

Ninth-Twelfth Grade Canal Sciences Program Outline

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. b. 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. d. 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.

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 abiotic 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?

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 complete an activity being conducted within the Interpretive Center, Cotton Room (new classroom), and/or courtyard. There will be a boat option at extra cost that can be included in the field trip.
2. Students will participate in an interactive, hands-on scientific inquiry game in which they must solve clues, perform monitored experiments, and develop conclusions to find the answer to the puzzle.
4. For the boat option, students will experience the canal's wildlife and vegetation up close. On our Eco-Active Boat Tour they will learn about conservation and resources, recycling, clean energy, the effects of industrialization, and what they can do now to prevent harm to our environment and future problems for our planet.
5. Students will answer questions throughout the learning experience to facilitate understanding and reinforce knowledge.

Timeline:

CSI: Canal Science Investigation: 1 hour 15 minutes

Boat Ride/Discovery Walk: 45 minutes each

Materials:

-CSI information packets

-Certificates of completion for activity

-Science equipment and materials for CSI (detailed in activity outline)

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Assessment:

Students will show what they learned by taking 5-10 minutes at the end of the field trip to participate in an open forum style question and answer session with their guide. Any correct answers will be awarded a key chain (maximum of 3 per group). This will give students an opportunity to clarify information, correct any misunderstandings, and review/reinforce knowledge.