ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

Standard 1.0 Environmental Issues

The student will investigate and analyze environmental issues ranging from local to global perspectives and develop and implement a local action project that protects, sustains, or enhances the natural environment.

TOPIC

A. ENVIRONMENTAL ISSUE INVESTIGATION ** Carroll County Outdoor School uses the EII process in every single class. Each class has a different topic, but we follow EII within each topic. Our topics are: habitat, watershed, wetland, stream, history, and action.

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	CONNECTION TO NEXT GENERATION SCIENCE STANDARDS
1. Identify an environmental issue.	• Pollution • Land use • Impervious surfaces	• Habitat destruction • Native and Non-native species • Loss of a species	• Landfills • Air and water pollution as a result of landfills	Science and Engineering Practices
2. Develop and write research questions related to an environmental issue.	Students are guided to ask the question (or one similar): Are we (at Hashawha) healthy for the Chesapeake Bay?	Students are guided to ask: Does Hashawha have a healthy habitat?	Students are guided to ask: How do we produce waste and what happens to our waste?	Science and Engineering Practices MS-LS2-i MS-ESS2-c
3. Given a specific issue, communicate the issue, the stakeholders involved and the stakeholders' beliefs and values.	Students identify the many people that live in the watershed and how they may impact the water and rely on it: Farmers, homeowners, fishermen, land developers, schools, businesses, Recreational water users.	• Habitat destruction: students identify in a given area, what has destructed the habitat (land development for example) and what the people in the house think, the developer, the wildlife • Loss of a species: both in the cases of the bald eagle and the American Chestnut, human activities damaged a population. Students identify the roles played in each scenario and how each stakeholder felt.	While observing the landfill, the many stakeholders are identified: the people who put trash into it, the people who maintain it now, the stream which is monitored monthly, the houses close to it that have had methane gas seeping into their houses.	MS-ESS3-i
4. Design and conduct the research.	• Water pouring to identify impervious surfaces • Salamander hunting for a bio-indicator of water quality • Collection of macro-invertebrates and fish as bio-indicators of water quality	• Students play camouflage to gather information about the food, water and shelter available in an area. • Students make observations about the differences between habitats (tall grass meadow, forest, mowed grass field, etc)	• Students gather and weigh their waste at every meal. They keep track of the data throughout the week.	Science and Engineering Practices

5. Use data and references to interpret findings to form conclusions.	The students answer the question that began the class and write the answer in their journals. They reference keys, The Bay Report Card, and maps of the area to fully answer the question.	The students answer the question that began the class with data they collected.	By graphing how much waste and compost they produce each meal, students answer where their waste goes and how much goes there.	Science and Engineering Practices MS-LS2-g

TOPIC
B. ACTION COMPONENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Use recommendation(s) to develop and implement an environmental action plan.	Students identify that rain gardens, rain barrels, composting, planting trees, tall grass and creating buffers are all good for water quality. During action class, the students may select one of these projects and complete it.	Students identify that native plants, trees, biodiversity, bird feeders, bird boxes, tall grass, and gardens are good for habitat that has already been disturbed. During action class, the students may select one of these projects and complete it.	Students brainstorm ways to reduce waste: turning off the lights, eating all the food on their plate, composting, recycling, reducing what they are using as ways to reduce waste during the week during journal class.	MS-ESS3-g MS-LS4-j MS-LS2-g MS-ESS3-e
2. Communicate, evaluate and justify personal views on environmental issue and alternate ways to address them.	Journal class: How they can make their own backyards better for the bay	Journal Class: How they can make their own backyards a healthier habitat	Journal Class: Identifying ways to reduce waste.	MS-LS2-c MS-LS2-g
3. Analyze the effectiveness of the action plan in terms of achieving the desired outcomes.	Action class uses information from all classes during the week. Part of action class is planning the project. Some projects that students choose are not feasible. Students discuss among themselves which projects are and are not achievable.			MS-ESS3-g MS-LS4-j

Standard 2: Interactions of Earth's Systems

The student will analyze and apply the properties of systems thinking and modeling to the study of Earth's systems.

TOPIC
A. EARTH SYSTEMS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze and explain the interactions of earth's systems.				

TOPIC
B. SYSTEMS THINKING

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze, explain and apply the properties of systems thinking to earth systems interactions.				

INDICATOR **	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
2. Modeling: Use models and computer simulations to extend his/her understanding of scientific concepts.	Students use the stream table in order to identify how land use can affect run-off amounts and stream flow.	Students participate in the wildlife simulation game to understand how populations affect each other. While this is not a computer simulation, it is a simulation		MS-LS2-a. MS-LS2-f. MS-ESS3-g.

****See Science State Curriculum Skills and Processes**

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

Standard 3: Flow of Matter and Energy

The student will analyze and explain the movement of matter and energy through interactions of earth's systems (*biosphere, geosphere, hydrosphere, atmosphere, and cryosphere*) and the influence of this movement on weather patterns, climatic zones, and the distribution of life.

TOPIC

A. CONSERVATION OF MATTER WITHIN EARTH SYSTEMS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Demonstrate that matter cycles through and between living systems and the physical environment, constantly being recombined in different ways.				

TOPIC

B. ENERGY DISTRIBUTION THROUGH EARTH SYSTEMS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze how the position and movement of the Earth in space determine distribution of heat and light.				
2. Explain that transfer of thermal energy between the atmosphere and the land or oceans produces temperature and density gradients in the atmosphere and the oceans.				
3. Explain that transfer of thermal energy between the atmosphere and the land or oceans influences climate patterns.				

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

TOPIC
C. INTERACTION OF PHYSICAL SYSTEMS AND THE BIOSPHERE

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze and explain the movement of matter and energy through earth's systems and the influence of this movement on the distribution of life.				

Standard 4: Populations, Communities and Ecosystems

The student will use physical, chemical, biological, and ecological concepts to analyze and explain the interdependence of humans and organisms in populations, communities and ecosystems.

TOPIC
A. CYCLING OF MATTER AND ENERGY

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level.		• Camouflage game: students identify flow of energy in food chains by simulating them. • Wildlife simulation game: students identify interdependence of organisms by simulating a food web		MS-LS1-j MS-LS2-d MS-LS2-e

TOPIC
B. POPULATION DYNAMICS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze the growth or decline of populations and identify a variety of responsible factors.	Students discuss populations of fish, oysters and crabs in the Chesapeake Bay as a result of various factors affecting water quality	Students analyze population trends using any of the following populations: white-tailed deer, wetland obligate species, American Chestnut Tree, and bald eagle		MS-LS2-a MS-LS2-c

TOPIC
C. COMMUNITY AND ECOSYSTEM DYNAMICS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.	.	Wildlife simulation game: After playing the game, and observing the data about starting populations and ending populations, students analyze how populations rely on one another and how that shapes an ecosystem		MS-LS2-a. MS-LS2-d.

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

TOPIC
D. STABILITY IN POPULATIONS, COMMUNITIES AND ECOSYSTEMS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Use models and provide examples to show how the interaction and interdependence of populations contribute to the stability of populations, communities and ecosystems.		• The wildlife simulation game wrap-up and discussion • Students compare and contrast mitigated and natural wetlands		MS-LS2-a. MS-LS2-f
2. Use models and provide examples to show how species' interactions may generate ecosystems that are stable for hundreds or thousands of years.				

TOPIC
E. DIVERSITY

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Provide examples and evidence to show that a greater diversity of genes, species and/or environments increases the chance that at least some living things will survive in the face of large changes in the environment.		The game Camouflage challenges students to survive like animals. Based on the results of the game, students discuss how they survived, including how they are dressed. These observations and conversations can be easily applied to changes in the environment.		MS-LS4-e.

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

Standard 5: Humans and Natural Resources

The student will use concepts from chemistry, physics, biology, and ecology to analyze and interpret both positive and negative impacts of human activities on earth's natural systems and resources.

TOPIC

A. HUMAN IMPACT ON NATURAL PROCESSES

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze the effects of human activities on earth's natural processes.	• Discussion about water pollution specifically that we are destroying water faster than the water cycle can clean it. • Students identify the role of impervious surfaces as reducing the earth's natural filtering process with water pouring • Students identify the role of a rain garden in assisting the natural process of infiltration • Identify the role of farming on land use	Students observe and analyze the role of alien plants and animals while participating in one of the following: -checking bluebird boxes -visiting the Chestnut Orchard. -Identifying and removing alien plants • Students observe an aerial map of Hashawha and compare it to an aerial view of their school to identify how humans have affected habitat.	• Read and discuss the story THE LORAX by Dr. Seuss. • Visit or view the old Carroll County landfill to discuss our waste and how it affects the earth (connections to stream class, wetland and habitat)	MS-ESS-i.
2. Analyze the effects of human activities that deliberately or inadvertently alter the equilibrium of natural processes.	• Students discuss the land around a stream and how it effects a stream (riparian buffers vs. impervious surfaces) • Stakeholder activity	• Students discuss hunting practices/laws and how they affect the food chain and other natural processes • Raptor Cages and raptor program: students discuss imprinting and rehabilitation • Role of land use and pollution	• Students compare and contrast landfills vs. 3r's and composting.	MS-ESS3-i

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

TOPIC
B. HUMAN IMPACT ON NATURAL RESOURCES

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze, from local to global levels, the relationship between human activities and the earth's resources.	Water waste lesson in journal class	Students identify from where alien species originate and how those species are impacting local resources	The SLOP lesson within Journal class teaches how food comes with a cost.	MS-LS2-a

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

Standard 6: Environment and Health

The student will use concepts from science, social studies and health to analyze and interpret both positive and negative impacts of natural events and human activities on human health.

TOPIC
A. NATURAL CHANGES AND HUMAN HEALTH

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Identify and describe natural changes in the environment that may affect the health of human populations and individuals.				

TOPIC
B. HUMAN-INDUCED CHANGES AND HUMAN HEALTH

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Describe and explain that many changes in the environment designed by humans bring benefits to society as well as cause risks.				

TOPIC
C. HAZARDS AND RISK ANALYSIS

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze and explain that human activities, products, processes, technologies and inventions can involve some level of risk to human health.				

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

Standard 7: Environment & Society

The student will analyze how the interactions of heredity, experience, learning and culture influence social decisions and social change.

TOPIC
A. ENVIRONMENTAL QUALITY

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Investigate factors that influence environmental quality.	• Water pouring identifies that pervious surface improves environmental quality. • Searching for salamanders, macro-invertebrates and fish identifies that buffers improve environmental quality. • Physical assessment at the stream helps students identify that erosion and sediment reduce quality.	• Through camouflage, students learn that areas that provide food, water, and shelter improve environmental quality. • Habitat assessment allows students to investigate and assess a habitat based on standards of healthy habitat.	Students compare and contrast the 3R's and composting with traditional waste practices (like landfills)	

TOPIC
B. INDIVIDUAL AND GROUP ACTIONS AND THE ENVIRONMENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Examine the influence of individual and group actions on the environment and explain how groups and individuals can work to promote and balance interests.	• Action class discussions and wrap-up • Water quality activity with the different stakeholders and water pollution/role-playing	• Action class discussions and wrap-up	• SLOP class for Journal time.	
	Students produce an ACTION plan during journal class which reflects how they as an individual can balance interests Students participate in the Confidence Course to identify how groups must work to promote and balance the interest of solving a problem. Instruction includes a real-life example of groups: the bog turtle.			

ENVIRONMENTAL LITERACY CURRICULUM ALIGNMENT

TOPIC

C. CULTURAL PERSPECTIVES AND THE ENVIRONMENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Investigate cultural perspectives and dynamics and apply their understanding in context				

TOPIC

D. POLITICAL SYSTEMS AND THE ENVIRONMENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Understand how different political systems account for, manage, and affect natural resources and environmental quality.				

TOPIC

E. ECONOMICS AND ENVIRONMENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Analyze and explain global economic and environmental connections.				

TOPIC

F. TECHNOLOGY AND ENVIRONMENT

INDICATOR	WATER QUALITY	ECOSYSTEMS/HABITAT	WASTE	**CONNECTION TO NEXT GENERATION SCIENCE STANDARDS**
1. Investigate and examine the social and environmental impacts of various technologies and technological systems on the environment.				