Shepard Preparatory High School

Environmental Science Curriculum

Unit 1	
Ecology	
Timeframe	September through mid-November (10-12 weeks)
Unit Overview	Students will gain an understanding of population health, community ecology, biomes, biodiversity and conservation.
Essential Questions	1. How do changes in population size relate to environmental conditions? 2. How do organisms affect one another's survival and the environment? 3. How does the environment affect where and how an organism lives? 4. Why is it important to protect biodiversity?
Unit Focus	• Organisms depend on resources provided by their habitat for survival • Limiting factors will determine the growth rate and size of a population • An organism's niche is affected in part by competitive interactions • Energy is transferred through a food chain from one trophic level to the next • Communities undergo succession following a disturbance • Biodiversity enables ecosystems to provide economically valuable services and products • Biodiversity loss can stem from habitat loss, pollution and climate change
Interdisciplinary Connections	Social Studies • RH.11-12.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of primary and secondary sources, connecting insights gained from specific details to develop an understanding of the text as a whole. 21st Century Life Skills and Careers • CRP11 Use technology to enhance productivity. • CRP12. Work productively in teams while using cultural global competence
Common Assessments	• Pre- Assessment: Students will demonstrate prior knowledge of the great variety of living things on earth • Unit project: written report and PowerPoint on an invasive species • End of Unit Assessment: Students demonstrate knowledge of earth's biodiversity, community ecology and man's conservation efforts (teacher devised tests)

Materials	
Common Materials	**Supplemental Materials**
Pearson Environmental Science: Your World Your Turn etext materials for Pearson Environmental Science	National Geographic Education materials (videos, infographics, activities, etc.) Thirteen.org/Nature videos, supplemental materials News articles

New Jersey Student Learning Standards (NJSLS)			
Subject Area Environmental Science/ecology	**Technology** *8.1: Educational Technology* *8.2: Technology Education, Engineering, Design and Computational Thinking - Programming*	**21st Century Life and Careers** *Career Ready Practices* *9.1: Personal Financial Literacy* *9.2: Career Awareness, Exploration, and Preparation*	**ELA Companion** *Secondary Science and Social Studies Only*
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. HS-LS2-6. 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	**8.1** Educational Technology: 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. **8.2** Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	CRP 2. Apply appropriate academic and technical skills. CRP 4. Communicate clearly and effectively and with reason. CRP 5. Consider the environmental, social, and economic impacts of decisions. CRP 11. Use technology to enhance productivity.	RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the

activities on the environment and biodiversity.			subject under investigation.

Differentiation	
Differentiation for Support and General Curriculum (504, ELL, Special Education, Struggling Learners)	**Differentiation for Enrichment**
Accommodations for Classroom: Pair visual prompts with verbal presentations Ask students to restate information, directions, and assignments Model skills / techniques to be mastered Extended time to complete class work Student-directed learning/ independent studies when appropriate **Accommodations for Homework and Assignments**: Extended time to complete assignments Provide the student with clearly stated (written) expectations and grading criteria for assignments **Accommodations for Assessments:** Extended time on classroom assessments **Further Modifications for General Curriculum students:** Students on the General curriculum will have selected goals removed as per their IEP in order to facilitate mastery of foundational skills and allow more instructional time for re-teaching, review, and remediation. See Goals & Objectives for specific goals and objectives for General Curriculum students.	Use of higher level questioning techniques Provide assessments that require higher level thinking Increased production of writing assignments Varying time requirements to complete assignments Independent studies at teacher/admin discretion Extension activities **Further Modifications for Honors Students** Students in Honors courses, in addition to regular class assignments, will complete enrichment/extension activities outside of the regular class period. These assignments may be projects, labs, research papers or other activities assigned by the teacher

Unit 2	
Humans and the Environment	
Timeframe	Mid-November through January (10 weeks)
Unit Overview	Students will study man's impact on the environment, and gain an understanding of how we can balance our needs with environmental health.
Essential Questions	1. How does the human population affect the environment? 2. What is the relationship between environmental health and our own health? 3. How can we balance our needs for housing and jobs with the needs of the environment?
Unit Focus	• Population size increases have been triggered by technological advances • Social factors affect a nation's population growth and resource use • Human impact on the environment is large and is influenced by a nation's wealth and technology • Environmental health hazards can be biological, social, chemical and physical • Cities have negative and positive environmental impacts • Urban sprawl affects transportation, pollution, health, land use and economics
Interdisciplinary Connections	Social Studies • RH.11-12.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of primary and secondary sources, connecting insights gained from specific details to develop an understanding of the text as a whole. 21st Century Life Skills and Careers • CRP11 Use technology to enhance productivity. • CRP12. Work productively in teams while using cultural global competence
Common Assessments	• Pre- Assessment: Students will understand that man has tremendous influence on the health of the planet • Unit project: report and visual project on urban vs. rural living • End of Unit Assessment: Students demonstrate knowledge of human population trends and the relationship between our resource needs and environmental health (teacher devised tests)
Materials	

Common Materials	Supplemental Materials
Pearson Environmental Science: Your World Your Turn etext materials for Pearson Environmental Science	National Geographic Education materials (videos, infographics, activities, etc.) Thirteen.org/Nature videos, supplemental materials News articles

New Jersey Student Learning Standards (NJSLS)			
Subject Area Environmental Science/humans and the environment	**Technology** *8.1: Educational Technology* *8.2: Technology Education, Engineering, Design and Computational Thinking - Programming*	**21st Century Life and Careers** *Career Ready Practices* *9.1: Personal Financial Literacy* *9.2: Career Awareness, Exploration, and Preparation*	**ELA Companion** *Secondary Science and Social Studies Only*
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-ESS3-3. Create a computational simulation to illustrate	**8.1** Educational Technology: 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. **8.2** Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and	CRP 2. Apply appropriate academic and technical skills. CRP 4. Communicate clearly and effectively and with reason. CRP 5. Consider the environmental, social, and economic impacts of decisions. CRP 11. Use technology to	RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

the relationships among management of natural resources, the sustainability of human populations, and biodiversity	the environment.	enhance productivity.	

Differentiation

Differentiation for Support and General Curriculum (504, ELL, Special Education, Struggling Learners)	Differentiation for Enrichment
Modifications for Classroom: Pair visual prompts with verbal presentations Ask students to restate information, directions, and assignments Model skills / techniques to be mastered Extended time to complete class work Student-directed learning/ independent studies when appropriate **Modifications for Homework and Assignments**: Extended time to complete assignments Provide the student with clearly stated (written) expectations and grading criteria for assignments **Modifications for Assessments:** Extended time on classroom assessments **Further Modifications for General Curriculum students:** Students on the General curriculum will have selected goals removed as per their IEP in order to facilitate mastery of foundational skills and allow more instructional time for re-teaching, review, and remediation. See Goals & Objectives for specific goals and objectives for General Curriculum students.	Use of higher level questioning techniques Provide assessments that require higher level thinking Increased production of writing assignments Varying time requirements to complete assignments Independent studies at teacher/admin discretion Extension activities **Further Modifications for Honors Students** Students in Honors courses, in addition to regular class assignments, will complete enrichment/extension activities outside of the regular class period. These assignments may be projects, labs, research papers or other activities assigned by the teacher

Unit 3	
Earth's Resources	
Timeframe	February through mid-April (10 weeks)
Unit Overview	Using the earth's finite resources in a sustainable way
Essential Questions	1. How can we manage renewable resources for sustainable use? 2. How can we balance demand for food with the need to protect the environment? 3. Why are we running out of fresh water? 4. How can we ensure that there is clean air?
Unit Focus	• Managing the harvesting of renewable resources to ensure future availability • Producing enough food for a growing population in a sustainable fashion • Fresh water is a renewable natural resource but quantities are limited • Measures to limit and prevent pollution of the atmosphere
Interdisciplinary Connections	Social Studies • RH.11-12.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of primary and secondary sources, connecting insights gained from specific details to develop an understanding of the text as a whole. 21st Century Life Skills and Careers • CRP11 Use technology to enhance productivity. • CRP12. Work productively in teams while using cultural global competence
Common Assessments	• Pre- Assessment: Students will demonstrate some understanding of nonrenewable and renewable resources • Unit project: fresh water availability • End of Unit Assessment: Students demonstrate knowledge of the sustainable use of renewable resources, and the human role in maintaining fresh water and clean air (teacher devised texts)

Materials	
Common Materials	**Supplemental Materials**
Pearson Environmental Science: Your World Your Turn etext materials for Pearson Environmental Science	National Geographic Education materials (videos, infographics, activities, etc.) Thirteen.org/Nature videos, supplemental materials

	News articles

New Jersey Student Learning Standards (NJSLS)			
Subject Area Environmental Science/earth's resources	**Technology** *8.1: Educational Technology* *8.2: Technology Education, Engineering, Design and Computational Thinking - Programming*	**21st Century Life and Careers** *Career Ready Practices* *9.1: Personal Financial Literacy* *9.2: Career Awareness, Exploration, and Preparation*	**ELA Companion** *Secondary Science and Social Studies Only*
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-ESS3-4. Evaluate or refine a technological	**8.1** Educational Technology: 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. **8.2** Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	CRP 2. Apply appropriate academic and technical skills. CRP 4. Communicate clearly and effectively and with reason. CRP 5. Consider the environmental, social, and economic impacts of decisions. CRP 11. Use technology to enhance productivity.	RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

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

Differentiation	
Differentiation for Support and General Curriculum (504, ELL, Special Education, Struggling Learners)	**Differentiation for Enrichment**
Modifications for Classroom: Pair visual prompts with verbal presentations Ask students to restate information, directions, and assignments Model skills / techniques to be mastered Extended time to complete class work Student-directed learning/ independent studies when appropriate **Modifications for Homework and Assignments**:	Use of higher level questioning techniques Provide assessments that require higher level thinking Increased production of writing assignments Varying time requirements to complete assignments Independent studies at teacher/admin discretion Extension activities **Further Modifications for Honors Students**

Extended time to complete assignments Provide the student with clearly stated (written) expectations and grading criteria for assignments **Modifications for Assessments:** Extended time on classroom assessments **Further Modifications for General Curriculum students:** Students on the General curriculum will have selected goals removed as per their IEP in order to facilitate mastery of foundational skills and allow more instructional time for re-teaching, review, and remediation. See Goals & Objectives for specific goals and objectives for General Curriculum students.	Students in Honors courses, in addition to regular class assignments, will complete enrichment/extension activities outside of the regular class period. These assignments may be projects, labs, research papers or other activities assigned by the teacher

Unit 4	
A Sustainable Future	
Timeframe	Mid-April through June (10 weeks)
Unit Overview	Examine the causes and consequences of climate change; compare nonrenewable and renewable energy.
Essential Questions	1. What are the causes of man-induced climate change and how is it impacting the planet? 2. Can nonrenewable energy resources be counted on for our energy needs? 3. Can renewable energy contribute a much larger portion of our energy requirements?
Unit Focus	• Studies of global climate change indicate rising atmospheric temperatures, new precipitation trends, melting glaciers and polar ice, and rising sea levels • Climate change has been caused by the increase in greenhouse gases in the atmosphere • Burning of fossil fuels, which are limited in supply, cause pollution that affects health and the environment • Renewable fuels include solar, wind, biofuels, geothermal, hydropower and fuel cells • Renewable sources can reduce fossil fuel use, reduce pollution, and cut greenhouse gas emissions
Interdisciplinary Connections	Social Studies • RH.11-12.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of primary and secondary sources, connecting insights gained from specific details to develop an understanding of the text as a whole. 21st Century Life Skills and Careers • CRP11 Use technology to enhance productivity. • CRP12. Work productively in teams while using cultural global competence
Common Assessments	• Pre- Assessment: Students will demonstrate some understanding that human activities are causing climate change • Unit project: climate change modeling • End of Unit Assessment: Students will demonstrate a knowledge of the causes and impacts of climate change; and the changing nature of our energy supply (teacher devised tests)
Materials	
Common Materials	**Supplemental Materials**

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New Jersey Student Learning Standards (NJSLS)			
Subject Area Environmental Science/A sustainable future	**Technology** *8.1: Educational Technology* *8.2: Technology Education, Engineering, Design and Computational Thinking - Programming*	**21st Century Life and Careers** *Career Ready Practices* *9.1: Personal Financial Literacy* *9.2: Career Awareness, Exploration, and Preparation*	**ELA Companion** *Secondary Science and Social Studies Only*
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-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	**8.1** Educational Technology: 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. **8.2** Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	CRP 2. Apply appropriate academic and technical skills. CRP 4. Communicate clearly and effectively and with reason. CRP 5. Consider the environmental, social, and economic impacts of decisions. CRP 11. Use technology to enhance productivity	RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.			

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