PUBLIC SCHOOLS OF EDISON TOWNSHIP

OFFICE OF CURRICULUM AND INSTRUCTION

Integrated Science

Length of Course:	Term
Elective/Required:	Elective/Required
Schools:	High School
Eligibility:	Grade 11-12
Credit Value:	5 Credits
Date Approved:	August 17, 2021

TABLE OF CONTENTS

STATEMENT OF PURPOSE

The Integrated Science curriculum is an introductory course that covers both the physical and life sciences, integrating all fields of science for a broader and more relevant understanding. The curriculum covers the core material of introductory chemistry, physics, astronomy, earth science, ecology, and biology; and is aligned with and contributes to the accomplishment of the state (NJSLS-S) and national standards. (NGSS) The course is designed to develop science literacy and deepen the students' understanding of scientific ideas and concepts. The program was chosen to complement the flow and sequence of scientific studies from Chemistry and is an elective course for Grade 12 science. Numerous labs and hands-on activities are incorporated to motivate and interest students, as well as address the needs and abilities of all students. Inquiry based activities encourage problem solving strategies and critical thinking skills. The engaging narrative emphasizes unifying concepts across physical and life sciences through a clear, friendly writing style, and fun, relevant examples that motivate students.

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COURSE OBJECTIVES

By the end of the Integrated Science course, students will be able to:

Unit 1-Chemistry (chapters 9-13 in textbook)

- HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. **(chapter 9)**
- HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **(chapters 9, 11, 12)**
- HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. **(chapters 11, 12, 13)**
- HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. **(chapters 11, 12, 13)**
- HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. **(chapters 12 and 13)**
- HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. **(chapter 10)**

Unit 2-Physics (chapter 2-6 & 8 in textbook)

- HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration **(chapter 2 and 3)**
- HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. **(chapter 4)**
- HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. **(chapters 4 and 5)**
- HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. **(chapter 5)**
- HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. **(chapter 6)**
- HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. **(chapter 4 and 6)**
- HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). **(chapters 5 and 6)**
- HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. **(chapters 4-6, and 8)**
- HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). **(chapter 6)**

- HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media **(chapter 8)**
- HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other **(chapter 8)**

Units 3 and 4 -Astronomy and Earth Science (chapters 22-29 in textbook)

- HS-ESS1-5. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks **(chapters 22-24)**
- HS-ESS1-6. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history **(chapters 22-25 and 28)**
- HS-ESS2-1. Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. **(chapters 22, 24, 25, and 27)**
- HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems **(chapters 22, 24, 25, and 27)**
- HS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection **(chapters 22, 23, and 27)**
- HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate **(chapters 22, 24, and 26)**
- HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (**chapters 24 and 25)**
- HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. **(chapters 23, 24, and 26)**
- HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. **(chapters 24 and 26)**
- HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and climate change have influenced human activity **(chapters 26 and 27)**
- HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity **(chapter 27)**
- HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems. **(chapter 27)**
- HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems **(chapters 24, 26, and 27)**
- HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). **(chapters 24, 26 and 27)**
- HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation **(chapters 28 and 29)**
- HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. **(chapter 29)**

- HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements. **(chapter 29)**

Units 5 and 6-Ecology and Biology

- HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells **(chapters 16-19)**
- HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. **(chapters 18-20)**
- HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. **(chapter 15, 19, and 20)**
- HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms **(chapters 15 and 18-20)**
- HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. **(chapter 15)**
- HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. **(chapters 15 and 16)**
- HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. **(chapters 15, 19, and 20)**
- HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. **(chapters 16-19)**
- HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. **(chapters 15-18)**
- HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population **(chapter 16)**
- HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. **(chapters 17 and 18)**
- HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment **(chapter 17)**
- HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. **(chapters 17, 18, and 21)**
- HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations **(chapters 17, 18, and 21)**
- HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. **(chapters 17, 18, and 21)**
- HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. **(chapter 21)**

- HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. **(chapter 21)**
- HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. **(chapter 21)**
- HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. **(chapter 21)**
- HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity **(chapter 21)**

Engineering Design

- **(NJSLS/HS-ETS1-2)** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Earth's Place In The Universe

- **(NJSLS/HS-ESS1-4)** Use mathematical or computational representations to predict the motion of orbiting objects in the solar system

TIMELINE AND PACING GUIDE

Marking Period 1:

Chemistry
- Atoms and the Periodic table
- The Atomic Nucleus and Radioactivity
- Investigating Matter
- Chemical Bonds and Mixtures
- Chemical reactions

Quarterly Exam 1

Marking Period 2:

Physics
- Describing Motion
- Newton's Laws of Motion
- Momentum and Energy
- Gravitation
- Wave Properties of Sound and Light

Quarterly Exam 2

Marking Period 3:

Astronomy
- The Solar System
- The Universe

Earth Science
- Plate Tectonics: The Earth System
- Rocks and Minerals
- Earth's Surface-Land and Water
- Surface Processes
- Weather and Climate
- Environmental Geology

Quarterly Exam 3

Marking Period 4:

Ecology
- The Evolution of Life
- Diversity of Life on Earth
- Ecology-Studying Ecosystems

Biology
- The Basic Unit of Life-The Cell
- Genetics
- Human Biology I-Control and Development
- Human Biology II-Care and Maintenance

Quarterly Exam 4

UNIT 1: CHEMISTRY - ATOMS AND PERIODIC TABLE

Essential Questions:
How can one explain the structure and properties of matter?
How do we organize the elements?
How do the interactions of the electrons and nuclei of atoms determine their structure and properties?
How are the trends in periodicity related to their electronic structure?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
NJSLS/HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
NJSLS/HS-ESS1-3: Communicate scientific ideas about the way stars, over their life cycle, produce elements.
NJSLS/HS-ESS1-4: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies** Technology Implementation/ Interdisciplinary Connections	**Assessment Check Points**
PS1.A: Structure and Properties of Matter Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states.	**Developing and Using Models** From the given model, students identify and describe the components of the model that are relevant for their predictions, including: • Elements and their arrangement in the periodic table • A positively-charged nucleus composed of both protons and neutrons, surrounded by negatively charged electrons • Electrons in the outermost energy level of atoms (i.e., valence electrons) • The number of protons in each element.	**Patterns** Students use the periodic table to predict the patterns of behavior of the elements based on the attraction and repulsion between electrically charged particles and the patterns of outermost electrons that determine the typical reactivity of an atom. Students predict the following patterns of properties: • The number and types of bonds formed (i.e. ionic, covalent, metallic) by an element and between elements • The number and charges in stable ions that form from atoms in a group of the periodic table	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* The elements Protons and neutrons The Periodic Table Textbook: Conceptual Integrated Science, Third Edition Chapter 3	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

		• The trend in reactivity and electronegativity of atoms down a group, and across the table.		

Resources: Essential Materials, Supplementary Materials, Links to Best Practices

Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh
PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics)
Gizmos (https://www.explorelearning.com)
Pivot (https://www.pivotinteractives.com)

Instructional Adjustments: Modification will be made to accommodate IEP mandates for classifies students

UNIT 1: CHEMISTRY – THE ATOMIC NUCLEUS AND RADIOACTIVITY

Essential Questions:

How can a change in the nucleus of an atom lead to positive and or detrimental applications?
What are the benefits, hazards, and practical implications of nuclear chemistry?
What are the differences between the types of radioactivity?

NGSS Performance Expectations: (Students who demonstrate understanding can:)

NJSLS/ HS-PS1-8: Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
NJSLS/HS-ESS1-1: Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.
NJSLS/HS-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
NJSLS/HS-ESS1-6: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
NJSLS/HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
NJSLS/HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
NJSLS/HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
NJSLS/HS-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)

Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies** Technology Implementation/ Interdisciplinary Connections	**Assessment Check Points**
PS1.C: Nuclear Processes Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve the release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.	**Developing and Using Models** Students develop models in which they identify and describe the relevant components of the models, including • Identification of an element by the number of protons • The number of protons	**Energy and Matter** The scale of energy changes associated with nuclear processes, relative to the scale of energy changes associated with chemical processes. **Energy and Matter** In nuclear processes,	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Radioactivity (nuclear decay) The strong nuclear force	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests

	and neutrons in the nucleus before and after the decay • The identity of the emitted particles (i.e., alpha, beta – both electrons and positrons, and gamma) Students develop five distinct models to illustrate the relationships between components underlying the nuclear processes of 1) fission, 2) fusion and 3) three distinct types of radioactive decay. Students include the following features, based on evidence, in all five models: • The total number of neutrons plus protons is the same both before and after the nuclear process, although the total number of protons and the total number of neutrons may be different before and after.	Atoms are not conserved, but the total number of protons plus neutrons is conserved. The total amount of energy and matter in closed systems is conserved.	Half-life transmutation Nuclear fission Mass-Energy Equivalence Textbook: Conceptual Integrated Science, Third Edition Chapter 3	Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com Pivot (https://www.pivotinteractives.com			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 1: CHEMISTRY – INVESTIGATING MATTER

Essential Questions:

What is the structure of matter?
How are models and experimental data used to explain what is happening on an atomic level?
How do attractive forces determine the physical properties of matter?
How do the intermolecular forces influence the properties of a substance?
How does the bonding in a solid-state affect the properties of a solid?
What are the mathematical equations related to various macroscopic properties?

NGSS Performance Expectations: (Students who demonstrate understanding can:)

NJSLS/HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
NJSLS/HS-PS1-3: Plan and investigate to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
NJSLS/HS-PS1-5: Apply scientific principles and evidence to explain the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
NJSLS/HS-PS1-8: Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)

Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics

MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)

HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

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8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

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CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies** Technology Implementation/ Interdisciplinary Connections	**Assessment Check Points**
PS1.A: Structure and Properties of Matter The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. **PS1.B: Chemical Reactions** The fact that atoms are conserved, together with knowledge of the chemical properties of the elements	**Constructing Explanations and Designing Solutions** Students construct an explanation of the outcome of the given reaction, including: • The idea that the total number of atoms of each element in the reactant and products is the same • The numbers and types of bonds (i.e., ionic, covalent) that each atom forms, as determined by	**Patterns** Students describe their reasoning that connects the evidence, along with the assumption that theories and laws that describe their natural world operate today as they did in the past and will continue to do so in the future, to construct an explanation for how the patterns of outermost electrons and the electronegativity of elements can be used to predict the number and types of bonds each element forms.	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* The structure of matter Phase Changes Physical and chemical properties Determining physical and chemical changes Elements to compounds	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

involved, can be used to describe and predict chemical reactions. **PS3.D: Energy in Chemical Processes and Everyday Life** Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.	the outermost (valence) electron states and the electronegativity • The outermost (valence) electron state of the atoms that make up both the reactants and the products of the reaction is based on their position in the periodic table • A discussion of how the patterns of attraction allow the prediction of the type of reaction that occurs (e.g., formation of ionic compounds, combustion of hydrocarbons). Students identify and describe the evidence to construct the explanation, including • Identification of the products and reactants, including their chemical formulas and the arrangement of their outermost (valence) electrons • Identification that the number and types of atoms are the same both	**Cause and Effect** The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.	Naming compounds Textbook: Conceptual Integrated Science, Third Edition Chapter 3	

	before and after a reaction • Identification of the numbers and types of bonds (i.e., ionic, covalent) in both the reactants and the products • The patterns of reactivity (e.g., the high reactivity of alkali metals) at the macroscopic level as determined by using the periodic table • The outermost (valence) electron configuration and the relative electronegativity of the atoms that make up both the reactants and the products of the reaction based on their position in the periodic table. • In the explanation, students describe the causal relationship between the observable macroscopic patterns of reactivity of elements in the periodic table and			

	the patterns of outermost electrons for each atom and its relative electronegativity. • Given new evidence or context, students construct a revised or expanded explanation about the outcome of a chemical reaction and justify the revision. **Obtaining, Evaluating, and Communicating Information** Develop a model based on evidence to illustrate the relationships between systems or between components of a system.			
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchockik Yeh PhET online simulations (Https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 1: CHEMISTRY – CHEMICAL BONDS AND MIXTURES

Essential Questions:
How are chemical bonds formed through attractive forces?
What are the different ways to name chemical compounds?
How are electrons shared?
What are the properties of ionic compounds?
What are the properties of covalent compounds?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
NJSLS/HS-PS1-3: Plan and investigate to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
NJSLS/HS-PS1-5: Apply scientific principles and evidence to explain the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS1.A: Structure and Properties of Matter The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. **PS1.B: Chemical Reactions** The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions.	**Constructing Explanations and Designing Solutions** • A discussion of how the patterns of attraction allow the prediction of the type of reaction that occurs (e.g., formation of ionic compounds, combustion of hydrocarbons). Students identify and describe the evidence to construct the explanation, including • Identification of the products and reactants, including their chemical formulas and the	**Cause and Effect** The significance of a phenomenon is dependent	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Electron-dot structure Ionic bonding Covalent bonding Polar covalent bonds Molecular polarity Molecular attractions Describing solutions Solubility	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

PS3.D: Energy in Chemical Processes and Everyday Life Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.	arrangement of their outermost (valence) electrons • Identification that the number and types of atoms are the same both before and after a reaction • Identification of the numbers and types of bonds (i.e., ionic, covalent) in both the reactants and the products • The patterns of reactivity (e.g., the high reactivity of alkali metals) at the macroscopic level as determined by using the periodic table • The outermost (valence) electron configuration and the relative electronegativity of the atoms that make up both the reactants and the products of the reaction based on their position in the periodic table. In the explanation, students describe the causal relationship between the		Textbook: Conceptual Integrated Science, Third Edition Chapter 3	

	observable macroscopic patterns of reactivity of elements in the periodic table and the patterns of outermost electrons for each atom and its relative electronegativity. Given new evidence or context, students construct a revised or expanded explanation about the outcome of a chemical reaction and justify the revision. **Obtaining, Evaluating, and Communicating Information** Develop a model based on evidence to illustrate the relationships between systems or between components of a system.			
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 1: CHEMISTRY – CHEMICAL REACTIONS

Essential Questions:
How does the temperature affect the rate of a reaction?
How does concentration affect the rate of reaction?
How do elementary reactions occur?
Why aren't all reactions occurring in one step?
How does the presence of a catalyst affect the rate of a reaction?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
NJSLS/HS-PS1-3: Plan and investigate to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
NJSLS/HS-PS1-5: Apply scientific principles and evidence to explain the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)
Technology

8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS1.A: Structure and Properties of Matter The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. **PS1.B: Chemical Reactions** The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions.	**Constructing Explanations and Designing Solutions** Students construct an explanation of the outcome of the given reaction, including: • The idea that the total number of atoms of each element in the reactant and products is the same • The numbers and types of bonds (i.e., ionic, covalent) that each atom forms, as determined by the outermost (valence) electron states and the electronegativity • The outermost (valence) electron	**Patterns** Students describe their reasoning that connects the evidence, along with the assumption that theories and laws that describe their natural world operate today as they did in the past and will continue to do so in the future, to construct an explanation for how the patterns of outermost electrons and the electronegativity of elements can be used to predict the number and types of bonds each element forms.	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Chemical equations Energy and chemical reactions Reaction rates Textbook: Conceptual Integrated Science, Third Edition Chapter 3	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

	state of the atoms that make up both the reactants and the products of the reaction is based on their position in the periodic table • A discussion of how the patterns of attraction allow the prediction of the type of reaction that occurs (e.g., formation of ionic compounds, combustion of hydrocarbons). Students identify and describe the evidence to construct the explanation, including • Identification of the products and reactants, including their chemical formulas and the arrangement of their outermost (valence) electrons • Identification that the number and types of atoms are the same both before and after a reaction • Identification of the numbers and types of bonds (i.e., ionic, covalent) in both the			

	reactants and the products • The patterns of reactivity (e.g., the high reactivity of alkali metals) at the macroscopic level as determined by using the periodic table • The outermost (valence) electron configuration and the relative electronegativity of the atoms that make up both the reactants and the products of the reaction based on their position in the periodic table. In the explanation, students describe the causal relationship between the observable macroscopic patterns of reactivity of elements in the periodic table and the patterns of outermost electrons for each atom and its relative electronegativity. Given new evidence or context, students construct			

	a revised or expanded explanation about the outcome of a chemical reaction and justify the revision.			
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 2: PHYSICS – DESCRIBING MOTION

Essential Questions:
How do we define motion?
How do we describe and predict the motion of objects?
How do we describe objects in free fall?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS2-1: Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
[Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object sliding down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS2.B: Types of Interactions Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. (HS-PS2-4),(HS-PS2-5)	**Planning and Carrying Out Investigations** Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5) **Analyzing and Interpreting Data** Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine	**Patterns** Empirical evidence is needed to identify patterns. (HE-ESS1-5) **Scale, Proportion, and Quantity** Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (HS-ESS1-4) **Cause and Effect** Systems can be designed to cause a desired effect (HS-PS2-3) **Systems and System Models** Models (e.g., physical, mathematical, computer	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Defining motion Mass - a measure of inertia Net force Equilibrium (static and dynamic) Naming common forces: gravitational force/weight, normal force (support force), tension force, drag force, spring force	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

	an optimal design solution. (HS-PS2-1) **Using Mathematics and Computational Thinking** Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4) **Constructing Explanations and Designing Solutions** Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3) **Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6) **Science Models, Laws, Mechanisms, and Theories Explain Natural**	models) can be used to simulate systems and interactions— including energy, matter, and information flows— within and between systems at different scales. (HS-ETS1-4)	Friction Force Speed and Velocity Constant acceleration, free fall Multiple representations problem solving and ranking tasks Textbook: Conceptual Integrated Science, Third Edition Chapter 2	

	Phenomena Theories and laws provide explanations in science. (HS-PS2- 1),(HS-PS2-4) Laws are statements or descriptions of the relationships among observable phenomena. (HS-PS2-1),(HS-PS2-4)			
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Instructions:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 2: PHYSICS – NEWTON'S LAWS OF MOTION

Essential Questions:
How can we change the motion of an object?
How do we describe and predict changes in the motion of an object?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS2-1: Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
[Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object sliding down a ramp, or a moving object being pulled by a constant force.]
[Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS2.A: Forces and Motion Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1) **PS2.B: Types of Interactions** Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. (HS-PS2-4),(HS-PS2-5)	**Planning and Carrying Out Investigations** Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5) **Analyzing and Interpreting Data** Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable	**Patterns** Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4) **Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS2- 1),(HS-PS2-5) Systems can be designed to cause a desired effect. (HS-PS2-3) **Systems and System Models**	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Determining net force Newton's 1st Law of Motion Newton's 2nd Law of Motion Newton's 3rd Law of Motion Vectors Multiple representations problem solving and ranking tasks Textbook: Conceptual Integrated Science, Third Edition	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

	scientific claims or determine an optimal design solution. (HS-PS2-1) **Using Mathematics and Computational Thinking** Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4) **Constructing Explanations and Designing Solutions** Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3) **Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6) **Science Models, Laws, Mechanisms, and Theories**	When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2) **Systems and System Models** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows— within and between systems at different scales. (HS-ETS1-4)	Chapter 3	

	Explain Natural Phenomena Theories and laws provide explanations in science. (HS-PS2- 1),(HS-PS2-4) Laws are statements or descriptions of the relationships among observable phenomena. (HS-PS2-1),(HS-PS2-4)			
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 2: PHYSICS – MOMENTUM

Essential Questions:
How do we quantify motion?
How do airbags help save lives?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
[Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.]
[Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.]

NJSLS/HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
[Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.]
[Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS2.A: Forces and Motion Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (HS-PS2-2) If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (HS-PS2-2),(HS-PS2-3) **ETS1.A: Defining and Delimiting Engineering Problems** Criteria and constraints also include satisfying any requirements set by society,	**Planning and Carrying Out Investigations** Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5) **Analyzing and Interpreting Data** Analyze data using tools, technologies, and/or models	**Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS2- 1),(HS-PS2-5) Systems can be designed to cause a desired effect. (HS-PS2-3) **Systems and System Models** When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Momentum	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (secondary to HS-PS2-3) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (secondary to HS-PS2-3)	(e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-PS2-1) **Using Mathematics and Computational Thinking** Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4) **Constructing Explanations and Designing Solutions** Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3) **Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)			

Resources: Essential Materials, Supplementary Materials, Links to Best Practices	**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students
Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhETonline simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)	

UNIT 2: PHYSICS – ENERGY

Essential Questions:
How can we change the energy of a system?
How can we analyze motion in terms of energy?
Why is the first hill of a roller coaster always the tallest?
Why haven't humans created a perpetual motion machine?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
[Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.]
[Assessment Boundary: Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.]

NJSLS/HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).
[Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.]

NJSLS/HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
[Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.]
[Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS3.A: Definitions of Energy Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the	**Planning and Carrying Out Investigations** Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable	**Systems and System Models** Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (HSPS3-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Work Mechanical Energy (Kinetic	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:**

system, energy is continually transferred from one object to another and between its various possible forms. (HSPS3-1),(HS-PS3-2) At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (HSPS3-2) (HS-PS3-3) These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space. (HS-PS3-2) **PS3.B: Conservation of Energy and Energy Transfer**	measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5) **Developing and Using Models** Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS3-2),(HSPS3-5) **Using Mathematics and Computational Thinking** Create a computational model or simulation of a phenomenon, designed device, process, or system. (HS-PS3-1) **Constructing Explanations and Designing Solutions** Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HSPS3-3)	**Energy and Matter** Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HSPS3-3) Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems. (HS-PS3-2) **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing	Energy and Gravitational Potential Energy), Thermal Energy Power Work-Energy Theorem Conservation of Mechanical Energy Textbook: Conceptual Integrated Science, Third Edition Chapter 4	Tests Quizzes Project Quarterly exam

Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1) Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-1),(HS-PS3-4) Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (HS-PS3-1) The availability of energy limits what can occur in any system. (HS-PS3-1) **PS3.D: Energy in Chemical Processes** Although energy cannot be destroyed, it can be converted	**Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)	costs and risks. (HS-PS3-3) **Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems** Science assumes the universe is a vast single system in which basic laws are consistent. (HSPS3-1)		

to less useful forms—for example, to thermal energy in the surrounding environment. (HS-PS3-3),(HS-PS3-4) **ETS1.A: Defining and Delimiting Engineering Problems** Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (secondary to HS-PS3-3)				
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhETonline simulations (https://phet.colorado.edu/en/simulations/category/physics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 2: PHYSICS – GRAVITATION

Essential Questions:
How do we describe the motion of planets around the Sun?
Why doesn't Earth "fall into" the Sun?
What is "weightlessness"?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS1-4: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.
[Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.]
[Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]

NJSLS/HS-PS2-4: Use mathematical representations of Newton's Law of Gravitation to describe and predict the gravitational forces between objects.
[Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational fields.]
[Assessment Boundary: Assessment is limited to systems with two objects.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)

HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS2.B: Types of Interactions Newton's law of universal gravitation provides the mathematical model to describe and predict the effects of gravitational force between distant objects. (HS-PS2-4) Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. (HS-PS2-4),(HS-PS2-5)	**Analyzing and Interpreting Data** Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-PS2-1) **Using Mathematics and Computational Thinking** Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4)	**Patterns** Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4) **Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS2- 1),(HS-PS2-5)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Newton's Law of Universal Gravitation Weight and weightlessness Centripetal force and simulated gravity Projectile motion Satellites	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

PS3.C: Relationship Between Energy and Forces When two objects interacting through a field change relative position, the energy stored in the field is changed. (HS-PS3-5)	**Constructing Explanations and Designing Solutions** Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3) **Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6) **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** Theories and laws provide explanations in science. (HS-PS2- 1),(HS-PS2-4) Laws are statements or descriptions of the relationships among observable phenomena. (HS-PS2-1),(HS-PS2-4)	**Systems and System Models** When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2)	Circular and elliptical orbits Textbook: Conceptual Integrated Science, Third Edition Chapter 5	

Resources: **Essential Materials, Supplementary Materials, Links to Best Practices**	**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students
Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulationscategory/phsics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)	

UNIT 2: PHYSICS – WAVES

Essential Questions:
What are the defining properties of a wave?
What is the nature of sound?
What is the nature of light?
What is the mechanism behind an object's color?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
[Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the earth.]
[Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.]

NJSLS/HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
[Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.] [Assessment Boundary: Assessment does not include using quantum theory.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)

MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
PS4.A: Wave Properties The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (HS-PS4-1) Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at	**Using Mathematics and Computational Thinking** Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. (HS-PS4-1) **Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a	**Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Vibrations and waves Describing wave motion Describing wave type Wave properties (waves can reflect, refract, disperse, diffract, interfere and follow Principle of Superposition)	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.) (HS-PS4-3)	proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)		The nature of sound Resonance The nature of light Color Doppler Effect Wave-Particle Duality Textbook: Conceptual Integrated Science, Third Edition Chapter 8	
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulationscategory/phsics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 3: ASTRONOMY – THE SOLAR SYSTEM

Essential Questions:
How does the Sun produce so much energy?
How are the planets similar, and how are they different?
How did our Moon form, and how does it go through phases?
What are solar and lunar eclipses, and why are they rare?
What are meteors, asteroids, and comets?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
[Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11- year sunspot cycle, and non-cyclic variations over centuries.]
[Assessment Boundary: Assessment does not include details of the atomic and subatomic processes involved with the sun's nuclear fusion.]

NJSLS/HS-ESS1-6. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
[Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS1.A: The Universe and Its Stars The star called the Sun is changing and will burn out over a lifespan of approximately 10 billion years. (HS-ESS1-1) The study of stars' light spectra and brightness is used to identify compositional elements of stars, their	**Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)	**Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* The Solar System and its formation The Sun The inner planets	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project

movements, and their distances from Earth. (HS-ESS1- 2),(HS-ESS1-3) **ESS1.B: Earth and the Solar System** Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (HS-ESS1-4)			The outer planets Earth's Moon Failed planet formation Textbook: Conceptual Integrated Science, Third Edition Chapter 28	Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulationscategory/phsics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 3: ASTRONOMY – THE UNIVERSE

Essential Questions:
How are stars formed?
How do stars die?
How are stars organized within galaxies?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
[Clarification Statement: Emphasis is on the astronomical evidence of the redshift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]

NJSJS/HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.
[Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.]

NJSLS/HS-ESS1-6. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
[Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)
WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Mathematics
MP.2 Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4 Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2- 4)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS1.A: The Universe and Its Stars The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave	**Obtaining, Evaluating, and Communicating Information** Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually,	**Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* The brightness and color of stars	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:**

background) that still fills the universe. (HSESS1-2) Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (HS-ESS1- 2),(HS-ESS1-3)	and mathematically). (HS-PS2-6)		The Hertzsprung-Russell Diagram The life cycle of stars Black holes Galaxies Textbook: Conceptual Integrated Science, Third Edition Chapter 29	Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh PhET online simulations (https://phet.colorado.edu/en/simulationscategory/phsics) Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com			**Instructional Adjustments:** Modifications will be made to accommodate IEP for mandates for classified students	

UNIT 4: EARTH SCIENCE – PLATE TECTONICS: THE EARTH SYSTEM

Essential Questions:
How are the layers of Earth different from one another?
How do the characteristics of Earth's layers determine their interactions?
What does the theory of Continental Drift say and what evidence supports it?
What is the mechanism that powers continental drift and how does it function?
What occurs at different kinds of plate boundaries and how does this impact humans?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. [Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal rocks. Examples include evidence of the ages oceanic crust increasing with distance from mid-ocean ridges (a result of plate spreading) and the ages of North American continental crust decreasing with distance away from a central ancient core of the continental plate (a result of past plate interactions).]

NJSLS/HS-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).] [Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.]

NJSLS/HS-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-ESS2-2), (HS-ESS2-3)

• RST.11-12.2 Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS2-2)

• WHST.9-12.1 Write arguments focused on discipline-specific content. (HS-ESS2-7)

•WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)

• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)

• MP.4 Model with mathematics. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)

• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)

• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)

• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-5), (HS-ESS2-6)

Technology

8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them

CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS1.C: The History of Planet Earth Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (HSESS1-5) **ESS2.B: Plate Tectonics and LargeScale System Interactions** Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. (ESS2.B Grade 8 GBE), (secondary to HS-ESS1-5)	**Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-ESS1-2)	**Stability and Change** Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS1-6)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Properties of Earth's Layers Convection Currents Movements of continents over time The theory of Continental Drift and its history Plate Boundaries and physical results of interactions between plates Earthquakes, Volcanoes, and Tsunamis Textbook: Conceptual Integrated Science, Third Edition Chapter 22	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

Resources: Essential Materials, Supplementary Materials, Links to Best Practices	**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students
Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)	

UNIT 4: EARTH SCIENCE – ROCKS AND MINERALS

Essential Questions:
How are minerals defined and differentiated from one another?
What is the rock cycle?
How are rocks differentiated from minerals and from one another?
What is the importance of mineral and rock resources in our modern society?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

NJSLS/HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-ESS2-2), (HS-ESS2-3)
• RST.11-12.2 Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS2-2)
• WHST.9-12.1 Write arguments focused on discipline-specific content. (HS-ESS2-7)
• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)
• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• MP.4 Model with mathematics. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-5), (HS-ESS2-6)

Technology

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP9. Model integrity, ethical leadership and effective management

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS1.C: The History of Planet Earth Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (HSESS1-5) **ESS2.B: Plate Tectonics and Large Scale System**	**Planning and Carrying Out Investigations** Planning and carrying out investigations in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.	**Structure and Function** The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (HS-ESS2-5)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Properties of Minerals Formation of Minerals and Rocks	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests

Interactions Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. Plate movements are responsible for most continental and ocean-floor features and for the distribution of most rocks and minerals within Earth's crust. (ESS2.B Grade 8 GBE) (HS-ESS2-1)	Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-ESS2-5)		Identification of Minerals and Rocks Transitions between phases of the Rock Cycle Usage of mineral and rock resources by humans and the impact of this activity on the environment Textbook: Conceptual Integrated Science, Third Edition Chapter 23	Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 4: EARTH SCIENCE – EARTH'S SURFACE: LAND AND WATER

Essential Questions:

How are the variations in Earth's surface (i.e. mountains, faults, plains, plateaus) produced?
What processes change the surface of Earth and what powers these dynamic interactions?
How does human usage of water resources impact their sustainability and the ecosystems they support?
How are water resources differentiated and what are their various characteristics?

NGSS Performance Expectations: (Students who demonstrate understanding can:)

NJSLS/HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

NJSLS/HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)

Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-ESS2-2), (HS-ESS2-3)

• RST.11-12.2 Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS2-2)

• WHST.9-12.1 Write arguments focused on discipline-specific content. (HS-ESS2-7)

• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)

• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• MP.4 Model with mathematics. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-5), (HS-ESS2-6)

Technology

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

CRP5. Consider the environmental, social and economic impacts of decisions.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS2.C: The Roles of Water in Earth's Surface Processes The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These	**Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and	**Interdependence of Science, Engineering, and Technology** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Usage of Topographic maps	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework

properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (HS-ESS2-5) **ESS2.B: Plate Tectonics and Large Scale System Interactions** Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. Plate movements are responsible for most continental and ocean-floor features and for the distribution of most rocks and minerals within Earth's crust. (ESS2.B Grade 8 GBE) (HS-ESS2-1)	analyze data. Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-ESS2-2)	critical aspect of decisions about technology. (HS-ESS2-2)	Orogenesis, erosion, and weathering Properties of the hydrosphere and its constituent parts (oceans, freshwater, glaciers) Human impacts on water resources including pollution and depletion of potable water Textbook: Conceptual Integrated Science, Third Edition Chapter 24	**Summative Assessments:** Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students	

UNIT 4: EARTH SCIENCE – SURFACE PROCESSES

Essential Questions:
How are the processes of weathering, erosion, and deposition differentiated?
What are the results of weathering, erosion, and deposition on landforms and how do they impact living systems?
How are humans impacted by surface processes and how are we changing how these processes occur?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).] [Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.]

NJSLS/HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

NJSLS/HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-ESS2-2), (HS-ESS2-3)

• RST.11-12.2 Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS2-2)
• WHST.9-12.1 Write arguments focused on discipline-specific content. (HS-ESS2-7)
• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)
• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4)

Mathematics
• MP.2 Reason abstractly and quantitatively. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• MP.4 Model with mathematics. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-1), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-6)
• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ESS2-4), (HS-ESS2-5), (HS-ESS2-6)

Technology
8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP7. Employ valid and reliable research strategies.
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS2.A: Earth Materials and Systems Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (HS-ESS2-1), (HS-ESS2-2) **ESS2.C: The Roles of Water in Earth's Surface Processes** The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (HS-ESS2-5)	**Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. Construct an oral and written argument or counter-arguments based on data and evidence. (HS-ESS2-7)	**Stability and Change** Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS2-7) Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS2-1) Feedback (negative or positive) can stabilize or destabilize a system. (HS-ESS2-2)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Describing activities of weathering, erosion, and deposition Soil formation, identification of varieties, and importance to living things Water's ability to transform Earth's surface Wind's ability to transform Earth's surface Textbook: Conceptual Integrated Science, Third Edition Chapter 25	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates for classified students.	

UNIT 4: EARTH SCIENCE – WEATHER AND CLIMATE

Essential Questions:

How are weather and climate differentiated?
What forces drive changes in weather and climate?
How do Earth's properties (tilt of axis, surface features, dynamic systems, etc.) interact to cause various weather and climate patterns?
How does the circulation of air change weather and climate?
How does the circulation of water change weather and climate?
How do short term weather patterns and long term climate changes impact humans?
How do humans drive changes in weather and climate patterns?

NGSS Performance Expectations: (Students who demonstrate understanding can:)

NJSLS/HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

NJSLS/HS-ESS2-4 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1–10 years: large volcanic eruption, ocean circulation; 10–100s of years: changes in human activity, ocean circulation, solar output; 10–100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10–100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]

NJSLS/HS-ESS3-5 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. [Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]

NJSLS/HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). [Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.] [Assessment Boundary: Assessment does not include running computational

representations but is limited to using the published results of scientific computational models.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-ESS3-1), (HS-ESS3-2), (HS-ESS3-4), (HS-ESS3-5)
• RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS3-5)
• RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ESS3-5)
• RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ESS3-2), (HS-ESS3-4)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS3-1)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-ESS3-1), (HS-ESS3-2), (HS-ESS3-3), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• MP.4 Model with mathematics. (HS-ESS3-3), (HS-ESS3-6)
• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)

Technology

8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP7. Employ valid and reliable research strategies.

CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS2.D: Weather and Climate Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (secondary to HS-ESS3- 6) **ESS3.D: Global Climate Change** Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5) Through computer simulations and other studies, important discoveries are still being made about how the ocean,	**Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. Create a computational model or simulation of a phenomenon, designed device, process, or system. (HS-ESS3-3) Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (HS-ESS3-6)	**Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-ESS3-1) **Systems and System Models** When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-ESS3-6)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Identifying differences between climate patterns and weather patterns Describing forces that act to change climate patterns and their causes Seasonal differences in weather Factors that cause variation in weather and climate (solar output, latitude, air and water circulation, albedo, greenhouse effect and human disturbances) Weather modeling Textbook. Conceptual Integrated Science, Third Edition Chapter 26	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

the atmosphere, and the biosphere interact and are modified in response to human activities. (HS-ESS3-6)				

Resources: Essential Materials, Supplementary Materials, Links to Best Practices

Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh
Gizmos (https://www.explorelearning.com)
Pivot (https://www.pivotinteractives.com)

Instructional Adjustments: Modifications will be made to accommodate IEP mandates for classified students

UNIT 4: EARTH SCIENCE – ENVIRONMENTAL GEOLOGY

Essential Questions:
What are the biggest threats associated with earthquakes and how do we safeguard against them?
What are the biggest threats associated with volcanoes and how do we safeguard against them?
What are the biggest threats associated with tsunamis and how do we safeguard against them?
What are the biggest threats associated with hurricanes and how do we safeguard against them?
How has Earth's climate changed over time and why?
What role does human activity play in modern climate change?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

NJSLS/HS-ESS2-4 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1–10 years: large volcanic eruption, ocean circulation; 10–100s of years: changes in human activity, ocean circulation, solar output; 10–100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10–100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]

NJSLS/HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). [Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.] [Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-ESS3-1), (HS-ESS3-2), (HS-ESS3-4), (HS-ESS3-5)
• RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS3-5)
• RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ESS3-5)
• RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ESS3-2), (HS-ESS3-4)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS3-1)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-ESS3-1), (HS-ESS3-2), (HS-ESS3-3), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• MP.4 Model with mathematics. (HS-ESS3-3), (HS-ESS3-6)
• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)
• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS3-1), (HS-ESS3-4), (HS-ESS3-5), (HS-ESS3-6)

Technology

8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP7. Employ valid and reliable research strategies.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
ESS3.D: Global Climate Change Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5) Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (HS-ESS3-6)	**Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K– 8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. Analyze data using computational models in order to make valid and reliable scientific claims. (HS-ESS3-5)	**Influence of Engineering, Technology, and Science on Society and the Natural World** Modern civilization depends on major technological systems. (HS-ESS3-1), (HS-ESS3-3) Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (HS-ESS3-2), (HS-ESS3-4)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Seismic disasters (volcanoes, earthquakes, and tsunamis) History of natural disasters and how we have aimed to protect humans, resources, and property from damage History of climate change on Earth and drivers of those changes (solar output, latitude, air and water circulation, albedo, greenhouse effect and human disturbances) Natural disaster predictions, forecasting, and warning systems Textbook: Conceptual Integrated Science, Third Edition Chapter 27	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)	**Instructional Adjustments:** Modifications will be made to accommodate IEP mandates fir classified students

UNIT 5: ECOLOGY – THE EVOLUTION OF LIFE

Essential Questions:
How do species change over time?
How are different traits passed on from one generation to another?
What role does the environment play in evolution?
What role do other living things play in evolution?
How have humans changed from their ancestors over time?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

NJSLS/HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]

NJSLS/HS-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. [Clarification Statement: Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.] [Assessment Boundary: Assessment does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.]

NJSLS/HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations. [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4)

• RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS4-5)

• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4)

• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS4-6)

• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS4-6)

• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5)

• SL.11-12.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (HS-LS4-1), (HS-LS4-2)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5)

• MP.4 Model with mathematics. (HS-LS4-2)

Technology

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP7. Employ valid and reliable research strategies.

CRP9. Model integrity, ethical leadership and effective management

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS4.A: Evidence of Common Ancestry and Diversity Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1) **LS4.B: Natural Selection** Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance	**Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science. Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS4-5)	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-LS4-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Darwin's work and the development of Natural Selection The genetics of evolution Artificial Selection Inheritable changes Acquired characteristics and other non-evolutionary change Textbook: Conceptual Integrated Science, Third Edition Chapter 17	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

among individuals. (HS-LS4-2), (HS-LS4-3) The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (HS-LS4-3) **LS4.C: Adaptation** Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HS-LS4-2)				
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 5: ECOLOGY – DIVERSITY OF LIFE ON EARTH

Essential Questions:
How are different organisms organized?
How has our organization system for living things changed over time?
What are the evolutionary relationships between various living things?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]

NJSLS/HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations. [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]

NJSLS/HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. [Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
• RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4)
• RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS4-5)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4)
• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS4-6)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS4-6)

• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5)

• SL.11-12.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (HS-LS4-1), (HS-LS4-2)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-LS4-1), (HS-LS4-2), (HS-LS4-3), (HS-LS4-4), (HS-LS4-5)

• MP.4 Model with mathematics. (HS-LS4-2)

Technology

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices

CRP2. Apply appropriate academic and technical skills

CRP4. Communicate clearly and effectively and with reason.

CRP7. Employ valid and reliable research strategies.

CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS4.A: Evidence of Common Ancestry and Diversity Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can	**Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Modeling classification systems	**<u>Formative Assessments</u>**: Exit tickets Laboratory activities Classwork Homework

be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1)	Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-LS4-1)	confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-LS4-1)	Classification systems from the past Using patterns and systems to organize living things Defining a living thing Textbook: Conceptual Integrated Science, Third Edition Chapter 18	**Summative Assessments:** Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 5: ECOLOGY – STUDYING ECOSYSTEMS

Essential Questions:
How do organisms interact with other organisms and their surroundings?
How does energy enter ecosystems and how is it transferred between living things?
How do ecosystems develop, grow, and change?
What are limiting factors and why are they important?
How is the human population growing and how is that impacting us and our environment?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.]

NJSLS/HS-LS2-2 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.]

NJSLS/HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. [Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.]

NJSLS/HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.9-10.8 Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)

• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS2-1), (HS-LS2-2), (HS-LS2-3), (HS-LS2-6), (HS-LS2-8)

• RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)

• RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)

• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS2-1), (HS-LS2-2), (HS-LS2-3)

• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS2-3)

• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS2-7)

Mathematics

• MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7)

• MP.4 Model with mathematics. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4)

• HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)

• HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)

• HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)

• HSS-ID.A.1 Represent data with plots on the real number line. (HS-LS2-6)

• HSS-IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. (HS-LS2-6)

• HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6)

Technology

8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

Career Ready Practices

CRP2. Apply appropriate academic and technical skills

CRP4. Communicate clearly and effectively and with reason.

CRP7. Employ valid and reliable research strategies.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS2.A: Interdependent Relationships in Ecosystems Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-1), (HS-LS2-2)	**Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HS-LS2-1)	**Scale, Proportion, and Quantity** The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-LS2-1) Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Different scales of ecology Limiting factors, carrying capacities, and population growth patterns Human population growth Resource consumption Energy in ecosystems Human disruptions and ecosystem change	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

	Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2) Use mathematical representations of phenomena or design solutions to support claims. (HS-LS2-4)		Textbook: Conceptual Integrated Science, Third Edition Chapter 21	
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 6: BIOLOGY – THE BASIC UNIT OF LIFE – THE CELL

Essential Questions:
What are the differences between eukaryotic and prokaryotic cells and why are they important?
How can cells communicate to one another and in large groups?
What is the function and importance of mitosis?
How do cells get and use energy in different organisms?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

NJSLS/HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

NJSLS/HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. [Assessment Boundary: Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.]

NJSLS/HS-LS1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. [Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]

NJSLS/HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy

• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS1-1), (HS-LS1-6)

• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1), (HS-LS1-6)

• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)

• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)

• WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)

• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1), (HS-LS1-6)

• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2), (HS-LS1-4), (HS-LS1-5), (HS-LS1-7)

Mathematics

• MP.4 Model with mathematics. (HS-LS1-4)

• HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)

• HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4)

Technology

8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Career Ready Practices

CRP4. Communicate clearly and effectively and with reason.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS1.A: Structure and Function Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.) Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) Feedback mechanisms maintain a living system's internal conditions within	**Developing and Using Models** Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-4), (HS-LS1-5), (HS-LS1-7)	**Energy and Matter** Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HS-LS1-5), (HS-LS1-6) Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (HS-LS1-7)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Modeling types of cells Modeling cell reproduction Investigating cell communication Photosynthesis Cell respiration Textbook: Conceptual Integrated Science, Third Edition Chapter 15	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam

certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)				
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 6: BIOLOGY – GENETICS

Essential Questions:
What is DNA and how does its structure determine its function?
How are genes expressed?
What is the importance of chromosomes?
What are mutations, how can they occur, and what do they cause?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.]

NJSLS/HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbonbased molecules. [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.] [Assessment Boundary: Assessment does not include the details of the specific chemical reactions or identification of macromolecules.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS1-1), (HS-LS1-6)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1), (HS-LS1-6)
• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)
• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
• WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)
• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1), (HS-LS1-6)

• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2), (HS-LS1-4), (HS-LS1-5), (HS-LS1-7)

Mathematics

• MP.4 Model with mathematics. (HS-LS1-4)

• HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)

• HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4)

Technology

8.1.12.B.2 Apply previous content knowledge by creating and piloting a digital learning game or tutorial.

Career Ready Practices

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS1.A: Structure and Function All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)	**Planning and Carrying Out Investigations** Planning and carrying out in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types,	**Structure and Function** Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* DNA structure and experimental design Replication of DNA	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project

	how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)		Formation of Chromosomes and karyotyping Mutations-types causes and effects Meiosis and crossing over Mendel and statistical analysis Cancer Artificial engineering and manipulation of genetic material Textbook: Conceptual Integrated Science, Third Edition Chapter 16	Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 6: BIOLOGY – HUMAN BIOLOGY I – CONTROL AND DEVELOPMENT

Essential Questions:
How does the human body maintain homeostasis?
How does the nervous system function?
How does the human body gain information about its surroundings?
How does the human body communicate from organ to organ and system to system?
How does the human body grow and reproduce?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

NJSLS/HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

NJSLS/HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS1-1), (HS-LS1-6)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1), (HS-LS1-6)

• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)
• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
• WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)
• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1), (HS-LS1-6)
• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2), (HS-LS1-4), (HS-LS1-5), (HS-LS1-7)

Mathematics

• MP.4 Model with mathematics. (HS-LS1-4)
• HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)
• HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4)

Technology

8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

Career Ready Practices

CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS1.B: Growth and Development of Organisms In multicellular organisms, individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)	**Systems and System Models** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2), (HS-LS1-4)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Functioning of the nervous system Brain, nerve, and spinal health Hormones and puberty Reproductive health Pregnancy Skeletal and muscular health Textbook: Conceptual Integrated Science, Third Edition Chapter 19	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	

UNIT 6: BIOLOGY – HUMAN BIOLOGY II – CARE AND MAINTENANCE

Essential Questions:
How does the human body maintain homeostasis?
How does the circulatory system function?
How does the digestive system function?
How does the immune system function?
How does the respiratory system function?
What can we do to keep our bodies healthy and functioning at an optimum level?

NGSS Performance Expectations: (Students who demonstrate understanding can:)
NJSLS/HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

NJSLS/HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

NJSLS/HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

Unit Assessment: (What is the evidence (authentic) that students have achieved the targeted standards/unit objectives?)
Quarterly Exam
Tests and quizzes
Class laboratory activities

ELA/ Literacy
• RST.11-12.1 Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. (HS-LS1-1), (HS-LS1-6)
• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1), (HS-LS1-6)

• WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)
• WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a selfgenerated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
• WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)
• WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1), (HS-LS1-6)
• SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2), (HS-LS1-4), (HS-LS1-5), (HS-LS1-7)

Mathematics

• MP.4 Model with mathematics. (HS-LS1-4)
• HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)
• HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4)

Technology

8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

Career Ready Practices

CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP7. Employ valid and reliable research strategies.
CRP11. Use technology to enhance productivity.

Student Learning Objectives: (SLO)			**Instructional Actions**	
Disciplinary Core Ideas	**Science and Engineering Practices**	**Crosscutting Concepts**	**Activities/Strategies Technology Implementation/ Interdisciplinary Connections**	**Assessment Check Points**
LS1.A: Structure and Function Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	**Planning and Carrying Out Investigations** Planning and carrying out in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)	**Scientific Investigations Use a Variety of Methods** Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)	*Use appropriate online and textbook resources for presentation, demonstration, classroom and laboratory activities and formative assessments for:* Functioning of the digestive system Functioning of the respiratory system Functioning of the circulatory system Functioning of the immune system Public health and policy investigation Social issues with public health Textbook: Conceptual Integrated Science, Third Edition Chapter 20	**Formative Assessments**: Exit tickets Laboratory activities Classwork Homework **Summative Assessments:** Tests Quizzes Project Quarterly exam
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook: Conceptual Integrated Science, Third Edition. Hewitt, Lyons, Suchocki, Yeh Gizmos (https://www.explorelearning.com) Pivot (https://www.pivotinteractives.com)			**Instructional Adjustments**: Modifications will be made to accommodate IEP mandates for classified students	