

**MOORESTOWN TOWNSHIP PUBLIC SCHOOLS
MOORESTOWN, NEW JERSEY**

*Moorestown High School
Science Department*

**CP Environmental Science
*Grades – 11-12***

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[Course Description and Fundamental Concepts](#)

In this course students will use a combination of discussion and experimentation. They will make observations, construct charts and graphs, organize data and develop hands-on activities to reinforce written material. The students will explore a variety of environmental topics which will include: overpopulation, sustainability, our urban world, a global perspective and the impact of science on society. Within this framework we will explore energy issues, air, water, and land pollution, waste management issues and how they affect our planet's ecosystems. Students will gain a better understanding of the environment and issues that affect our planet, the causes of these problems and student ideas for possible solutions.

[New Jersey Student Learning Standards \(NJSLS\)](#)

Subject/Content Standards

Include grade appropriate subject/content standards that will be addressed

Standard #	Standard Description
HS-ESS1	
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.
HS-ESS2	
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.
HS-ESS2-2	Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth systems.
HS-ESS2-3	Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.
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.
HS-ESS2-5	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
HS-ESS2-6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
HS-ESS3	
HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
HS-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
HS-ESS3-3	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
HS-ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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.
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.
HS-PS1	
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.
HS-LS2	
HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
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.
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.
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-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.
HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS2-8	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
HS-LS4	
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.
HS-LS4-6	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
HS-ETS1	
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.

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.
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.
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

English Companion Standards

List grade-level appropriate companion standards for *History, Social Studies, Science and Technical Subjects (CTE/Arts) 6-12*. English Companion Standards are required in these subject/content areas.

Unit Addressed	Standard #	Standard Description
2,3,4	RST.9-10.8	<i>Assess the extent to which 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)</i>
1,2,3,4,5,6,7,8	RST.11-12.1	<i>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-ESS1-5),(HS-ESS2-2),(HS-ESS2-3),(HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-4),(HS-ESS3-5),(HS-LS2-1),(HS-LS2-2),(HS-LS2-3),(HS-LS2-6),(HS-LS2-8),(HS-LS4-2),(HS-LS4-3),(HS-LS4-4)</i>
1,5,7,8	RST.11-12.2	<i>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-ESS2-2), (HS-ESS3-5)</i>
2,3,4,5,7,8	RST.11-12.7	<i>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),(HS-LS2-6),(HS-LS2-7),(HS-LS2-8)</i>
1,2,3,4,5,6,7,8	RST.11-12.8	<i>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-ESS1-5),(HS-ESS3-2),(HS-ESS3-4),(HS-LS2-6),(HS-LS2-7),(HS-LS2-8),(HS-LS4-5)</i>
2	WHST.9-12.1	<i>Write arguments focused on discipline-specific content. (HS-ESS2-7)</i>

2,3,5,7,8	WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS3-1),(HS-LS2-1),(HSL2-2),(HS-LS2-3),(HS-LS4-2),(HS-LS4-3),(HS-LS4-4)
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),(HS-LS4-6)
3	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),(HS-LS2-7),(HS-LS4-6)
2	WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5)
1,5	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)

Career Awareness, Exploration, Preparation, and Training ([Standard 9.2](#))

List appropriate units below for which standards will be addressed

By Grade 12		
Unit Addressed	Core Idea	Standard / Description
1-8	There are strategies to improve one's professional value and marketability.	<p>9.2.12.CAP.1: Analyze unemployment rates for workers with different levels of education and how the economic, social, and political conditions of a time period are affected by a recession.</p> <p>9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.</p> <p>9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth.</p>

	<p>Career planning requires purposeful planning based on research, self-knowledge, and informed choices.</p>	<p>9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.</p> <p>9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.</p> <p>9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.</p> <p>9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.</p> <p>9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.</p> <p>9.2.12.CAP.9: Locate information on working papers, what is required to obtain them, and who must sign them.</p> <p>9.2.12.CAP.10: Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).</p> <p>9.2.12.CAP.11: Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education.</p>
	<p>An individual's income and benefit needs and financial plan can change over time.</p>	<p>9.2.12.CAP.12: Explain how compulsory government programs (e.g., Social Security, Medicare) provide insurance against some loss of income and benefits to eligible recipients.</p> <p>9.2.12.CAP.13: Analyze how the economic, social, and political conditions of a time period can affect the labor market.</p>
	<p>Securing an income involves an understanding of the costs and time in preparing for a career field, interview and negotiation skills, job searches, resume development, prior experience, and vesting and retirement plans.</p>	<p>9.2.12.CAP.14: Analyze and critique various sources of income and available resources (e.g., financial assets, property, and transfer payments) and how they may substitute for earned income.</p>

	<p>Understanding income involves an analysis of payroll taxes, deductions and earned benefits.</p>	<p>9.2.12.CAP.15: <i>Demonstrate how exemptions, deductions, and deferred income (e.g., retirement or medical) can reduce taxable income.</i></p> <p>9.2.12.CAP.16: <i>Explain why taxes are withheld from income and the relationship of federal, state, and local taxes (e.g., property, income, excise, and sales) and how the money collected is used by local, county, state, and federal governments.</i></p> <p>9.2.12.CAP.17: <i>Analyze the impact of the collective bargaining process on benefits, income, and fair labor practice.</i></p> <p>9.2.12.CAP.18: <i>Differentiate between taxable and nontaxable income from various forms of employment (e.g., cash business, tips, tax filing and withholding).</i></p> <p>9.2.12.CAP.19: <i>Explain the purpose of payroll deductions and why fees for various benefits (e.g., medical benefits) are taken out of pay, including the cost of employee benefits to employers and self-employment income.</i></p> <p>9.2.12.CAP.20: <i>Analyze a Federal and State Income Tax Return.</i></p>
	<p>There are ways to assess a business's feasibility and risk and to align it with an individual's financial goals.</p>	<p>9.2.12.CAP.21: <i>Explain low-cost and low-risk ways to start a business.</i></p> <p>9.2.12.CAP.22: <i>Compare risk and reward potential and use the comparison to decide whether starting a business is feasible.</i></p> <p>9.2.12.CAP.23: <i>Identify different ways to obtain capital for starting a business</i></p>

Life Literacies and Key Skills ([Standard 9.4](#))

List appropriate units below for which standards will be addressed

By Grade 12		
Unit Addressed	Core Idea	Standard / Description
1-8	<p>Creativity and Innovation: With a growth mindset, failure is an important part of success.</p>	<p>9.4.12.CI.1: <i>Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).</i></p>

1-8	<p>Creativity and Innovation: Innovative ideas or innovation can lead to career opportunities.</p>	<p><i>9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).</i></p> <p><i>9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).</i></p>
	<p>Critical Thinking and Problem-solving: Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.</p>	<p><i>9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).</i></p> <p><i>9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).</i></p> <p><i>9.4.12.CT.3: Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).</i></p> <p><i>9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.</i></p>
	<p>Digital Citizenship: Laws govern the use of intellectual property and there are legal consequences to utilizing or sharing another’s original works without permission or appropriate credit.</p>	<p><i>9.4.12.DC.1: Explain the beneficial and harmful effects that intellectual property laws can have on the creation and sharing of content (e.g., 6.1.12.CivicsPR.16.a).</i></p> <p><i>9.4.12.DC.2: Compare and contrast international differences in copyright laws and ethics</i></p>
	<p>Digital Citizenship: Laws govern many aspects of computing, such as privacy, data, property, information, and identity. These laws can have beneficial and harmful effects, such as expediting or delaying advancements in computing and protecting or infringing upon people’s rights.</p>	<p><i>9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).</i></p> <p><i>9.4.12.DC.4: Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).</i></p> <p><i>9.4.12.DC.5: Debate laws and regulations that impact the development and use of software.</i></p>
	<p>Digital Citizenship: Cultivating online reputations for employers and academia requires separating private and professional digital identities.</p>	<p><i>9.4.12.DC.6: Select information to post online that positively impacts personal image and future college and career opportunities.</i></p>

1,4	<p>Digital Citizenship: Digital communities influence many aspects of society, especially the workforce. The increased connectivity between people in different cultures and different career fields have changed the nature, content, and responsibilities of many careers.</p>	<p><i>9.4.12.DC.7: Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).</i></p>
	<p>Digital Citizenship: Network connectivity and computing capability extended to objects, sensors and everyday items not normally considered computers allows these devices to generate, exchange, and consume data with minimal human intervention. Technologies such as Artificial Intelligence (AI) and blockchain can help minimize the effect of climate change.</p>	<p><i>9.4.12.DC.8: Explain how increased network connectivity and computing capabilities of everyday objects allow for innovative technological approaches to climate protection.</i></p>
8	<p>Global and Cultural Awareness: Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.</p>	<p><i>9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political, economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).</i></p>
	<p>Information and Media Literacy: Advanced search techniques can be used with digital and media resources to locate information and to check the credibility and the expertise of sources to answer questions, solve problems, and inform the decision-making.</p>	<p><i>9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information.</i></p> <p><i>9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources (e.g., NJSLSA.W8, Social Studies Practice: Gathering and Evaluating Sources).</i></p>

	<p>Information and Media Literacy: Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully</p>	<p><i>9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)</i></p> <p><i>9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).</i></p>
8	<p>Information and Media Literacy: In order for members of our society to participate productively, information needs to be shared accurately and ethically.</p>	<p><i>9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately (e.g., 2.1.12.CHSS.6, S.IC.B.4, S.IC.B.6, 8.1.12.DA.1, 6.1.12.GeoHE.14.a, 7.1.AL.PRSNT.2).</i></p> <p><i>9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity (e.g., NJLSA.SL5).</i></p>
8	<p>Information and Media Literacy: Accurate information may help in making valuable and ethical choices.</p>	<p><i>9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change (e.g., NJLSA.W1, 7.1.AL.PRSNT.4).</i></p>
1-8	<p>Information and Media Literacy: Media have embedded values and points of view.</p>	<p><i>9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations (e.g., NJLSA.R6, 7.1.AL.IPRET.6).</i></p> <p><i>9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media (e.g., 1.5.12acc.C2a, 7.1.IL.IPRET.4).</i></p>
1-8	<p>Technology Literacy: Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.</p>	<p><i>9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6).</i></p> <p><i>9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.</i></p>

	<p>Technology Literacy: Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.</p>	<p>9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).</p>
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Interdisciplinary Connections ([2020 NJSLs](#))

List any other content standards addressed as well as appropriate units. All arts integration connections may be listed within this chart.

Visual & Performing Arts Integration ([Standard 1](#)) List appropriate units below for which standards (1.1 through 1.5) may be addressed

Unit Addressed	Artistic Process	Anchor Standard
5,6,7,8	Creating	<p>Anchor Standard 1: Generating and conceptualizing ideas. Anchor Standard 2: Organizing and developing ideas. Anchor Standard 3: Refining and completing products.</p>
5,6,7,8	Connecting	<p>Anchor Standard 10: Synthesizing and relating knowledge and personal experiences to create products. Anchor Standard 11: Relating artistic ideas and works within societal, cultural, and historical contexts to deepen understanding.</p>
5,6,7,8	Performing/ Presenting/ Producing	<p>Anchor Standard 4: Selecting, analyzing, and interpreting work. Anchor Standard 5: Developing and refining techniques and models or steps needed to create products. Anchor Standard 6: Conveying meaning through art.</p>
	Responding	<p>Anchor Standard 7: Perceiving and analyzing products. Anchor Standard 8: Applying criteria to evaluate products. Anchor Standard 9: Interpreting intent and meaning.</p>

Other Interdisciplinary Content Standards

List appropriate units below for any other content/standards that may be addressed

Unit Addressed	Content / Standard #	Standard Description
1,2,3,4,5,6,7,8	Math / MP.2	Reason abstractly and quantitatively. (HS-ESS1-5),(HS-ESS2-1),(HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-4),(HS-ESS2-6),(HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6),(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-6),(HS-LS2-7),(HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5)
1,3,4,5,6,7,8	Math / MP.4	Model with mathematics. (HS-ESS2-1),(HS-ESS2-3),(HS-ESS2-4),(HS-ESS2-6),(HS-ESS3-3),(HS-ESS3-6),(HS-PS1-8),(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS4-2)
1,3,5,6,7,8	Math / 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),(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6),(HS-PS1-8),(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)
1,3,5,6,7,8	Math / HSN-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS1-5),(HS-ESS2-1),(HS-ESS2-3),(HS-ESS2-4),(HS-ESS2-6),(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6),(HS-PS1-8),(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)
1,3,5,6,7,8	Math / HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS1-5),(HS-ESS2-1),(HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-4),(HS-ESS2-5),(HS-ESS2-6),(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6),(HS-PS1-8),(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)
1,2,3,4	Math / HSS-ID.A.1	Represent data with plots on the real number line. (HS-LS2-6)
1,2,3,4	Math / 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)
1,2,3,4	Math / HSS-IC.B.6	Evaluate reports based on data. (HS-LS2-6)

Pacing Guide (All Dates are approximate based on the school calendar)

Unit/ Topic	Month (w/Approx number of Teaching Days)
<p><i>Unit 1 : An Introduction to Environmental Science</i> Chapter 1: Science and the Environment Chapter 2: Methods of Environmental Science Chapter 3: The Dynamic Earth</p>	<p>September (~19 days)</p>
<p><i>Unit 2: Ecology</i> Chapter 4: The Organization of Life</p>	<p>October (~19 days)</p>
<p><i>Unit 3: Ecosystems</i> Chapter 5: How Ecosystems Work Chapter 6&7: Biomes</p>	<p>November (~16 days)</p>
<p><i>Unit 4: Populations</i> Chapter 8: Understanding Populations</p>	<p>December (~15 days)</p>
<p><i>Unit 4 (cont.): Populations</i> Chapter 9: The Human Population</p>	<p>January (~18 days)</p>
<p><i>Unit 5: Human Effects on Land</i> Chapter 14: Land Chapter 15: Food and Agriculture</p>	<p>February (~18 days)</p>
<p><i>Unit 5 (cont.): Human Effects on Land</i> Chapter 16: Mining and Mineral Resources Chapter 19: Waste</p>	<p>March (~15-20 days)</p>
<p><i>Unit 6: Energy</i> Chapter 17: Non-Renewable Energy Chapter 18: Renewable Energy</p>	<p>April (~15-20 days)</p>
<p><i>Unit 7: Human Effects on Water</i> Chapter 11: Water</p>	<p>May (~18 days)</p>
<p><i>Unit 8: Human Effects on Air</i> Chapter 12: Air Chapter 13: Atmosphere and Climate Change</p>	<p>June (~15 days)</p>

Unit One: Introduction to Environmental Science

Chapter 1 - Science and the Environment
Chapter 2 - Methods of Environmental Science
Chapter 3 - The Dynamic Earth

Step 1 – Desired Results: What do I want my students to learn?

Standards

[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.

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.

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.

HS-ESS2-3. Develop a model based on evidence of Earth’s interior to describe the cycling of matter by thermal convection.

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Unit Big Ideas:

(What Fundamental Concepts Should be Learned during this Unit?)

- Can you distinguish environmentalism from environmental science?
- How could you as an individual make our planet’s resources more sustainable?
- Will California fall off into the ocean?
- How do “dead zones” affect the environment surrounding them?
- How do economic factors influence environmental policy?

Objectives

Unit 2: Ecology

Chapter 4: The Organization of Life

Step 1 – Desired Results: What do I want my students to learn?

Standards

[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.

HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

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.

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Unit Big Ideas:

(What Fundamental Concepts Should be Learned during this Unit?)

- How did giraffes get such long necks?
- What is a GMO?
- Why are some insects so hard to kill?
- How are changes in environmental conditions related to changes in population size?

Objectives

Students will be able to...

- Distinguish and determine the biotic and abiotic factors in an ecosystem.
- Determine how a population differs from a species.
- Explain how habitats are important for organisms.
- Using models and simulations show how evolution by natural selection functions.
- Explain the concept of adaptation and show how it leads to drug and pesticide resistance.
- Observe organisms and be able to determine a classification hierarchy. (concept map)
- Describe properties of matter that are most important to environmental systems
- Describe the role that the environment plays in an organism's survival and reproduction.

Unit 3: Ecosystems

Chapter 5: How Ecosystems Work

Chapter 6&7: Biomes

Step 1 – Desired Results: What do I want my students to learn?

Standards

[NJSLs](#) -

HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

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.

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.

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-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.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce

HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- How might climate change affect where I live?
- What causes toxic algae?
- Why are (something small and ugly at the bottom of a food web) important? Or Why aren't polar bears important to the environment?
- Why is it important to measure and protect biodiversity?
- How do organisms interact with the environment?

Objectives

Students will be able to...

- Determine how organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system.
- Model a food chain, food web and trophic pyramid.
- Concept map the carbon, nitrogen and phosphorus cycle and how each cycle affects them and their environment.
- Understand that the Earth has different biomes and be able to differentiate the major differences between them
- Explain how communities respond to a disturbance.

Unit 4: Populations

Chapter 8: Understanding Populations

Chapter 9: Human Population

Step 1 – Desired Results: What do I want my students to learn?

Standards

[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

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Why can't we keep having as many kids as we want?
- How many people can the Earth hold/sustain?
- What will the Earth look like with 10 billion people?
- How do we balance the relationship between our own health and the health of the environment?
- How can we balance the way we use land with the needs of the environment?

Objectives

Students will be able to...

- Compare and contrast the differences between humans and other organisms' properties of a population.
- Model exponential growth.
- Demonstrate population density.
- How is the population regulated in nature?
- Give an example of a niche and a habitat for three different organisms.
- Describe the five main types of species interaction, i.e. parasitism.
- Using the four properties to predict population size, predict the population of a country based on the age structure diagram and explain how it moves through the demographic transition. (Describe how population growth trends differ between developed nations and developing nations)
- Describe the relationship between a nation's wealth and consumption of resources.
- Describe social and environmental factors that affect human population size
- Determine how resources can be available for our growing population.

Unit 5: Human Effects on Land

Chapter 14: Land

Chapter 15: Food and Agriculture

Step 1 – Desired Results: What do I want my students to learn?

Standards

[NJSLs](#) -

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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.

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.

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Unit Big Ideas:

(What Fundamental Concepts Should be Learned during this Unit?)

- Why was there an armed standoff at a wildlife preserve in the west in 2016?
- How much land does it take to produce the food I like to eat?
- What food can be labeled organic?
- How can we balance our growing demand for food with our need to protect the environment?
- Why is it important to manage Earth's resources sustainably?

Objectives

Students will be able to...

- Describe three major ways in which humans use land.
- Determine ecosystem services of a specific ecosystem given.
- Explain the function of parks and open space.
- Compare the environmental costs of producing different types of food.
- Explain the importance of the green revolution.
- Distinguish between the various methods of agriculture.
- Determine if there is a balance between the ecological and economic value of forest resources.

Continue Unit 5: Human Effects on Land

Chapter 16 - Mining and Mineral Resources
Chapter 19 - Waste

Step 1 – Desired Results: What do I want my students to learn?

Standards

[NJSLS](#) -

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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.

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.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Dig it out and dump it back in a hole, sounds crazy?
- How much packaging is wasted?
- When will we run out of natural resources?
- Can we make the benefits of mining outweigh the costs?
- What can we do with old landfills?

Objectives

Students will be able to...

- What is the difference between a mineral and a rock?
- List examples of renewable and nonrenewable resources.
- Describe how resources are discovered and the main methods of utilizing them.
- List the environmental consequences of mining and ways the land is reclaimed.

Unit 6: Energy

Chapter 17: Non-Renewable Energy
Chapter 18: Renewable Energy

Step 1 – Desired Results: What do I want my students to learn?

Standards

[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

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Is renewable energy cheaper than fossil fuels?
- What effect do nonrenewable energy resources have on the environment?
- Do the benefits of renewable energy outweigh the costs?

Objectives

Students will be able to...

- Diagram how energy sources are used to produce electricity.
- Compare and contrast the differences in renewable and nonrenewable energy sources.
- Explain problems associated with fossil fuels
- Explore and explain how we can use the heat from the Earth to both warm and cool our homes

Unit 7: Human Effects on Water

Chapter 11: Water

Step 1 – Desired Results: What do I want my students to learn?

Standards

[NJSLS](#) -

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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.

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.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Why should I be worried about water; I turn the tap and it's always there?
- Why is the level of water in the Colorado River so low?
- What can you do to improve water quality in your watershed?

Objectives

Students will be able to...

- Determine why dams, reservoirs and canals have an environmental impact on water resources.
- Research and determine why the total amount of water on Earth is not a problem, but making it available where and when it is needed is a problem.
- Compare and contrast the different types of aquifers in the U.S.
- Understand where water pollution comes from and how it is treated.
- Model water treatment, drinking and wastewater. (flow chart or concept map)

Unit 8: Human Effects on Air

Chapter 12 - Air

Chapter 13 - Atmosphere and Climate Change

Step 1 – Desired Results: What do I want my students to learn?

Standards

[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.

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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.

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.

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Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- How can I tell the air is polluted?
- The ozone layer and will I need SPF 1,000,000 one day?
- Six degrees celsius could change the world.
- Does congestion charging work to reduce air pollution ?
- How does climate change impact low-lying areas?

Objectives

Students will be able to...

- Name five primary air pollutants and give sources of each.
- Describe how smog forms.
- How does air pollution affect humans and other organisms?
- Compare and contrast the difference in weather and climate.
- What causes the seasons?
- Model the different climate zones of the Earth.
- Why is the ozone layer important and what major chemicals cause the damage?
- Diagram the greenhouse effect.

Please contact the Content Supervisor for any questions.