey simulations</p> <p>Abiotic vs. Biotic factors and their influence on an ecosystem</p> <p>Carrying capacity lab activities</p> <p>Pine Barrens case study and examination of local food webs</p> <p>Code a predator/ prey game using Scratch</p> <p>Graphing human population</p> <p>Energy pyramid STEM activity</p> <p>Moose/Wolf population case study</p> <p>Rube Goldberg contraption to model flow of energy through an ecosystem</p>	<p style="text-align: center;">Other Assessments</p> <p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning) <p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams ➤ Final Exams ➤ Performance Assessment <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model

Unit 5 Knowledge and Skills	
Unit 5 Learning Targets	
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> ➤ Identify and describe examples of predator-prey and symbiotic relationships in various ecosystems. ➤ Demonstrate understanding of how competition for resources limits population growth and influences ecosystem dynamics. ➤ Define limiting factors and provide real-world examples of how they affect populations. ➤ Analyze how species interactions such as competition, predation, and symbiosis affect survival and reproduction. ➤ Distinguish between abiotic and biotic factors and explain their influence on organisms within an ecosystem. 	
Unit 5 Enduring Understandings	Unit 5 Essential Questions
<p><i>Students will know:</i></p> <ul style="list-style-type: none"> ➤ Biodiversity supports the health and stability of ecosystems, and both natural and human-caused changes can impact it. ➤ Energy flows through ecosystems in food chains and food webs, and matter cycles through various processes. ➤ Ecosystems are made up of living (biotic) and nonliving (abiotic) components that interact in complex ways. ➤ Organisms compete for limited resources such as food, water, and shelter, which can limit population size and biodiversity. ➤ Species interact in ecosystems through competitive, predatory, and mutually beneficial (symbiotic) relationships that shape community structure. 	<ul style="list-style-type: none"> ➤ What is biodiversity, and why is it important for both ecosystems and humans? ➤ How do relationships such as competition, predation, and symbiosis affect populations within ecosystems? ➤ How can humans conserve biodiversity and the natural resources ecosystems depend on? ➤ How do abiotic and biotic factors influence the survival and distribution of organisms in an ecosystem? ➤ What happens to ecosystems when environmental conditions change?
Unit 5 Instructional Plan	
Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest 	<ul style="list-style-type: none"> ➤ McGraw Hill, <i>Integrated Science: Course 1</i> ➤ <u>Science World Journals</u> ➤ Online web quests ➤ Youtube links ➤ Nearpod

- Open-ended lab reflections
- Labs and Engineering based projects

- BrainPop
- EdPuzzle
- Google Suite
- Colorado PHET
- Gizmos

Suggested Options for Differentiation, Accommodations, and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, diagrams, and graphic organizers to support abstract concepts.
- Pre-teach and review vocabulary and scientific terms.
- Provide guided notes, outlines, and study guides.
- Offer leveled texts or simplified resources when needed.
- Provide small-group or one-on-one instruction.
- Pair students with supportive lab partners or peer tutors.
- Read aloud directions and model lab procedures.
- Offer preferential seating near teacher, board, or lab materials.
- Allow extended time for labs, projects, and assessments.
- Accept oral, dictated, or technology-supported responses.
- Modify workload or adjust the number of test/assignment items.
- Provide access to large-print, Braille, or digital texts with audio features.
- Allow scribes or communication devices when required.
- Incorporate interactive simulations, videos, and multimedia supports.

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing settings.
- Accept oral, dictated, or typed responses.
- Provide large-print, Braille, or digital text with assistive technology.
- Allow use of scribes or communication devices.

Students at Risk of School Failure

- Use visuals, models, and real-life examples to explain concepts.
- Pre-teach vocabulary and connect science content to prior knowledge.
- Break labs and projects into smaller, step-by-step tasks.
- Provide frequent teacher check-ins and feedback.
- Offer small-group instruction and structured practice.

- Assign supportive partners during labs or projects.
 - Provide preferential seating.
 - Scaffold writing tasks (sentence starters, lab report templates).
-

Gifted and Talented

- Ask open-ended, higher-order science questions (evaluate, create, hypothesize).
 - Encourage independent investigations, experiments, or research.
 - Provide enrichment projects, STEM challenges, or cross-curricular connections.
 - Offer advanced science texts, journals, or online resources.
 - Use flexible grouping for inquiry-based labs, projects, and debates.
 - Allow choice in assessments (presentations, research papers, experiments).
 - Incorporate simulations, problem-solving competitions, or design challenges.
 - Provide opportunities to reflect and share findings with authentic audiences.
-

Multilingual Learners

- Collaborate with ESL/MLL teachers.
 - Provide small-group and partner learning opportunities.
 - Pre-teach and revisit science vocabulary using visuals, cognates, and realia.
 - Use bilingual glossaries, labeled diagrams, and picture dictionaries.
 - Scaffold writing with sentence frames, lab templates, and structured outlines.
 - Provide oral response options and extended time.
 - Use digital supports (translation tools, captioned videos, audio readings).
 - Scaffold academic conversations with discussion stems and lab talk routines.
-

Diversity and Inclusion

- Integrate diverse cultural contributions to science.
- Provide alternative formats for projects (oral, digital, hands-on).
- Use visuals, diagrams, and clear academic language.
- Avoid slang and idioms; emphasize precise scientific vocabulary.
- Collaborate with cultural liaisons and support staff.
- Establish inclusive classroom routines and norms.
- Allow sufficient wait time before calling on students.
- Build strong family partnerships and communicate science learning goals.

Core Instructional and Supplemental Materials and Additional Resources

Instructional Materials

- Textbook
- Laboratory manuals and equipment
- OpenSci Ed manuals and instructional material

Supplemental Materials

- Teacher generated presentations
- Science websites (National Geographic, PBS Learning, NewsELA, Next Generation Science, Gizmos, PHET, HHMI, Amoeba Sisters)
- EdPuzzle videos
- NearPod lessons
- Multimedia resources
- Chromebooks
- Station work

Intervention Materials

- Individuals with disabilities Resources
- School databases
- Multimedia Resources
- Online Resources and videos
- LinkIt Data
- MLL translations
- Translation apps
- Graphic organizers, guided notes
- Student- teacher goal setting
- Think, Pair, Share
- Review games
- Tiered assignments

Social and Emotional Learning - New Jersey SEL

Competencies and Sub-Competencies Social and emotional learning (SEL) involves the process through which children and adults acquire and apply the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions. The purpose of the SEL competencies is to provide schools with guidelines for integrating SEL across grades and subject areas.

Self-Awareness

- 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

Self-Management

- Understand and practice strategies for managing one's own emotions, thoughts and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals

Social Awareness

- Recognize and identify the thoughts, feelings and perspectives of others
- Demonstrate 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

- 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

- 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

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 6 Overview	
Content Area: Science	
Course 7th Grade Science	Grade Levels: 7
Unit 6: Human Impact	Duration: 30 days
Introduction/Unit Focus:	
<p>In this unit, students deepen their understanding of how human activities affect Earth’s systems by analyzing and interpreting data and designing thoughtful, evidence-based solutions. The focus is on exploring the complex and far-reaching impacts of human use of natural resources such as land, water, energy, and minerals on the environment and society. Students investigate the causes and effects of these activities, examining how they alter ecosystems, contribute to climate change, and affect the availability and quality of resources.</p> <p>Building on their learning from earlier units, particularly Unit 3, students apply engineering practices to define real-world environmental problems. They identify and clearly articulate the criteria and constraints involved in developing effective solutions, considering not only the scientific and technical aspects but also the societal and environmental implications. Students then evaluate multiple potential solutions, test and analyze data from these designs, and refine their ideas to create improved, more sustainable outcomes.</p> <p>This unit emphasizes the crosscutting concepts of cause and effect and the influence of science, engineering, and technology on both society and the natural world. These themes guide students as they consider how innovation can be used to mitigate human impact and solve environmental challenges. Through the iterative design process, students gain hands-on experience with problem-solving, critical thinking, and systems thinking.</p> <p>By the end of the unit, students are expected to demonstrate proficiency in interpreting data and designing solutions that reflect a balance between human needs and environmental health. This work empowers students to become thoughtful stewards of Earth’s resources and informed participants in discussions about sustainability and human-environment interactions.</p>	
Disciplinary Content for the Unit	
<p>Standard 9.1 Personal Financial Literacy</p> <p>This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is</p>	

an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

- (1) highlight and promote diversity, including economic diversity, equity, inclusion,

tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLs) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards Unit 6 (Major Standards)

<https://www.nj.gov/education/cccs/2020/NJSLs-Science.pdf>

MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

[Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

MS-ESS3-2 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development,

agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
[Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> ➤ 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-ESS3-2) <p>Constructing Explanations and Designing Solutions</p> <p>Constructing explanations and designing solutions in 6-8 builds on K-5 experiences and progresses to include constructing explanations and designing</p>	<p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> ➤ Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2) <p>ESS3.C: Human Impacts on Earth Systems</p> <ul style="list-style-type: none"> ➤ Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3) 	<p>Patterns</p> <ul style="list-style-type: none"> ➤ Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> ➤ Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3) <p>Cause and effect relationships</p> <ul style="list-style-type: none"> ➤ may be used to predict phenomena in natural or designed systems. (MS-ESS3-4) <p>----- ----- -----</p> <p style="text-align: center;"><i>Connections to Engineering, Technology, and Applications of Science</i></p>

<p>solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p> <ul style="list-style-type: none"> ● Apply scientific principles to design an object, tool, process or system. (MS-ESS3-3) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> ● Engaging in argument from evidence in 6-8 builds on K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). ● Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-ESS3-4) 	<ul style="list-style-type: none"> ➤ Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3), (MS-ESS3-4) 	<p>Influence of Science, Engineering, and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> ➤ 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-ESS3-4) ➤ 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 region to region and over time. (MS-ESS3-2), (MS-ESS3-3) <p>-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>Science Addresses Questions About the Natural and Material World</p>
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		Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-ESS3-4)
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Unit 6 Supporting and Additional Standards
[New Jersey Student Learning Standards-Mathematics](#)
[New Jersey Student Learning Standards-ELA](#)
<https://www.state.nj.us/education/cccs/2016/ela/CompanionG0608.pdf>

ELA/Literacy -

RI.CR.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-4), (MS-ESS3-5)

SL.II.7.2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. (MS-ESS3-2)

W.AW.7.1. Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

- A. Introduce claim(s) about a topic or issue, acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
- B. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- C. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
- D. Establish and maintain a formal style/academic style, approach, and form.
- E. Provide a concluding statement or section that follows from and supports the argument presented.. (MS-ESS3-4)

W.IW.7.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant

content.

- A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aid in comprehension.
- B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
- C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
- D. Use precise language and domain/ grade-level- specific vocabulary to inform about or explain the topic.
- E. Establish and maintain a formal style academic style, approach, and form.
- F. Provide a concluding statement or section (e.g., sentence, part of a paragraph, paragraph, or multiple paragraphs) that follows the flow of ideas, reflects back on the topic, and supports the information or explanation presented. (MS-ESS3-1)

W.WR.7.5. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation. (MS-ESS3-3)

W.SE.7.6. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.(MS-ESS3-3)

Mathematics -

MP.2 Reason abstractly and quantitatively. (MS-ESS3-2), (MS-ESS3-5)

6.RP.A. Understand ratio concepts and use ratio reasoning to solve problems

1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”(MS-ESS3-3), (MS-ESS3-4)

7.RP.A. Understand ratio concepts and use ratio reasoning to solve problems

2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ -cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.” (Clarification: Expectations for unit rates in this grade are limited to non-complex fractions.) (MS-ESS3-3), (MS-ESS3-4)

6.EE.B. Reason about and solve one-variable equations and inequalities

6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)

7.EE.B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations

4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
 - a. Solve word problems leading to equations of the form $ax + b = c$ and $ax + b = c$, where a , b , and c are specific rational numbers. Solve equations of these forms with accuracy and efficiency. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
 - b. Solve word problems leading to inequalities of the form $ax + b < c$ or $ax + b > c$, where a , b , and c are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)

Unit 6 New Jersey Student Learning Standards Connections: [Career Readiness, Life Literacies, and Key Skills](#)

Disciplinary Concepts: Career Awareness and Planning

<i>Core Ideas</i>	Performance Expectations (Identified with Standard Number and Statement)
An individual's strengths, lifestyle goals, choices, and interests affect employment and income	<p>9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.</p> <p>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.</p>
Early planning can provide more options to pay for postsecondary training and employment.	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

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	postsecondary options.
There are a variety of resources available to help navigate the career planning process.	9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.	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.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level
Disciplinary Concepts: Critical Thinking and Problem-solving (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Multiple solutions often exist to solve a problem.	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).
Disciplinary Concepts: Digital Citizenship (9.4)	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.	9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).
Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.
Disciplinary Concepts: Global and Cultural Awareness (9.4)	
Core Ideas	Performance Expectations (Identified with

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	Standard Number and Statement)
Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Unit 6 New Jersey Student Learning Standards: Computer Science and Design Thinking	
Disciplinary Concepts: Data and Analysis	
<i>Core Ideas</i>	<i>Performance Expectations</i>
People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.	8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
The purpose of cleaning data is to remove errors and make it easier for computers to process.	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Disciplinary Concepts: Engineering Design	
<i>Core Idea</i>	<i>Performance Expectations</i>
Engineering design is a systematic, creative, and iterative process used to address local and global problems. The process includes generating ideas, choosing the best solution, and making,	8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

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testing, and redesigning models or prototypes.	8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
Disciplinary Concepts: Interaction of Technology and Humans	
Core Idea	Performance Expectations
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. New needs and wants may create strains on local economies and workforces. Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.	8.2.8.ITH.2: Compare how technologies have influenced society over time
New Jersey Student Learning Standards: <u>Climate Change Mandate</u>	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
<p>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.</p> <p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms and living things. These interactions vary with latitude, altitude and local and regional geography, all of which can affect oceanic and atmospheric flow patterns.</p> <p>The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time and globally redistributing it through ocean currents.</p>	MS-ESS2-6: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help	MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

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<p>forecast the locations and likelihoods of future events</p>	
<p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things.</p>	<p>MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>
<p>Human activities, such as the release of greenhouse gasses from burning fossil fuels, are major factors in the current rise in Earth’s mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.</p>	<p>MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused climate change over the past century.</p>

Unit 6 Evidence of Student Learning

Performance Tasks/Use of Technology:	Other Assessments
<p>Design house that would withstand natural disaster</p> <p>Nonfiction summaries and articles</p> <p>Investigation of plastics in ocean using albatross case study</p> <p>Invasive species wanted poster</p> <p>Human population graph and resources graphs for comparison</p>	<p>Formative</p> <ul style="list-style-type: none"> ➤ Observation ➤ Homework ➤ Class participation ➤ Graphic Organizers ➤ Projects ➤ Student Response Systems ➤ Do-Now/Exit Cards ➤ Laboratories/Lab Reports ➤ Notebook ➤ Graphs, Models, and Tables ➤ Station work ➤ CER (claim, evidence, reasoning)

<p>Chart occurrences of natural disasters such as earthquakes or fires to determine predictions and patterns</p> <p>Climate change impacts on populations and resources</p>	<p>Summative</p> <ul style="list-style-type: none"> ➤ Chapter/Unit Test ➤ Presentations ➤ Laboratory Reports/Practical ➤ Unit Projects <p>Benchmark</p> <ul style="list-style-type: none"> ➤ SGO Exams ➤ Final Exams ➤ Performance Assessment <p>Alternative</p> <ul style="list-style-type: none"> ➤ Student surveys ➤ Scientist circles ➤ Driving question board ➤ Consensus model
<p>Unit 6 Knowledge and Skills</p>	
<p>Unit 6 Learning Targets</p>	
<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> ➤ Identify and explain various ways humans alter the environment and describe the resulting impacts on ecosystems. ➤ Predict how the growth of the human population affects the availability and use of natural resources. ➤ Define environmental problems and design investigations to explore how human activities influence ecosystems. ➤ Examine historical data on natural disasters in a specific region and develop a plan to reduce future damage through mitigation strategies. 	
<p>Unit 6 Enduring Understandings</p>	<p>Unit 6 Essential Questions</p>
<p><i>Students will know:</i></p> <ul style="list-style-type: none"> ➤ Human activities have significantly altered the biosphere, leading to the destruction of habitats and, in some cases, the extinction of species. ➤ As the human population increases, the demand for natural resources also rises, often leading to resource depletion and 	<ul style="list-style-type: none"> ➤ What impact does a growing human population have on natural resources and ecosystem balance? ➤ In what ways have human activities damaged or transformed natural habitats, and how has this contributed to species extinction? ➤ How can understanding the history of natural hazards in a region help us forecast future events and reduce their impact?

<p>environmental stress.</p> <ul style="list-style-type: none"> ➤ The history and frequency of natural hazards can be studied to predict and prepare for future events. ➤ Human actions, such as land development and deforestation, can influence the intensity or frequency of natural disasters. 	
Unit 6 Instructional Plan	
Suggested Activities	Resources
<ul style="list-style-type: none"> ➤ Graphic organizers and guided note taking ➤ Construct a model ➤ Draw diagrams ➤ Homework ➤ Journal Entries ➤ Web Quest ➤ Open-ended lab reflections ➤ Labs and Engineering based projects 	<ul style="list-style-type: none"> ➤ McGraw Hill, <i>Integrated Science: Course 1</i> ➤ <u>Science World Journals</u> ➤ Online web quests ➤ Youtube links ➤ Nearpod ➤ BrainPop ➤ EdPuzzle ➤ Google Suite ➤ Colorado PHET ➤ Gizmos
Suggested Options for Differentiation, Accommodations, and Modifications	
<p>Special Education</p> <ul style="list-style-type: none"> ➤ Follow all IEP modifications. ➤ Use visuals, diagrams, and graphic organizers to support abstract concepts. ➤ Pre-teach and review vocabulary and scientific terms. ➤ Provide guided notes, outlines, and study guides. ➤ Offer leveled texts or simplified resources when needed. ➤ Provide small-group or one-on-one instruction. ➤ Pair students with supportive lab partners or peer tutors. ➤ Read aloud directions and model lab procedures. ➤ Offer preferential seating near teacher, board, or lab materials. ➤ Allow extended time for labs, projects, and assessments. ➤ Accept oral, dictated, or technology-supported responses. ➤ Modify workload or adjust the number of test/assignment items. ➤ Provide access to large-print, Braille, or digital texts with audio features. ➤ Allow scribes or communication devices when required. ➤ Incorporate interactive simulations, videos, and multimedia supports. 	

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing settings.
- Accept oral, dictated, or typed responses.
- Provide large-print, Braille, or digital text with assistive technology.
- Allow use of scribes or communication devices.

Students at Risk of School Failure

- Use visuals, models, and real-life examples to explain concepts.
- Pre-teach vocabulary and connect science content to prior knowledge.
- Break labs and projects into smaller, step-by-step tasks.
- Provide frequent teacher check-ins and feedback.
- Offer small-group instruction and structured practice.
- Assign supportive partners during labs or projects.
- Provide preferential seating.
- Scaffold writing tasks (sentence starters, lab report templates).

Gifted and Talented

- Ask open-ended, higher-order science questions (evaluate, create, hypothesize).
- Encourage independent investigations, experiments, or research.
- Provide enrichment projects, STEM challenges, or cross-curricular connections.
- Offer advanced science texts, journals, or online resources.
- Use flexible grouping for inquiry-based labs, projects, and debates.
- Allow choice in assessments (presentations, research papers, experiments).
- Incorporate simulations, problem-solving competitions, or design challenges.
- Provide opportunities to reflect and share findings with authentic audiences.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group and partner learning opportunities.
- Pre-teach and revisit science vocabulary using visuals, cognates, and realia.
- Use bilingual glossaries, labeled diagrams, and picture dictionaries.
- Scaffold writing with sentence frames, lab templates, and structured outlines.
- Provide oral response options and extended time.

