

**Iroquois School District**

**Curriculum Map for  
Environment and Ecology Standards  
For High School**

**Patricia Vathis**  
**Pennsylvania Department of Education**

4.1. Watersheds and Wetlands Developed by Patricia Vathis		Grade 8 Science	Physical Science	Science – Biology Environmental	Social Studies
A	<p>A. Describe changes that occur from a stream’s origin to its final outflow.</p> <ul style="list-style-type: none"> <li>Identify Pennsylvania’s major watersheds and their related river systems.</li> <li>Describe changes by tracing a specific river’s origin back to its headwaters including its major tributaries.</li> </ul>	<p>Describe changes by tracing a specific river’s origin back to its headwaters including its major tributaries. P This entire standard area is covered</p>		<p>Describe changes that occur from a stream’s origin to its final outflow. (both bullets in Environmental 11/12<sup>th</sup>)</p>	<ul style="list-style-type: none"> <li>Identify Pennsylvania’s major watersheds and their related river systems. P (Geography – 9<sup>th</sup>)</li> </ul>
B	<p>B. Explain the relationship among landforms, vegetation and the amount and speed of water.</p> <ul style="list-style-type: none"> <li>Analyze a stream’s physical characteristics.</li> <li>Describe how topography influences streams.</li> <li>Explain the influence of mountains on precipitation.</li> <li>Explain how vegetation affects storm water runoff.</li> <li>Delineate the boundaries of a watershed.</li> <li>Describe factors that affect the quality of groundwater.</li> <li>Explain how the speed of water and vegetation cover relates to erosion.</li> </ul>	<p>Explain the relationship among landforms, vegetation and the amount and speed of water. P This entire standard area is covered in 6<sup>th</sup> and 7<sup>th</sup> grade</p>			<ul style="list-style-type: none"> <li>Describe how topography influences streams. P (Geography-9<sup>th</sup>)</li> </ul>
C	<p>C. Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments.</p> <ul style="list-style-type: none"> <li>Describe and explain the physical factors that affect a stream and the organisms living there.</li> <li>Identify terrestrial and aquatic organisms that live in a watershed.</li> <li>Categorize aquatic organisms found in a watershed continuum from headwater to mouth (e.g., shredder, predator, decomposer).</li> <li>Identify the types of organisms</li> </ul>	<p>Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments. P This entire standard area is covered</p>			

	<p>that would live in a stream based on the stream's physical characteristics.</p> <ul style="list-style-type: none"> <li>• Explain the habitat needs of specific aquatic organisms.</li> </ul>				
D	<p>Describe the multiple functions of wetlands.</p> <ul style="list-style-type: none"> <li>• Describe wetlands in terms of their effects (e.g., habitat, flood, buffer zones, prevention areas, nurseries, food production areas).</li> <li>• Explain how a wetland influences water quality, wildlife and water retention.</li> <li>• Analyze wetlands through their indicators (e.g., soils, plants, and hydrology).</li> </ul>			<p>Describe the multiple functions of wetlands.</p> <p>P This entire standard area is covered in new Environmental Science course and Biology</p>	
E	<p>Identify and describe natural and human events on watersheds and wetlands.</p> <ul style="list-style-type: none"> <li>• Describe how natural events affect a watershed (e.g., drought, floods).</li> <li>• Identify the effects of humans and human events on watersheds.</li> <li>• Evaluate the effects of natural events on watersheds and wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the effects of natural events on watersheds and wetlands. P</li> </ul>			<ul style="list-style-type: none"> <li>• Describe how natural events affect a watershed (e.g., drought, floods).</li> <li>• Identify the effects of humans and human events on watersheds.</li> </ul> <p>P (Geography-9<sup>th</sup>)</p>

4.2 Renewable and Nonrenewable Resources Developed by Patricia Vathis		Grade 8 Science	Geography 9th	Science – Environmental (11/12 <sup>th</sup> )	Social Studies Am. World
A	<p>A. Explain that renewable and nonrenewable resources supply energy and materials.</p> <ul style="list-style-type: none"> <li>Identify alternative sources of energy.</li> <li>Identify and compare fuels used in industrial and agricultural societies.</li> <li>Compare and contrast the cycles of various natural resources.</li> <li>Explain food and fiber as renewable resources.</li> </ul>	<p>Explain that renewable and nonrenewable resources supply energy and materials. P This entire standard area is covered.</p>			
B	<p>B. Evaluate factors affecting availability of natural resources.</p> <ul style="list-style-type: none"> <li>Describe natural occurrences that may affect the natural resources.</li> <li>Analyze technologies that affect the use of our natural resources.</li> <li>Evaluate the effect of consumer desires on various natural resources.</li> </ul>				<p>C. Evaluate factors affecting availability of natural resources. P This entire standard area is covered in American/World History</p>
C	<p>D. Analyze how man-made systems have impacted the management and distribution of natural resources.</p> <ul style="list-style-type: none"> <li>Explain the complete cycle of a natural resource, from extraction to disposal, detailing its uses and effects on the environment.</li> <li>Analyze energy uses and energy conservation in different regions.</li> <li>Examine conservation practices in different countries.</li> <li>Analyze the costs and benefits of different man-made systems and how they use renewable and nonrenewable natural resources.</li> <li>Analyze the impact of information systems on management and distribution of natural resources.</li> </ul>		<p>Analyze how man-made systems have impacted the management and distribution of natural resources. P This entire standard area is covered.</p>		

D	<p>Explain different management alternatives involved in recycling and solid waste management.</p> <ul style="list-style-type: none"> <li>Analyze the manufacturing process (before, during and after) with consideration for resource recovery.</li> <li>Compare various methods dealing with solid waste (e.g., incinerating, compost, land application).</li> <li>Differentiate between pre/post consumer and raw materials.</li> <li>Illustrate how one natural resource can be managed through reduction, recycling, reuse or use.</li> </ul>	<p>Explain different management alternatives involved in recycling and solid waste management.</p> <p>P This entire standard area is covered</p>		<p>Explain different management alternatives involved in recycling and solid waste management.</p> <p>P This entire standard area is covered</p>	

<b>4.3. Environmental Health</b> Developed by Patricia Vathis		<b>Grade 8</b>	<b>Geography 9th</b>	<b>Science Environmental (11/12<sup>th</sup>)</b>	<b>Social Studies Civics and Government 8th</b>
<b>A</b>	<p>A. Describe environmental health issues.</p> <ul style="list-style-type: none"> <li>Identify the effects on human health of air, water and soil pollution and the possible economic costs to society.</li> <li>Describe how indoor pollution may affect human health (e.g., dust mites, fumes, cat dandruff).</li> <li>Explain the costs and benefits of cleaning up contaminants.</li> <li>Explain how common household cleaning products are manufactured and how to dispose of their by-products after use.</li> </ul>	Describe environmental health issues. <b>P This entire standard area is covered.</b>		Describe environmental health issues. <b>P This entire standard area is covered.</b>	
<b>B</b>	<p>B. Explain how multiple variables determine the effects of pollution on environmental health, natural processes and human practices.</p> <ul style="list-style-type: none"> <li>Explain how human practices affect the quality of the water and soil.</li> <li>Identify evidence of natural events around the world and their effects on environmental health (e.g., Yellowstone National Park fires).</li> <li>Identify local and state environmental regulations and their impact on environmental health.</li> <li>Analyze data and explain how point source pollution can be detected and eliminated.</li> <li>Identify and explain ways of detecting pollution by using state-of-the-art technologies.</li> </ul>	<ul style="list-style-type: none"> <li>Identify evidence of natural events around the world and their effects on environmental health (e.g., Yellowstone National Park fires).</li> </ul>	<ul style="list-style-type: none"> <li>Identify evidence of natural events around the world and their effects on environmental health (e.g., Yellowstone National Park fires).</li> </ul>		Explain how multiple variables determine the effects of pollution on environmental health, natural processes and human practices. <b>P This entire standard area is covered.</b>
<b>C</b>	<p>C. Explain biological diversity as an indicator of a healthy environment.</p> <ul style="list-style-type: none"> <li>Explain species diversity.</li> <li>Analyze the effects of species extinction on the health of an ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>Explain species diversity.</li> <li>Analyze the effects of species extinction on the health of an ecosystem.</li> </ul>		Analyze the effects of species extinction on the health of an ecosystem. <b>P Biology</b>	



<b>4.4 Agriculture and Society</b> Developed by Patricia Vathis		<b>Grade 8</b>	<b>Geography 9th</b>	<b>Biology Environmental</b>	<b>Social Studies Economics</b>
<b>A</b>	<p>A. Describe the importance of agriculture to society.</p> <ul style="list-style-type: none"> <li>• Identify the major ash crops of Pennsylvania.</li> <li>• Identify what percentage of the United States' population is involved in the food and fiber industry.</li> <li>• Compare and contrast the influence of agriculture on a nation's culture, standard of living and foreign trade.</li> <li>• Identify laws that affect conservation and management of food and fiber production in the local area and analyze their impact.</li> <li>• Compare a contemporary economic issue in agriculture to its historical origin.</li> </ul>		Describe the importance of agriculture to society. P This entire standard area is covered.		Describe the importance of agriculture to society. P This entire standard area is covered.
<b>B</b>	<p>B. Assess the influence of agricultural science on farming practices.</p> <ul style="list-style-type: none"> <li>• Compare the practices of no-till farming to traditional soil preparation (e.g., plow, disc).</li> <li>• Analyze and explain the various practices of nutrient management on the farm.</li> <li>• Analyze and explain how farm efficiencies have changed human nutrition.</li> </ul>		Assess the influence of agricultural science on farming practices. P This entire standard area is covered.		
<b>C</b>	<p>C. Explain the functions of the components of the food and fiber system.</p> <ul style="list-style-type: none"> <li>• Compare and analyze growing conditions in the United States to determine which plants and animals are most suitable to each region.</li> <li>• Compare the management practices needed for a commodity (i.e., production, processing, research and development, marketing, distribution and</li> </ul>		Explain the functions of the components of the food and fiber system. P This entire standard area is covered.		Explain the functions of the components of the food and fiber system. P This entire standard area is covered.

	<p>regulations).</p> <ul style="list-style-type: none"> <li>• Identify a commodity, its origin and its steps of production.</li> <li>• Compare and analyze the cost of a commodity to its production cost.</li> <li>• Identify and describe how food safety issues have impacted production in agriculture.</li> </ul>				
D	<p>D. Explain different management alternatives involved in recycling and solid waste management.</p> <ul style="list-style-type: none"> <li>• Analyze the manufacturing process (before, during and after) with consideration for resource recovery.</li> <li>• Compare various methods dealing with solid waste (e.g., incineration, compost, land application).</li> <li>• Differentiate between pre/post-consumer and raw materials.</li> <li>• Illustrate how one natural resource can be managed through reduction, recycling, reuse or use.</li> </ul>		<p>Explain different management alternatives involved in recycling and solid waste management.</p> <p>P This entire standard area is covered.</p>		<p>Explain different management alternatives involved in recycling and solid waste management.</p> <p>P This entire standard area is covered.</p>

<b>4.5 Integrated Pest Management</b> Developed by Patricia Vathis		<b>Grade 8th</b>	<b>Geography 9th</b>	<b>Chemistry</b>	<b>Social Studies</b>
<b>A</b>	<p>A. Identify similar classifications of pests that may or may not have similar effects on different regions.</p> <ul style="list-style-type: none"> <li>Identify environmental effect(s) of pests on different regions of the world.</li> <li>Identify introduced species that are classified as pests in their new environments.</li> </ul>	<p>Identify similar classifications of pests that may or may not have similar effects on different regions. P This entire standard area is covered</p>			
<b>B</b>	<p>B. Analyze health benefits and risks associated with integrated pest management.</p> <ul style="list-style-type: none"> <li>Identify the health risks associated with chemicals used in common pesticides.</li> <li>Assess various levels of control within different integrated pest management practices including increased immunity to pesticides, food safety, sterilization, nutrient management and weed control.</li> </ul>			<p>Analyze health benefits and risks associated with integrated pest management. P This entire standard area is covered</p>	
<b>C</b>	<p>C. Determine the effects of integrated pest management practices on society over time.</p> <ul style="list-style-type: none"> <li>Analyze the risks to the environment and society associated with alternative practices used in integrated pest management.</li> <li>Analyze the benefits to the environment and society associated with alternative practices used in integrated pest management.</li> </ul>	<p>Determine the effects of integrated pest management practices on society over time. P This entire standard area is covered</p>			

<b>4.6 Ecosystems and their Interactions</b> Developed by Patricia Vathis		<b>Grade 8</b>	<b>Geography 9th</b>	<b>Biology Environmental</b>	<b>Social Studies Economics</b>
<b>A</b>	<p>A. Explain the biotic and abiotic components of an ecosystem and their interaction.</p> <ul style="list-style-type: none"> <li>Identify the major biomes and explain their similarities and differences.</li> <li>Compare and contrast the interactions of biotic and abiotic components in an ecosystem.</li> <li>Analyze the effects of abiotic factors on specific ecosystems.</li> <li>Describe how the availability of resources affects organism in an ecosystem.</li> <li>Explain energy flow in a food chain through an energy pyramid.</li> <li>Evaluate the efficiency of energy flow in a food chain.</li> <li>Explain the concept of carrying capacity in an ecosystem.</li> <li>Explain trophic levels.</li> <li>Identify a specific environmental impact and predict what change may take place to affect homeostasis.</li> <li>Examine and explain how organisms modify their environments to sustain their needs.</li> <li>Assess the effects of latitude and altitude on biomes.</li> <li>Interpret possible causes of population fluctuations.</li> <li>Explain how erosion and sedimentation have changed the quality of soil related habitats.</li> </ul>	<p>Explain the biotic and abiotic components of an ecosystem and their interaction. <b>P This standard area is covered with content dealing with aquatic</b></p>		<p>Explain the biotic and abiotic components of an ecosystem and their interaction. <b>P This standard area is covered with content dealing with terrestrial</b></p>	
<b>B</b>	<p>B. Explain how cycles affect the balance in an ecosystem.</p> <ul style="list-style-type: none"> <li>Describe an element cycle and its role in an ecosystem.</li> <li>Explain the consequences of interrupting natural cycles.</li> </ul>	<p>Explain how cycles affect the balance in an ecosystem. <b>P This entire standard area is covered</b></p>		<p>Explain how cycles affect the balance in an ecosystem. <b>P This entire standard area is covered</b></p>	

C	Analyze how ecosystems change over time. <ul style="list-style-type: none"><li>• Identify and explain the succession stages in an ecosystem.</li><li>• Identify causes of succession.</li><li>• Analyze consequences of interrupting natural cycles.</li></ul>	Analyze how ecosystems change over time. P This entire standard area is covered			
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<b>4.7 Threatened, Endangered and Extinct Species</b> Developed by Patricia Vathis		<b>Grade 8</b>	<b>Geography</b>	<b>Biology</b>	<b>Social Studies</b>
<b>A</b>	<p>A. Explain the significance of diversity in ecosystems.</p> <ul style="list-style-type: none"> <li>• Explain the role that specific organisms have in their ecosystem.</li> <li>• Identify a species and explain what effects its increase or decline might have on the ecosystem.</li> <li>• Identify a species and explain how its adaptations are related to its niche in the environment.</li> </ul>	<p>Explain the significance of diversity in ecosystems. <b>P</b> This entire standard area is covered</p>		<p>Explain the significance of diversity in ecosystems. <b>P</b> This entire standard area is covered</p>	
<b>B</b>	<p>B. Explain how structure, function and behavior of plants and animals affect their ability to survive.</p> <ul style="list-style-type: none"> <li>• Describe an organism's adaptations for survival in its habitat.</li> <li>• Compare adaptations among species.</li> </ul>			<p>Explain how structure, function and behavior of plants and animals affect their ability to survive. <b>P</b> This entire standard area is covered</p>	
<b>C</b>	<p>C. Identify and explain why adaptations can lead to specialization.</p> <ul style="list-style-type: none"> <li>• Explain factors that could lead to a species' increase or decrease.</li> <li>• Explain how management practices may influence the success of specific species.</li> <li>• Identify and explain criteria used by scientists for categorizing organisms as threatened, endangered or extinct.</li> </ul>			<p>Identify and explain why adaptations can lead to specialization. <b>P</b> This entire standard area is covered</p>	

<b>4.8 Humans and the Environment</b> Developed by Patricia Vathis		<b>Grade 8th</b>	<b>Geography 9<sup>th</sup></b>	<b>Biology Environmental</b>	<b>Social Studies</b>
<b>A</b>	<p>A. Analyze how society's needs relate to the sustainability of natural resources.</p> <ul style="list-style-type: none"> <li>• Explain why some societies have been unable to meet their natural resource needs.</li> <li>• Compare and contrast the use of natural resources and the environmental conditions in several countries.</li> <li>• Describe how uses of natural resources impact sustainability.</li> </ul>				Analyze how society's needs relate to the sustainability of natural resources. <b>P This entire standard area is covered.</b>
<b>B</b>	<p>B. Analyze the relationship between the use of natural resources and sustaining our society.</p> <ul style="list-style-type: none"> <li>• Explain the role of natural resources in sustaining society.</li> <li>• Analyze the effects of a natural resource's availability on a community or region.</li> </ul>				Analyze the relationship between the use of natural resources and sustaining our society. <b>P This entire standard area is covered.</b>
<b>C</b>	<p>C. Analyze how human activities may cause changes in an ecosystem.</p> <ul style="list-style-type: none"> <li>• Analyze and evaluate changes in the environment that are the result of human activities.</li> <li>• Compare and contrast the environmental effects of different industrial strategies (e.g., energy generation, transportation, logging, mining, agriculture).</li> </ul>	Analyze how human activities may cause changes in an ecosystem. <b>P This entire standard area is covered dealing with aquatic systems.</b>		Analyze how human activities may cause changes in an ecosystem. <b>P This entire standard area is covered dealing with terrestrial systems.</b>	
<b>D</b>	<p>D. Explain how the concept of supply and demand affects the environment.</p> <ul style="list-style-type: none"> <li>• Identify natural resources for which societal demands have been increasing.</li> <li>• Identify specific resources for which human consumption has resulted in scarcity of supply (e.g., buffalo, lobsters).</li> <li>• Describe the relationship between</li> </ul>				Explain how the concept of supply and demand affects the environment. <b>P This entire standard area is covered.</b>

	population density and resource use and management.				
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<b>4.9 Environmental Laws and Regulations</b> Developed by Patricia Vathis		<b>Grade 8th</b>	<b>Geography 9th</b>	<b>Biology Environmental</b>	<b>Social Studies</b>
<b>A</b>	<p>A. Explain why environmental laws and regulations are developed and enacted.</p> <ul style="list-style-type: none"> <li>• Explain the positive and negative impacts associated with passing environmental laws and regulations.</li> <li>• Understand conflicting rights of property owners and environmental laws and regulations.</li> <li>• Analyze the roles that local, state and federal governments play in the development and enforcement of environmental laws.</li> <li>• Identify local and state environmental regulations and their impact on environmental health.</li> <li>• Explain the positive and negative impacts of the Endangered Species Act.</li> </ul>	<p>Explain why environmental laws and regulations are developed and enacted. <b>P This entire standard area is covered</b></p>		<p>Explain why environmental laws and regulations are developed and enacted. <b>P This entire standard area is covered</b></p>	