Augusta Canal National Heritage Area
Grades 9-12- Environmental Science, Biology & Ecology Lesson Plans

Standards:

GA:

SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems. a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes. Explain the flow of matter and energy through ecosystems by arranging components of a food chain according to energy flow, comparing the quantity of energy in the steps of an energy pyramid, and explaining the need for cycling of major nutrients (C, O, H, N, P).

c. Relate environmental conditions to successional changes in ecosystems. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption. e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions. f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.

SEV1. Student will investigate the flow of energy and cycling of matter with in an ecosystem and relate these phenomena to human society. D. relate the cycling of matter and the flow of energy to the laws of conservation of matter and energy. Identify the role and importance of decomposers in the recycling process.

SEV4. Students will understand and describe availability, allocation, and conservation of energy and other resources. a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitation of sources. Distinguish between natural and produced resources. f. Describe the need for informed decision making of resources utilization.

SEV5. Student will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems. e. Describe the effects and potential of pollution and resource depletion on the environment on the local and global levels.

SEC2. Students will investigate factors influencing population density, dispersion and demographics. d. Relate the rapid growth of human population to environmental problems.

SEC5. Students will access the impact of human activity on the natural world, and research how ecological theory can address current issues facing our society locally as well as globally.

SC:

B-6.1 Explain how the interrelationships among organisms (including predation, competition, parasitism, mutualism, and commensalism) generate stability within ecosystems.

B-6.2 Explain how populations are affected by limiting factors (including density-dependent, density independent, biotic, and biotic factors). B-6.3 Illustrate the processes of succession in ecosystems.

B-6.4 Exemplify the role of organisms in the geochemical cycles (including the cycles of carbon, nitrogen, and water). B-6.5 Explain how ecosystems maintain themselves through naturally occurring processes (including maintaining the quality of the atmosphere, generating soils, controlling the hydrologic cycle, disposing of wastes, and recycling nutrients).

B-6.6 Explain how human activities (including population growth, technology, and consumption of resources) affect the physical and chemical cycles and processes of Earth.

Essential Question(s):

1. What effects do humans have on the environment and animal habitats?
2. How do organisms depend on one another and adapt to changing ecosystems when affected by humans?
3. What biological and chemical processes help or harm the environment?

4. Why is conservation and renewable resources, recycling, clean energy, and the effects of industrialization important?
5. What are some important factors in water quality for sustaining aquatic life?
6. How do we clean our drinking water?

Objectives:

Students will be able to determine the negative and/or positive effects humans have on the environment including population growth, power consumption, industrialization, water use, etc.
SWBAT determine the natural and unnatural processes that contribute or take away from the environment.
SWBAT establish an understanding and explain the interdependence of organism and their methods for generating stability within changing ecosystems.
SWBAT identify naturally occurring processes ecosystems use for maintenance.

Plan for Field Trip:

1. Students will listen to orientation and outline for the day in courtyard.
2. Students will take water samples from the canal to test water quality for aquatic life.
4. Students will view and discuss a power point on the Canal, as Augusta's source for drinking water.
5. After reviewing water treatment and filtration process, students will build small filtration systems.
6. Students will also test and draw conclusions about chlorine level in three water sources filtered canal water, tap water, and bottled water.

Timeline:

9:45-10:00	Courtyard Orientation
10:00-10:45	Eco-Boat Ride
10:45-11:00	Water sampling & Testing
11:00-11:45	Classroom ppt , filtration model building, & water testing

Materials:

Buckets
Test Strips and Thermometer
Power Point
Filtration kits
Alum

Assessment:

Post-visit "What do you see?" writing assessment
Post-visit reports and discussions on Utilities Brochure and Fill Kill news stories.