

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

*Moorestown High School  
Science Department*

**AP Environmental Science  
*Grades 11-12***

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## **Contents**

<b><u>Administration</u></b>	<b>3</b>
<b><u>Course Description and Fundamental Concepts</u></b>	<b>4</b>
<b><u>New Jersey Student Learning Standards</u></b>	<b>5</b>
<b><u>Pacing Guide</u></b>	<b>6</b>
<b><u>Units</u></b>	<b>7</b>

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## [Course Description and Fundamental Concepts](#)

This is an interdisciplinary course designed to be the equivalent of a one-semester introductory college course. Some of the major themes discussed include biochemical cycles, ecology, health, human population, energy sources and consumption, pollution and agriculture. Students will be provided with the underlying principles and methodologies required to rigorously examine these issues, investigate alternative solutions to both natural and man-made environmental issues, and weigh relative risks associated with these problems. Research, fieldwork and laboratory experimentation will be utilized. Students will be prepared to take the AP Environmental Science test offered by the College Board in May.

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

### Subject/Content Standards

*Include grade appropriate subject/content standards that will be addressed*

Standard #	Standard Description
<b><a href="#">HS-LS2</a> - Ecosystems: Interactions, Energy, and Dynamics</b>	
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.
<b><a href="#">HS-LS3</a> - Heredity: Inheritance and Variation of Traits</b>	
HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
<b><a href="#">HS-LS4</a> - Biological Evolution: Unity and Diversity</b>	
HS-LS4-1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
HS-LS4-2	Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3)

	competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
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.
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.
HS-LS4-6	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
<b><u>HS-ESS1</u> - Earth's Place in the Universe</b>	
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.
<b><u>HS-ESS2</u> - Earth's Systems</b>	
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 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.
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
<b><u>HS-ESS3</u> - Earth and Human Activities</b>	
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-ETS - Engineering and Design**

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.

<b>Unit Addressed</b>	<b>Standard #</b>	<b>Standard Description</b>
<b>1,2,3,5,7,8,9</b>	<i>RST.9-10.8</i>	<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>
<b>1,2,3,4,5,8,9,10</b>	<i>RST.11-12.1</i>	<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-LS2-1),(HS-LS2-2),(HS-LS2-3),(HS-LS2-6),(HS-LS2-8)  (HS-LS4-1),(HS-LS4-2),(HS-LS4-3),(HS-LS4-4)  (HS-ESS1-5)  (HS-ESS2-2),(HS-ESS2-3)</i>

		<i>(HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-4),(HS-ESS3-5)</i>
<b>3,5,7,9</b>	<i>RST.11-12.2</i>	<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>
<b>1,2,3,5,7,8,9</b>	<i>RST.11-12.7</i>	<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-LS2-6),(HS-LS2-7),(HS-LS2-8) (HS-ESS3-5)</i>
<b>1,2,3,4,5,6,7,8,9,10</b>	<i>RST.11-12.8</i>	<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-LS2-6),(HS-LS2-7),(HS-LS2-8)</i>  <i>(HS-LS4-5)</i>  <i>(HS-ESS1-5)</i>  <i>(HS-ESS3-2),(HS-ESS3-4)</i>
<b>1,2,3,4,5,6,8,9</b>	<i>WHST.9-12.2</i>	<i>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS2-1),(HSL2-2),(HS-LS2-3)</i>  <i>(HS-LS4-1),(HS-LS4- 2),(HS-LS4-3),(HS-LS4-4)</i>  <i>(HS-ESS1-5)</i>  <i>(HS-ESS3-1)</i>
<b>3,5,9</b>	<i>WHST.9-12.7</i>	<i>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-LS2-7)</i>  <i>(HS-LS4-6)</i>  <i>(HS-ESS2-5)</i>



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

### 21st-Century Skills and Technology Integration ([Standard 8](#))

List appropriate units below for which strands (A through F) will be addressed

<b>Standard 8.1 (K-12)</b>		<b>Educational Technology:</b> All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
<b>Unit Addressed</b>	<b>Strand Letter</b>	<b>Standard Description</b>
5-9	<b>Strand A</b>	<b>Technology Operations and Concepts:</b> Students demonstrate a sound understanding of technology concepts, systems, and operations.
5-9	<b>Strand B</b>	<b>Creativity and Innovation:</b> Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
1-9	<b>Strand C</b>	<b>Communication and Collaboration:</b> Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
1-9	<b>Strand D</b>	<b>Digital Citizenship:</b> Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
2-4, 9	<b>Strand E</b>	<b>Research and Information Fluency:</b> Students apply digital tools to gather, evaluate, and use information.
4-9	<b>Strand F</b>	<b>Critical thinking, problem-solving, and decision making:</b> Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

**Career Ready Practices ([Standard 9](#))**

List appropriate units below for which CRPs will be addressed

Unit Addressed	Standard #	Standard Description
5-9	<b>CRP1</b>	<i>Act as a responsible and contributing citizen and employee.</i>
1-9	<b>CRP2</b>	<i>Apply appropriate academic and technical skills.</i>
9	<b>CRP3</b>	<i>Attend to personal health and financial well-being.</i>
2-9	<b>CRP4</b>	<i>Communicate clearly and effectively and with reason.</i>
1-9	<b>CRP5</b>	<i>Consider the environmental, social and economic impacts of decisions.</i>
9	<b>CRP6</b>	<i>Demonstrate creativity and innovation.</i>
1-9	<b>CRP7</b>	<i>Employ valid and reliable research strategies.</i>
1-9	<b>CRP8</b>	<i>Utilize critical thinking to make sense of problems and persevere in solving them.</i>
1-9	<b>CRP9</b>	<i>Model integrity, ethical leadership, and effective management.</i>
9	<b>CRP10</b>	<i>Plan education and career paths aligned to personal goals.</i>
2-9	<b>CRP11</b>	<i>Use technology to enhance productivity.</i>
1-9	<b>CRP12</b>	<i>Work productively in teams while using cultural global competence</i>

**Interdisciplinary Connections**

List any other content standards addressed as well as appropriate units

**Visual & Performing Arts Integration ([Standard 1](#))**

List appropriate units below for which standards (1.1 through 1.4) may be addressed

Unit Addressed	Standard #	Standard Description
9	<b>Standard 1.1</b>	<b>The Creative Process:</b> <i>All students will demonstrate an understanding of the elements and principles that govern the creation of works of art in dance, music, theatre, and/or visual art.</i>

2	<b>Standard 1.2</b>	<b>History of the Arts and Culture:</b> <i>All students will understand the role, development, and influence of the arts throughout history and across cultures.</i>
9	<b>Standard 1.3</b>	<b>Performing/Presenting/Producing:</b> <i>All students will synthesize those skills, media, methods, and technologies appropriate to creating, performing, and/or presenting works of art in dance, music, theatre, and/or visual art.</i>
1,4,9	<b>Standard 1.4</b>	<b>Aesthetic Responses &amp; Critique Methodologies:</b> <i>All students will demonstrate and apply an understanding of arts philosophies, judgment, and analysis to works of art in dance, music, theatre, and/or visual art.</i>

### Other Interdisciplinary Content Standards

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

Unit Addressed	Content / Standard #	Standard Description
1,2,3,4,5,6,7,8,9,10	<i>Math / MP.2</i>	<i>Reason abstractly and quantitatively. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-6),(HS-LS2-7) (HS-LS3-3) (HS-LS4-1),(HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5)  (HS-ESS1-5)  (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6)</i>
1,2,3,5,8,9,10	<i>Math / MP.4</i>	<i>Model with mathematics. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4) (HS-LS4-2)  (HS-ESS3-3),(HS-ESS3-6)</i>
1,2,3,4,5,6,7,8,9	<i>Math / HSN-Q.A.1</i>	<i>Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)  (HS-ESS1-5)  (HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6)</i>

<b>1,2,3,4,5,6,7,8</b>	<i>Math / HSN-Q.A.2</i>	<i>Define appropriate quantities for the purpose of descriptive modeling. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)</i>  <i>(HS-ESS1-5)</i>  <i>(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6)</i>
<b>1,2,3,4,5,6,7,8,9</b>	<i>Math / HSN-Q.A.3</i>	<i>Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</i> <i>(HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)</i>  <i>(HS-ESS1-5)</i>  <i>(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-5),(HS-ESS3-6)</i>
<b>2,9</b>	<i>Math / HSS-ID.A.1</i>	<i>Represent data with plots on the real number line. (HS-LS2-6)</i>
<b>2,9</b>	<i>Math / HSS-IC.A.1</i>	<i>Understand statistics as a process for making inferences about population parameters based on a random sample from that population. (HS-LS2-6)</i>
<b>2,9</b>	<i>Math / HSS-IC.B.6</i>	<i>Evaluate reports based on data. (HS-LS2-6)</i>

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

<b>Unit/ Topic</b>	<b>Month</b> (w/Approx number of Teaching Days, all are based on AP CED Guidelines)
Unit 0/1 - The Living World Ecosystems (Part of Unit 1 Summer Assignment)	<b>September</b> (~15 days)
Unit 2 - The Living World - Biodiversity	<b>October</b> (~12 days)
Unit 3 - Populations	<b>October</b> (~12 days)
Unit 4 - Earth Systems and Resources (usually done first, prior to Unit 1)	<b>November</b> (~15 days)
Unit 5 - Land and Water Use	<b>December/January</b> (~18 - 20 days)
Unit 6 - Energy Resources and Consumption (NonRenewable and Renewable)	<b>February</b> (~15 days)
Unit 7 -Atmospheric Pollution	<b>March</b> (~12 days)
Unit 8 - Aquatic and Terrestrial Pollution	<b>April</b> (~15-20 days)
Unit 9 - Global Change	<b>May</b> (~15 days) AP Test 2nd Week of May
<b>Projects - Independent Research - Citizen Science</b>	<b>June</b> (~15 days)

## [Units](#)

Contact the Content Supervisor for unit details.