

Kingsway Regional School District



Committed to Excellence

Course Name: AP Environmental Science	
Prerequisite(s): CP Biology (90%), CP Chemistry and Algebra 1. Concurrent Courses: Honors Biology	Grade Level(s): 11-12
Department: Science	Credits: 1
BOE Adoption Date: September 2022	Revision Dates: N/A

Course Description and Outcomes

Advanced Placement Environmental Science is based upon an introductory level undergraduate course in Environmental Science. The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. A college textbook is used along with laboratory exercises that illustrate the stated goals. At least 20% of class time will be spent doing laboratory exercises.

Course Sequence & Pacing

Course Title: AP Environmental Science

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSLSS-SS, AP, ELL, etc.)
Unit 1: The Living World: Ecosystems and Biodiversity	5 weeks	<p>Introduction to Ecosystems</p> <ul style="list-style-type: none"> ● HS-LS2-6 ● ERT-1.A <p>Terrestrial and Aquatic Biomes HS-LS2-6</p> <ul style="list-style-type: none"> ● ERT-1.B <p>Cycles of Matter</p> <ul style="list-style-type: none"> ● HS-LS2-5 ● HS-ESS2-6 ● ERT-1.C ● ERT-1.D ● ERT-1.E ● ERT-1.F ● ERT-1.G <p>Energy Transfer and Productivity in an Ecosystem</p> <ul style="list-style-type: none"> ● HS-LS1-5 ● HS-LS2-4 ● HS-LS2-5 ● ENG-1.A ● ENG-1.B ● ENG-1.C ● ENG-1.D <p>Introduction to Biodiversity</p> <ul style="list-style-type: none"> ● HS-LS4-5 ● ERT-2.A <p>Ecosystem Services</p> <ul style="list-style-type: none"> ● HS-LS2-6 ● HS-LS2-7 ● ERT-2.B ● ERT-2.C <p>Natural Disruptions to Ecosystems and Ecological Tolerance</p> <ul style="list-style-type: none"> ● HS-LS2-6 ● HS-ESS2-1 ● ERT-2.G ● ERT-2.I ● ERT-2.J <p>Island Biogeography and Adaptations</p> <ul style="list-style-type: none"> ● HS-LS4-4 ● ERT-2.D ● ERT-2.E ● ERT-2.H

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSL-SS, AP, ELL, etc.)
		Generalist and Specialist Species <ul style="list-style-type: none"> ● HS-LS4-4 ● ERT-3.A
Unit 2: Populations	3 weeks	K-Selected and r-Selected Species <ul style="list-style-type: none"> ● HS-LS4-3 ● ERT-3.B Survivorship Curves <ul style="list-style-type: none"> ● HS-LS4-3 ● ERT-3.C Carrying Capacity, Population Growth, and Resource Availability <ul style="list-style-type: none"> ● HS-LS2-1 ● ERT-3.D ● ERT-3.E ● ERT-3.F Human Population Dynamics <ul style="list-style-type: none"> ● HS-LS2-2 ● HS-ESS3-1 ● EIN-1.A ● EIN-1.B ● EIN-1.C.1 ● EIN-1.D
Unit 3: Earth Systems and Resources	4 weeks	Plate Tectonics <ul style="list-style-type: none"> ● HS-ESS2-1 ● ERT-4.A Soil Formation, Composition, Properties and Erosion <ul style="list-style-type: none"> ● HS-ESS2-1 ● HS-ESS2-2 ● ERT-4.B ● ERT-4.C Watersheds <ul style="list-style-type: none"> ● HS-ESS2-2 ● ERT-4.F Earth's Atmosphere and Global Wind Patterns <ul style="list-style-type: none"> ● HS-ESS2-4 ● ERT-4.D ● ERT-4.E Solar Radiation and Earth's Seasons <ul style="list-style-type: none"> ● HS-ESS2-4 ● ENG-2.A Earth's Geography and Climate <ul style="list-style-type: none"> ● HS-ESS2-4 ● ENG-2.B El Niño and La Niña

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSLSS-SS, AP, ELL, etc.)
		<ul style="list-style-type: none"> ● HS-ESS2-4 ● ENG-2.C
Unit 4: Land and Water Use	6 weeks	<p>The Tragedy of the Commons</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● EIN-2.A <p>Clearcutting</p> <ul style="list-style-type: none"> ● HS-ESS2-2 ● HS-ESS3-4 ● EIN-2.B <p>The Green Revolution and Impacts of Agricultural Practices</p> <ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● EIN-2.C ● EIN-2.D <p>Irrigation, Pest Control, and Meat Production Methods</p> <ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● EIN-2.E ● EIN-2.F ● EIN-2.G ● EIN-2.H ● EIN-2.I <p>Impacts of Overfishing</p> <ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● EIN-2.J <p>Impacts of Mining</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● HS-ESS3-4 ● EIN-2.K ● EIN-2.L <p>Impacts of Urbanization</p> <ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● EIN-2.M <p>Ecological Footprints</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● EIN-2.N <p>Introduction to Sustainability</p> <ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● STB-1.A <p>Methods to Reduce Urban Runoff</p>

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSL-SS, AP, ELL, etc.)
		<ul style="list-style-type: none"> ● HS-ESS3-3 ● HS-ESS3-4 ● STB-1.B <p>Integrated Pest Management</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● STB-1.C ● STB-1.D <p>Sustainable Agriculture</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● STB-1.E <p>Aquaculture</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● STB-1.F <p>Sustainable Forestry</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● STB-1.G
Unit 5: Energy Resources and Consumption	4 weeks	<p>Renewable and Nonrenewable Resources</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.A <p>Global Energy Consumption</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.B <p>Fuel Types and Uses</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.C <p>Distribution of Natural Energy Resources</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.D <p>Nonrenewable Energy Sources</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.E ● ENG-3.G ● ENG-3.H <p>Renewable Energy Sources</p> <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.I ● ENG-3.J ● ENG-3.K ● ENG-3.L ● ENG-3.M ● ENG-3.N ● ENG-3.O ● ENG-3.P

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSLSS-SS, AP, ELL, etc.)
		<ul style="list-style-type: none"> ● ENG-3.Q ● ENG-3.R ● ENG-3.S Energy Conservation <ul style="list-style-type: none"> ● HS-ESS3-2 ● ENG-3.T
Unit 6: Atmospheric, Aquatic, and Terrestrial Pollution	7 weeks	Introduction to Air Pollution <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.A Types of Air Pollutants: Photochemical Smog, Atmospheric CO ₂ and Particulates, Indoor Air Pollutants <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.B ● STB-2.D ● STB-2.E ● STB-2.F Thermal Inversion <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.C Noise Pollution <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.J Reduction of Air Pollutants <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.G Acid Rain <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-2.H ● STB-2.I Point and Nonpoint Sources of Pollution <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSL-SS, AP, ELL, etc.)
		<ul style="list-style-type: none"> ● HS-LS4-6 ● STB-3.A <p>Solid Waste: Disposal, Reduction, and Sewage Treatment</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-3.K ● STB-3.L ● STB-3.M <p>Human Impacts on Aquatic Ecosystems</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-3.B ● STB-3.E ● STB-3.F ● STB-3.G <p>Endocrine Disruptors, Persistent Organic Pollutants (POPs), Bioaccumulation and Biomagnification</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● STB-3.C ● STB-3.D ● STB-3.H ● STB-3.I ● STB-3.J <p>Lethal Dose 50% (LD₅₀) and Dose Response Curve</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● EIN-3.A ● EIN-3.B <p>Human Health: Pollution, Pathogens, and Infectious Diseases</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-4 ● HS-LS4-6 ● EIN-3.C ● EIN-3.D

Unit Title	Suggested Pacing (weeks)	Unit Focus & Performance Expectations (i.e. related state/program standards - NJSL-SS, AP, ELL, etc.)
Unit 7: Global Change	6 weeks	<p>Human Impacts on Biodiversity</p> <ul style="list-style-type: none"> ● HS-LS2-7 ● HS-ESS3-3 ● EIN-4.A ● EIN-4.B ● EIN-4.C <p>Stratospheric Ozone Depletion and Reducing Ozone Depletion</p> <ul style="list-style-type: none"> ● HS-ESS3-4 ● STB-4.A ● STB-4.B <p>The Greenhouse Effect, Increases in the Greenhouse Gasses and Global Climate Change</p> <ul style="list-style-type: none"> ● HS-ESS3-1 ● HS-ESS3-5 ● HS-ESS3-4 ● STB-4.D ● STB-4.E ● STB-4.F <p>Ocean Warming and Acidification</p> <ul style="list-style-type: none"> ● HS-ESS3-6 ● HS-ESS3-5 ● STB-4.G ● STB-4.H

Unit Title 1 : The Living World: Ecosystems and Biodiversity	Section: 1	Pacing: 5 weeks
<p>Unit Description: The first unit sets the foundation for the course by examining the Earth as a system with interdependent components, processes, and relationships. Students will examine the distribution of resources in ecosystems and its influences on species interactions. There is a global distribution of terrestrial and aquatic biomes—regional ecosystems—that each have specific environmental features based on their shared climate. This distribution is dynamic, and it has changed due to global climate change. Each ecosystem relies on biogeochemical cycles for survival. These cycles facilitate the acquisition and transfer of energy into usable forms, and they can be altered by human activities. Students will apply their understanding of ecosystems to the living world and examine the importance of biodiversity. Biodiversity, which includes genetic, species, and habitat diversity, is critically important to ecosystems. Biodiversity in ecosystems is a key component to sustaining life within the living world. Natural and human disruptions have short- and long-term impacts on ecosystems. Ecological succession can occur in terrestrial and aquatic ecosystems in both developed and developing areas. Organisms within ecosystems must adapt to the changes created by these disruptions. In subsequent units, students will examine in greater detail how populations change over time.</p>		
<p><i>To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved <u>Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet</u>. These must be used in the planning and delivery of instruction.</i></p>		

Core Idea/Enduring Understanding	NJSLSS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
Ecosystems are the result of biotic and abiotic interactions. ERT-1	HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	<ul style="list-style-type: none"> ● Compare how the availability of resources influences species interactions citing data as evidence. ERT-1.A ● Analyze the global distribution and principal environmental aspects of terrestrial and aquatic biomes. ERT-1.B ● Construct a model to demonstrate the steps and reservoir interactions in the carbon, nitrogen, phosphorous, and hydrologic cycles. ERT-1.C, ERT-1.D, ERT-1.E, ERT-1.F ERT-1.G
Energy can be converted from one form to another. ENG-1	HS-LS1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	<ul style="list-style-type: none"> ● Apply a mathematical model to explain how solar energy is acquired and transferred by living organisms. ENG-1.A ● Model the flow of energy and cycling of matter through trophic levels. ENG-1.B ● Utilize the laws of thermodynamics to explain how energy decreases as it flows through ecosystems. ENG-1.C ● Classify food chains and food webs, and their constituent members by trophic level. ENG-1.D ● Investigate how positive and negative feedback loops can play a role in food webs. ENG-1.D

<p>Ecosystems have structure and diversity that change over time. ERT-2</p>	<p>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.</p> <p>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.</p> <p>HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</p> <p>HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</p> <p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity</p>	<ul style="list-style-type: none"> Analyze genetic, species, and habitat biodiversity and their importance to ecosystems. ERT-2.A Compare and contrast generalist and specialist species. ERT-3.A Investigate the role of ecosystem services and the results of human disruptions to ecosystem services. ERT-2.B, ERT-2.C Design an experiment to model ecological tolerance of a(n) individual/species. ERT-2.F Explain how natural disruptions, both short-term and long-term, impact an ecosystem. ERT-2.G Analyze a model of ecological succession to hypothesize the effect of ecological succession on ecosystems over time. ERT-2.I, ERT-2.J Assess island biogeography and its role in evolution of species. ERT-2.D, ERT-2.E Construct an explanation for the adaptations of organisms to their environment. ERT-2.H
---	---	---

Common Secondary Assessments	Common Primary Assessments
<p>Ecosystem Productivity CER Species Diversity Lab Report</p>	<p>LD50/Salt Toxicity Lab Report Unit 1 & 2 Exam Biome Project</p>

Interdisciplinary Connections for this Unit: <u>CORE AREA CONNECTIONS</u>
<p>ELA:</p> <ul style="list-style-type: none"> Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. Read and comprehend complex literary and informational texts independently and proficiently. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. <p>Math:</p>

<ul style="list-style-type: none"> • NJSLS-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking. 	
Related State Mandates Supported within the Unit:	
<input type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input checked="" type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input checked="" type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
Career Ready Practices: <u>Note applicable CRPs used within the unit.</u>	
<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input checked="" type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
21st Century Themes & Skills:	
<input checked="" type="checkbox"/> Global awareness <input type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
Course/Unit Resources (including technology-based resources):	
Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles	

Unit Title: Populations	Section: 2	Pacing: 3 weeks
--------------------------------	-------------------	------------------------

Unit Description: Populations within ecosystems change over time in response to a variety of factors. This unit examines the relationship between the type of species and the changes in a habitat over time. Specialist species are advantaged by habitats that remain constant, while generalist species tend to be advantaged by habitats that are changing. Different reproductive patterns, including those exhibited by K- and r-selected species, also impact changes to population. Population growth is limited by environmental factors, especially by the availability of resources and space, and these resources can be distributed inequitably in the local and global human population. In subsequent units, students will explore how increases in populations affect earth systems and resources, land and water use, and energy resources.

To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet. These must be used in the planning and delivery of instruction.

Core Idea/Enduring Understanding	NJSL-SS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
Populations change overtime in reaction to a variety of factors. ERT-3	<p>HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.</p> <p>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.</p>	<ul style="list-style-type: none"> ● Collect and analyze scientific evidence to form an explanation for the evolutionary success of both K-selected and r-selected species. ERT-3.B ● Using conceptual and graphical evidence, develop an explanation to describe the relationship between survivorship curves, life history patterns, and K-selected and r-selected species. ERT-3.C ● Utilizing graphical evidence regarding carrying capacity and population overshoot, analyze the impact of resource availability on the carrying capacity, population dynamics and population growth of species. Make predictions supported with scientific data as to how these changes would impact a species's ecosystem. ERT-3.D, ERT-3.E, ERT-3.F
Human populations change in reaction to a variety of factors, including social and cultural factors. EIN-1	<p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> ● Evaluate age structure diagrams to determine population growth and decline rates. EIN-1.A ● Critique and analyze social, cultural, economic, and environmental factors that affect total fertility rate in human populations. EIN-1.B ● Critique and analyze the social, cultural, economic, and environmental factors which influence human population growth and decline. EIN-1.C.1 ● Analyze various pieces of graphical and statistical evidence, including age structure diagrams, total fertility rate, population growth/decline rates, as well as a country's current economic system to identify what stage a country has reached in the demographic transition model. . EIN-1.D

Common Secondary Assessments	Common Primary Assessments
Survivorship Lab and CER Mark and Recapture Lab	Unit 2 Exam Human Population Analysis

Interdisciplinary Connections for this Unit: CORE AREA CONNECTIONS

ELA: <ul style="list-style-type: none"> ● Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. ● Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. ● Read and comprehend complex literary and informational texts independently and proficiently. ● Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. 	
Math: <ul style="list-style-type: none"> ● NJSL-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking. 	
Related State Mandates Supported within the Unit:	
<input checked="" type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
Career Ready Practices: <u>Note applicable CRPs used within the unit.</u>	
<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input checked="" type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input checked="" type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
21st Century Themes & Skills:	
<input checked="" type="checkbox"/> Global awareness <input checked="" type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input checked="" type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
Course/Unit Resources (including technology-based resources):	
Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles	

Unit Title: Earth Systems and Resources	Section: 3	Pacing: 4 weeks
Unit Description: This unit explores earth systems and its resources that support life. Geological changes that occur to earth systems at convergent and divergent boundaries can result in the creation of mountains, island arcs, earthquakes, volcanoes, and seafloor spreading. Soils are a resource, formed when parent material is weathered, transported, and		

deposited. The atmosphere is another resource, composed of certain percentages of major gasses. Climate is influenced by the sun's energy, Earth's geography, and the movement of air and water. In subsequent units, students will examine how humans use natural resources and the impact on the environment.

To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet. These must be used in the planning and delivery of instruction.

Core Idea/Enduring Understanding	NJSLS-SS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
Earth's systems interact, resulting in a state of balance over time. ERT-4	<p>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</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> ● Compare and contrast the geologic changes and events that occur at convergent, divergent, and transform plate boundaries. ERT-4.A ● Investigate the characteristics and formation of soil. ERT-4.B ● Compare similarities and differences between properties of different soil types. ERT-4.C ● Investigate the characteristics of a watershed. ERT-4.F ● Connect the structure and composition of the Earth's atmosphere as well as environmental factors to natural phenomena occurring such as atmospheric circulations. ERT-4.D, ERT-4.E
Most of the Earth's atmospheric processes are driven by input of energy from the sun. ENG-2	<p>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.</p>	<ul style="list-style-type: none"> ● Prove how the sun's energy affects the Earth's surface. ENG-2.A ● Develop an argument to support how the Earth's geography affects weather and climate. ENG-2.B ● Analyze the environmental changes and effects that result from El Niño or La Niña events (El Niño–Southern Oscillation). ENG-2.C

Common Secondary Assessments	Common Primary Assessments
Reading the Soil Triangle CER Coriolis Effect Lab	Soil Composition and Properties Lab Report Unit 3 Exam

Interdisciplinary Connections for this Unit: CORE AREA CONNECTIONS

- ELA:
- Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
 - Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
 - Read and comprehend complex literary and informational texts independently and proficiently.
 - Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
- Math:
- NJSLS-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking.

Related State Mandates Supported within the Unit:

<input type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
Career Ready Practices: Note applicable CRPs used within the unit.	
<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
21st Century Themes & Skills:	
<input checked="" type="checkbox"/> Global awareness <input type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
Course/Unit Resources (including technology-based resources):	
Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles	

Unit Title: Land and Water Use	Section: 4	Pacing: 5 weeks
Unit Description: This unit explores human activities that disrupt ecosystems both positively and negatively and the methods employed to reduce impact. It examines human use of natural resources through many means, including mining and clearcutting, and the impacts on the environment. Agricultural practices in particular can cause environmental disruption. For example, one of the largest uses of freshwater is for irrigation. Every irrigation method employed for agriculture has its own benefits and drawbacks. In subsequent units, students will examine different types of energy resources, the consumption of these resources, and the impact on the environment.		

To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet. These must be used in the planning and delivery of instruction.

Core Idea/Enduring Understanding	NJSLS-SS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
When humans use natural resources, they alter natural systems. EIN-2	<p>HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.</p> <p>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.</p> <p>HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems</p>	<ul style="list-style-type: none"> ● Explain the concept of the tragedy of the commons. EIN-2.A ● Analyze the effect of clearcutting on forests. EIN-2.B ● Critique changes in agricultural practices and draw conclusions as to which practices cause environmental damage. EIN-2.C, EIN-2.D ● Investigate the benefits and drawbacks of different methods of irrigation. EIN-2.E, EIN-2.F ● Investigate the benefits and drawbacks of different methods of pest control. EIN-2.G ● Investigate the benefits and drawbacks of different methods of meat production. EIN-2.H, EIN-2.I ● Assess the causes of and problems related to overfishing. EIN-2.J ● Assess the environmental dangers of natural resource extraction through mining. EIN-2.K ● Critique the ecological and economic impacts of natural resource extraction through mining. EIN-2.L ● Describe the effects of urbanization on the environment. EIN-2.M ● Construct your own ecological footprint, connecting the variables measured to assess where personal changes could be made in terms of resource consumption. EIN-2.N
Humans can mitigate their impact on land and water resources through sustainable use. STB-1	<p>HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems</p>	<ul style="list-style-type: none"> ● Interpret the concept of sustainability, applying this concept to personal lives. STB-1.A ● Formulate methods for mitigating the problems related to urban runoff. STB-1.B ● Critique the benefits and drawbacks of integrated pest management. STB-1.C, STB-1.D ● Analyze sustainable agricultural and food production best practices. STB-1.E ● Investigate the benefits and drawbacks of aquaculture. STB-1.F ● Create methods for mitigating human impact on forests. STB-1.G

Common Secondary Assessments	Common Primary Assessments
Tragedy of the Commons CER Resource Sustainability Lab	Unit 4 Exam

Interdisciplinary Connections for this Unit: CORE AREA CONNECTIONS
ELA:

- Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
 - Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
 - Read and comprehend complex literary and informational texts independently and proficiently.
 - Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
- Math:
- NJLS-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking.

Related State Mandates Supported within the Unit:

<input checked="" type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input checked="" type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
--	--

Career Ready Practices: Note applicable CRPs used within the unit.

<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input checked="" type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input checked="" type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input checked="" type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
--	--

21st Century Themes & Skills:

<input checked="" type="checkbox"/> Global awareness <input checked="" type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input checked="" type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
---	--

Course/Unit Resources (including technology-based resources):

Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles

Unit Title: Energy Resources and Consumption	Section: 5	Pacing: 5 weeks
---	-------------------	------------------------

Unit Description: This unit examines human use of renewable and nonrenewable sources of energy and its impact on the environment. Energy consumption differs throughout the world and the availability of natural energy resources depends on the region’s geologic history. Subsequent units will examine the impact of human activity on the atmosphere, land, and water.

To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet. These must be used in the planning and delivery of instruction.

Core Idea/Enduring Understanding	NJSL-SS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
Humans use energy from a variety of sources, resulting in positive and negative consequences. ENG-3	HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	<ul style="list-style-type: none"> ● Differentiate between nonrenewable and renewable energy sources. ENG-3.A ● Cite quantitative data to draw conclusions about trends in energy consumption. ENG-3.B ● Compare types of fuels and their uses. ENG-3.C ● Identify where natural energy resources occur. ENG-3.D ● Assess the use and methods of fossil fuels in power generation. ENG-3.E ● Assess the use of nuclear energy in power generation, analyzing its effect on the environment. ENG-3.G, ENG-3.H ● Analyze the effects of the use of biomass in power generation on the environment. ENG-3.I ● Assess the effects of the use of solar energy in power generation, analyzing its effect on the environment. ENG-3.J, ENG-3.K ● Assess the effects of the use of hydroelectricity in power generation, analyzing its effect on the environment. ENG-3.L, ENG-3.M ● Assess the effects of the use of geothermal energy in power generation, analyzing its effect on the environment. ENG-3.N, ENG-3.O ● Assess the effects of the use of hydrogen fuel cells in power generation, analyzing its effect on the environment. ENG-3.P, ENG-3.Q ● Assess the effects of the use of wind energy in power generation, analyzing its effect on the environment. ENG-3.R, ENG-3.S ● Using quantitative data regarding power generation as well as environmental effects, evaluate energy conservation solutions. Draw conclusions to determine a viable energy conservation solution that could be implemented long-term. ENG-3.T

Common Secondary Assessments	Common Primary Assessments
Global Energy Consumption CER Energy Resources Speed Dating	Unit 6 Exam

Interdisciplinary Connections for this Unit: CORE AREA CONNECTIONS
<p>ELA:</p> <ul style="list-style-type: none"> ● Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. ● Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. ● Read and comprehend complex literary and informational texts independently and proficiently. ● Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. <p>Math:</p> <ul style="list-style-type: none"> ● NJSL-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking.
Related State Mandates Supported within the Unit:

<input checked="" type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
Career Ready Practices: <u>Note applicable CRPs used within the unit.</u>	
<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input checked="" type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input checked="" type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input checked="" type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
21st Century Themes & Skills:	
<input checked="" type="checkbox"/> Global awareness <input checked="" type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
Course/Unit Resources (including technology-based resources):	
Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles	

Unit Title: Atmospheric, Aquatic, and Terrestrial Pollution	Section: 6	Pacing: 7 weeks
<p>Unit Description: Air pollution has many sources and effects, both indoors and outdoors. Air is a natural resource that covers the Earth and crosses many system boundaries. Human activities affect the quality of the air both indoors and outdoors. Through legislation, the Clean Air Act regulates the emission of air pollutants that affect human health. The gasses and particulates in the atmosphere come from both natural and human sources; once air pollution sources are identified, methods can be used to reduce it. Pollution created by human activities directly impacts ecosystems in the air, on land, and in water. The source of pollution can sometimes be easy to identify, but other times the source is diffused. There are many human health issues that can be linked to pollution. Legislation has been created to reduce discharges of pollution in water and regulate drinking water. Increases in waste cause global concerns for organisms that live on land and in water. In the final unit, students will explore how local and regional human activities can have a global impact.</p>		

To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet. These must be used in the planning and delivery of instruction.

Core Idea/Enduring Understanding	NJSLSS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
Human activities have physical, chemical, and biological consequences for the atmosphere. STB-2	<p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.</p> <p>HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.</p>	<ul style="list-style-type: none"> ● Analyze the sources and effects of air pollutants. STB-2.A ● Evaluate the causes and effects of photochemical smog and methods to reduce it. STB-2.B ● Assess natural sources of CO₂ and particulates. STB-2.D ● Design an experiment to evaluate types of indoor air pollutants. STB-2.E ● Use statistical evidence to quantify the effects of indoor air pollutants. STB-2.F ● Model thermal inversion and use data to analyze its relationship with pollution. STB-2.C ● Analyze human activities that result in noise pollution, connecting these activities to their environmental effects. STB-2.J ● Evaluate point-source air pollution reduction methods. STB-2.G ● Using chemical equations, model acid deposition and its effect on the environment. STB-2.H, STB-2.I
Human activities, including the use of resources, have physical, chemical, and biological consequences for ecosystems. STB-3	<p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.</p> <p>HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.</p>	<ul style="list-style-type: none"> ● Compare and contrast point and nonpoint sources of pollution. STB-3.A ● Critique solid waste disposal methods. STB-3.K ● Analyze changes to current practices that could reduce the amount of generated waste and their associated benefits and drawbacks. STB-3.L ● Analyze best practices in sewage treatment. STB-3.M ● Evaluate the impacts of human activities on aquatic ecosystems, including wetlands and mangroves. STB-3.B, STB-3.E ● Assess the environmental effects of excessive use of fertilizers and detergents on aquatic ecosystems. STB-3.F ● Describe the effects of thermal pollution on aquatic ecosystems. STB-3.G ● Model the effects of endocrine disruptors on organisms and ecosystems. STB-3.C, STB-3.D ● Assess the effect of persistent organic pollutants (POPs) on ecosystems. STB-3.H ● Compare and contrast the concepts and effects of bioaccumulation and biomagnification. STB-3.I, STB-3.J
Pollutants can have both direct and indirect impacts on the health of organisms, including humans. EIN-3	<p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on</p>	<ul style="list-style-type: none"> ● Design an experiment to identify the lethal dose 50% (LD₅₀) of a substance of an organism. EIN-3.A ● Evaluate the graphic representation of dose response curves. EIN-3.B ● Utilize statistics to determine the sources of human health issues that are linked to pollution. EIN-3.C ● Evaluate the impact of human pathogens and their cycling through the environment. EIN-3.D

	climate change and other natural systems. HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	
--	---	--

Common Secondary Assessments	Common Primary Assessments
Acid Rain Lab Water Quality Testing Lab	Air Pollution Lab Report Unit 6 Exam

Interdisciplinary Connections for this Unit: CORE AREA CONNECTIONS

<p>ELA:</p> <ul style="list-style-type: none"> Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. Read and comprehend complex literary and informational texts independently and proficiently. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. <p>Math:</p> <ul style="list-style-type: none"> NJSLS-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking.

Related State Mandates Supported within the Unit:

<input checked="" type="checkbox"/> Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 <input checked="" type="checkbox"/> LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	<input checked="" type="checkbox"/> Diversity, Equity, and Inclusion: P.L.2021, c.32 <input checked="" type="checkbox"/> Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
--	---

Career Ready Practices: Note applicable CRPs used within the unit.

<input checked="" type="checkbox"/> Act as a responsible & contributing citizen/employee <input checked="" type="checkbox"/> Apply appropriate academic & tech skills <input checked="" type="checkbox"/> Attend to personal health and/or financial well-being <input checked="" type="checkbox"/> Communicate clearly & effectively & within reason <input checked="" type="checkbox"/> Consider the environmental, social, & economic impacts of decisions <input checked="" type="checkbox"/> Demonstrate creativity & innovation	<input checked="" type="checkbox"/> Employ valid & reliable research strategies. <input checked="" type="checkbox"/> Utilize critical thinking to make sense of problems & persevere in solving them <input checked="" type="checkbox"/> Model integrity, ethical leadership, and effective management <input checked="" type="checkbox"/> Plan education & career paths aligned to personal goals <input checked="" type="checkbox"/> Use technology to enhance productivity <input checked="" type="checkbox"/> Work productively in teams while using cultural global competence
--	--

21st Century Themes & Skills:

<input checked="" type="checkbox"/> Global awareness <input checked="" type="checkbox"/> Financial, economic, business, and entrepreneurial literacy <input checked="" type="checkbox"/> Civic literacy <input checked="" type="checkbox"/> Health literacy <input checked="" type="checkbox"/> Information, media, and technology skills	<input checked="" type="checkbox"/> Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) <input checked="" type="checkbox"/> Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
---	--

Course/Unit Resources (including technology-based resources):

Unit Title: Global Change	Section: 7	Pacing: 6 weeks
<p>Unit Description: A central aspect of environmental science is to understand the global impact of local and regional human activities. Humans can mitigate their impact through sustainable use of resources. Human activities can cause ozone depletion in the stratosphere and increases in the greenhouse gasses in the atmosphere. Increases in greenhouse gasses can cause human health and environmental problems. These environmental problems include global climate change, ocean warming, and endangered species. Overall, this course provides an opportunity to examine the interrelationships among the natural world and challenges students to evaluate and propose solutions to a variety of environmental problems.</p>		
<p><i>To ensure the needs of all learners (including, but not limited to, special education, 504, ELL, & advanced learners) are met when delivering instruction and when assessing students, please refer to the District approved <u>Instructional & Assessment Supports: Accommodations/Modifications Reference Sheet</u>. These must be used in the planning and delivery of instruction.</i></p>		

Core Idea/Enduring Understanding	NJSL-SS Performance Expectation(s)/Learning Goals	Learning Objectives(s) (Use DOK language that designates a variety of rigor at increasing levels)
The health of a species is closely tied to its ecosystem, and minor environmental changes can have a large impact. EIN-4	<p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity</p> <p>HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p>	<ul style="list-style-type: none"> ● Evaluate the environmental problems associated with invasive species and design strategies to control them. EIN-4.A ● Assess how species become endangered and design strategies to combat the problem. EIN-4.B ● Critique the influence of human activities on biodiversity. Design strategies to combat the problem. EIN-4.C
Local and regional human activities can have impacts at the global level. STB-4	<p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.</p> <p>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.</p> <p>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.</p> <p>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).</p>	<ul style="list-style-type: none"> ● Assess the importance of stratospheric ozone to life on Earth. STB-4.A ● Evaluate the impact of the chemicals used to substitute for chlorofluorocarbons (CFCs). STB-4.B ● Assess the sources and potency of the greenhouse gasses. STB-4.C, STB-4.D ● Quantify the threats to human health and the environment posed by an increase in greenhouse gasses. STB-4.E ● Design an experiment to demonstrate how changes in climate, both short- and long-term, impact ecosystems. STB-4.F ● Assess the causes and effects of ocean warming. STB-4.H ● Design an experiment to model the causes and effects of ocean acidification. STB-4.G

Common Secondary Assessments	Common Primary Assessments
Ocean Acidification Lab	Unit 9 Exam

Interdisciplinary Connections for this Unit: <u>CORE AREA CONNECTIONS</u>
<p>ELA:</p> <ul style="list-style-type: none"> ● Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

<ul style="list-style-type: none"> • Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. • Read and comprehend complex literary and informational texts independently and proficiently. • Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. 	
Math: <ul style="list-style-type: none"> • NJLS-Science practices require the analysis and interpretation of data, the use of mathematical and computational thinking. 	
Related State Mandates Supported within the Unit:	
<ul style="list-style-type: none"> X Amistad Law: N.J.S.A. 18A 52:16A-88 <input type="checkbox"/> Holocaust Law: N.J.S.A. 18A:35-28 X LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 	<ul style="list-style-type: none"> X Diversity, Equity, and Inclusion: P.L.2021, c.32 X Asian Americans and Pacific Islanders: P.L.2021, c.416 <input type="checkbox"/> Other:
Career Ready Practices: Note applicable CRPs used within the unit.	
<ul style="list-style-type: none"> X Act as a responsible & contributing citizen/employee X Apply appropriate academic & tech skills X Attend to personal health and/or financial well-being X Communicate clearly & effectively & within reason X Consider the environmental, social, & economic impacts of decisions X Demonstrate creativity & innovation 	<ul style="list-style-type: none"> X Employ valid & reliable research strategies. X Utilize critical thinking to make sense of problems & persevere in solving them X Model integrity, ethical leadership, and effective management X Plan education & career paths aligned to personal goals X Use technology to enhance productivity X Work productively in teams while using cultural global competence
21st Century Themes & Skills:	
<ul style="list-style-type: none"> X Global awareness X Financial, economic, business, and entrepreneurial literacy X Civic literacy X Health literacy X Information, media, and technology skills 	<ul style="list-style-type: none"> X Learning and innovation skills (creativity & innovation, critical thinking & problem solving, & communication & collaboration) X Life and career skills (flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, & leadership & responsibility)
Course/Unit Resources (including technology-based resources):	
<p>Friedland/Relyea Environmental Science for the AP Course 3rd edition. 2019 (online resources), AP Classroom, Newsela articles</p>	