Creek Education

Program

Education Division

The Perfect Creek Education Program

Introduction

Water plays a major part in defining Petersburg National Battlefield's environmental conditions. The park is located within two drainage basins; the Chesapeake Bay and Albermarle Sound. Numerous streams and rivers drain the different park areas, creating a network of habitat for many different species of animals. Wetlands make up a portion of the battlefield's area. These transitional areas play an important role in the park's interconnected ecosystem, serving as a buffer and providing habitat for many unique species of animals.

During the siege of Petersburg (1864-65), there were more creeks and wetlands in the area that is now Petersburg National Battlefield than there are today. Both Confederate and Union troops constructed earthen dams to create standing water for both defensive and logistical purposes (water sources for troops and animals). However, today there are only a few small permanent creeks/lakes left on the battlefield's property.

Vernal (or temporary) creeks are more numerous, though. These creeks form in low points in especially wet seasons. These creeks play just as important of a role in the park's natural habitat as do the year-round creeks. They provide breeding ground and habitat for many types of amphibians and insects, and act as a source of food for other animals.

The most notable year-round body of water is present in the Five Forks unit.
The creek has been created by a beaver dam that blocks Hatcher's Run. It teems with life, as can be seen in the number of fish species that occupy its waters.

Petersburg National Battlefield is located within two drainage basins (Chesapeake Bay and Albermarle Sound). The confluence of the James and Appomattox Rivers occurs at City Point, and, because of the James' eventual outlet into the Chesapeake Bay, the park is included in the Virginia Coastal Zone.

Five streams drain the Eastern Front, and they are all within the Chesapeake Bay drainage basin. Poor and Harrison Creeks are the largest. Taylor's Creek is a tributary of Poor Creek, and Branch Creek and an unnamed creek are tributaries of Harrison Creek. All of these creeks drain into the Appomattox River, and, after that, into the Chesapeake Bay.

The park's Western Front lies in Dinwiddie County. This site is drained by Rohoic Creek, which eventually empties into the Appomattox River. Five Forks is drained by Hatcher's Run and Chamberlain's Bed Creek. These creeks drain into the Nottoway River, which drains into the Chowan River, and ultimately reach the Atlantic Ocean.

Length of Lesson: 1/2 day

Preparation Time: 30 minutes

Target Grade Level: 2-8

Standards of Learning Targeted:

Life Processes

2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes in their life cycles. Key concepts include some animals (frogs and butterflies) undergo distinct stages during their lives, while others generally resemble their parents; and flowering plants undergo many changes, from the formation of the flower to the development of the fruit.

4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include the structures of typical plants (leaves, stems, roots, and flowers); processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed); photosynthesis (sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar); and dormancy.

Living Systems

2.5 The student will investigate and understand that living things are part of a system. Key concepts include living organisms are interdependent with their living and nonliving surroundings; and habitats change over time due to many influences.

3.5 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include producer, consumer, decomposer; herbivore, carnivore, omnivore; and predator and prey.

3.6 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include water-related environments (pond, marshland, swamp, stream, river, and ocean environments); dry-land environments (desert, grassland, rain forest, and forest environments); and population and community.

6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include the health of ecosystems and the abiotic factors of a watershed; the location and structure of Virginia's regional watershed systems; divides, tributaries, river systems, and river and stream processes; wetlands; estuaries; major conservation, health, and safety issues associated with watersheds; and water monitoring and analysis using field equipment including hand-held technology.

Resources

3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include the interdependency of plants and animals; the effects of human activity on the quality of air, water, and habitat; the effects of fire, flood, disease, and erosion on organisms; and conservation and resource renewal.

4.8 The student will investigate and understand important Virginia natural resources. Key concepts include watershed and water resources; animals and plants; minerals, rocks, ores, and energy sources; and forests, soil, and land.

6.9 The student will investigate and understand public policy decisions relating to the environment. Key concepts include management of renewable resources (water, air, soil, plant life, animal life); management of nonrenewable resources (coal, oil, natural gas, nuclear power, mineral resources); the mitigation of land-use and environmental hazards through preventive measures; and cost/benefit tradeoffs in conservation policies.

Life Science

LS.4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include plant needs (light, water, gases, and nutrients); animal needs (food, water, gases, shelter, space); and factors that influence life processes.

LS.5 The student will investigate and understand how organisms can be classified. Key concepts include the distinguishing characteristics of kingdoms of organisms;
the distinguishing characteristics of major animal and plant phyla; and the characteristics of the species.

LS.7 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include the carbon, water, and nitrogen cycles; interactions resulting in a flow of energy and matter throughout the system; complex relationships within terrestrial, freshwater, and marine ecosystems; and energy flow in food webs and energy pyramids.

LS.10 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include differences between ecosystems and biomes; characteristics of land, marine, and freshwater ecosystems; and
adaptations that enable organisms to survive within a specific ecosystem.

LS.11 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term). Key concepts include phototropism, hibernation, and dormancy;
factors that increase or decrease population size; and eutrophication, climate changes, and catastrophic disturbances.

LS.14 The student will investigate and understand that organisms change over time. Key concepts include the relationships of mutation, adaptation, natural selection, and extinction; evidence of evolution of different species in the fossil record; and how environmental influences, as well as genetic variation, can lead to diversity of organisms.

Materials Needed:

- Rubber Boots
- Skimming Nets
- Buckets
- Aqua Scopes
- Magnifying Glasses
- Water Quality Kits
- Insect identification Cards
- Tree Identification Cards
- Wildlife Identification Cards
- Bird Identification Cards
- Burlap Sacks
- Hand Wipes
- Paper and Pencil
- Creek Worksheets

Setting the Stage

Welcome the students to the creek ecosystem, and tell them that you will first look at the big picture. Ask the students if the plants and animals in the water are part of this ecosystem - they should answer yes. Next, ask the students the same question about the water-loving plants that surround the area- of course, these too form part of the ecosystem. Ask the students "Where does this water come from? What other ecosystems can you see from here? Can these otherareas have any impact on the wetland ecosystem?"

Communicate your expectations of the students. Working in an outdoor environment means a different teaching environment. Include the following:
• the boundaries of the area-differences between Harris and Poor Creek
• the worksheets or other writing activities that you expect the students to complete
• respect for the lives of the animals that live in this creek community
• rules of conduct (may include no shouting, courteous behavior to visitors that pass by, making etc.)
• which areas of the creek are off limits, if any
• how far students may wade into the water
• the signal that will be used to draw them together (this could be a whistle, a handclap, or another noise)

Review how to use tools. Take the various pieces of equipment out of their containers, and ask students how they are used.

Introduce how you will use the basins, let the students know the proper way to add their finds to the basins.

A creek study is an outstanding opportunity for students to practice informal science-based inquiry, even though to the uninitiated it may look like “kids playing around in the water!” Allow them to select whatever tool they wish, remind them of your behavioral expectations, and allow a half-hour to pass as they discover some surprising creatures in the process. Remind students to transfer their captive organisms into the basins.

After the class has finished collecting their specimens gather into groups and to prepare a presentation to the rest of the class regarding what they have found.

Ask students to gather into groups and prepare a large cross-section drawing that will be entitled “The Creek Community.” On this diagram they should show the different organisms and where they are found: e.g., the horsefly larvae should be drawn on the bottom of the creek, the dragonfly should be resting on a grass stem, and the water strider should be on the water’s surface. Of course, students will have to visit each of the three basins in order to draw all of the creatures. Tell students that they will be asked to present their drawing to the rest of the class.

• Create a 15-20 minute long “quiet time” and have students write a descriptive entry in their journal that states how the students feel about the natural area, including paragraphs that start with the words “I feel...”, “I see...”, “I smell..”, etc.

• Measure water quality. Using water quality kits, have students measure inorganic parameters, and compare their results with the graph on this page that shows the normal range for inorganic parameters. This will help students judge what is right or wrong with their creek water.

• Have students sketch the wetland ecosystem, including all of the elements that help form the “big picture” of the area.

Before you leave the site, it is important that you discuss with your students whether or not this is a healthy ecosystem.

Ask the students

“What things indicate to you that this is a healthy ecosystem?”
Answers may include the fact that there are lots of different creatures living here, that there is no pollution here, etc. Tell student that each of these things is called an “indicator”, and that the best indicators are ones that can be measured. Have students discriminate between true indicators (e.g. number of different species) vs. more indicators that are more difficult to measure (e.g. “This looks like a pretty area”).

“What things would tell you that this is an ecosystem that is not very healthy?”
In order to best answer this question, have students scan the area, looking for signs of humans: water pipes or other pipes that discharge into the wetland; signs of change around these pipes, or in other areas of the creek; or obvious signs such as rusted metal or other discarded human items.

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Length of Lesson: 1/2 day
Preparation Time: 30 minutes
Target Grade Level: 2-8
Targeted Standards of Learning:

Life Processes 2.4, 4.4
Living Systems 2.5, 3.5, 3.6, 6.7
Resources 3.10, 4.8, 6.9
Life Science LS.4, LS.5, LS.7, LS.10, LS.11, LS.14

Objectives: At the end of the lesson, each student will:

- Understand the concept of an ecosystem.
- Understand the interdependence of members of an ecosystem.
- To understand what a watershed is.
- To understand how water moves through the environment—water cycle.
- To understand the concept of water quality and why it is important.
- To understand how sustainable forestry practices protect and enhance water quality.

Program Description:

Students will explore one of the creeks on Petersburg National Battlefield and will begin to understand why the water cycle and water quality is important and what influences there are on them. Trees help hold soil in place and filter out unwanted sediment to keep water clean. They shade creeks and regulate water temperature for the many aquatic species that need clean, cool water. Many different animals live in the forest near the creeks and ponds of Petersburg National Battlefield. Otters, beavers, deer, herons, salamanders, snakes, frogs, turtles and many others depend on healthy forest creeks and ponds for food, water, homes and protection. For this reason, foresters, hydrologists, geologists, aquatic biologists and many others here at Petersburg National Battlefield work together to manage our creeks and ponds.

To achieve this, students will don a pair of rubber boots and spend some time in the creek observing, collecting and studying the many living creatures in the creek. They will test water quality and discuss ways to preserve this habitat.