

Clean Water Volunteers Lesson Plan

Students learn about water pollution and how they can help to prevent it.

Water Atlas Curriculum Lesson 02

Lesson Summary: In this lesson, students will organize a clean-up campaign to maintain the beauty of different water bodies throughout Orange County, Florida. Students will be given the opportunity to plan and implement their successful clean-up programs at different water bodies throughout the county.

Grade Level: Middle School (6th–8th grade)

Time Allotted: Approximately two class periods (100 minutes total)

Performance Objectives

References are to the Next Generation Sunshine Standards (2007)

Math

MA.7.G.4.4 Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)), dimensions, and derived units to solve problems.

Language Arts–Writing

- LA.6.2.2.3 Organize information to show understanding (e.g., representing main ideas within text through charting, mapping, paraphrasing, summarizing, or comparing/contrasting)
- LA.6.3.1.2 Make a plan for writing that prioritizes ideas, addresses purpose, audience, main idea, and logical sequence
- LA.6.3.1.3 Use organizational strategies and tools (e.g., technology, outline, chart, table, graph, web, story map).
- LA.6.3.2.1 Develop main ideas from the prewriting plan using primary and secondary sources appropriate to purpose and audience.
- LA.7.6.2.3 Write an informational report that includes a focused topic, appropriate facts and relevant details, a logical sequence, a concluding statement, and a list of sources used.
- LA.8.4.2.1 Write in a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to manuals, assembly instructions).

Prior Knowledge

Students should be aware of water pollution problems in the United States and in particular Orange County, Florida. To make this relevant to our students' lives, the article below can be used to engage students in a whole class discussion.

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Have students find and read the document titled "[History of Lake Apopka](#)" in the Water Atlas Digital Library. (See References, below.)

Engage students in a whole class discussion by asking:

1. What is the main point of the article?
2. What can citizens do to help in the preservation of Lake Apopka?

Topic Overview

Comprehensive federal efforts aimed at controlling water pollution date back to 1948. Although this was the case, it took two decades of cautious experimentation before an effective regulatory scheme would evolve. The Clean Water Act of 1972 completely revised the federal approach to water pollution control. The primary control strategy of the Clean Water Act is aimed at regulating point source discharges—pipes and other discernible conveyances through which pollutants are added to waters of the United States.

The Orange County Environmental Protection Division coordinates volunteer efforts to educate citizens, provide ecological restoration, and monitor water bodies in Orange County. Volunteers are essential in carrying out watershed clean-ups, restoration projects, storm drain labeling, education programs, internships, and more to benefit Orange County residents and natural resources.

Key Vocabulary

Effluent

Something that flows out or forth; a waste liquid discharge from a manufacturing or treatment process in its natural state or partially or completely treated that discharges into the environment.

Exotic

Not native to the place where found.

Littoral zone

The shallow area along the shoreline of a non-flowing body of water, containing rooted plants that provide important habitat for other aquatic species.

Nonpoint source pollution

Pollution that cannot be traced to a particular source or point of entry.

Point source pollution

Pollution that can be traced to a particular source or point of entry, typically industrial facilities, landfills, sewage treatment plants, and mines.

Runoff

Also called stormwater. Water from rain or irrigation that doesn't soak into the ground, but

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flows into the nearest body of water. It can carry many suspended or dissolved contaminants, including: oils, greases, and other petroleum products; fecal matter; organic debris; fertilizers and pesticides; trash; and silt and sand-from the air and land.

Turbidity

The measurement of how much light penetrates a water body. Haziness or cloudiness caused by suspended particles or silt.

Materials

- Lake access
- Computer with printer and Internet access
- Clip boards
- Camera
- Scale

References

These references may be found in the Orange County Water Atlas Digital Library:

[EnviroScope Model: Exploring Watersheds and Riparian Forests](#) (lesson plan). 2011. Audubon Naturalist Society.

[EnviroScope Rental Information](#). 2011. Orange County Environmental Protection Division.

[Homeowner's Guide to Stormwater Runoff](#)

Source: St. Johns River Water Management District. 2002.

[Stormwater Runoff Crossword Puzzle](#)

Source: U.S. Environmental Protection Agency. 2003.

Also on the Orange County Water Atlas:

[Stormwater Education](#).

Other references:

[Coastal Cleanup Website](#). The Ocean Conservancy. (Accessed June 2011.)

[Clean Water Network](#). Website. (Accessed June 2011.)

[History of Lake Apopka](#). 2007. Friends of Lake Apopka.

[Low-Impact Development Center](#). Website. (Accessed June 2011.)

[Orange County Environmental Volunteer and Internship Program \(eVIP\)](#) webpage. Accessed July 2011.

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Procedure

Engage/Elicit

1. Ask students what they know about the lakes near their school. Have they fished, floated, swam or walked by them lately?
2. Ask students to tell the differences they have observed among different lakes in their communities.
3. Tell students that many of Florida's lakes are being invaded. Ask them who and what might be invading the lakes.

Explore

1. Conduct a class discussion on the concepts of “point source pollution” and “nonpoint source pollution” with students.
2. Discuss the dangers that are associated with debris dumped into water bodies.
3. Guide students to the Water Resource Search tool (Explore > Water Resources) and have them use the tool to investigate the number and type of each type of water resource in Orange County. Some are listed in more than one county/Water Atlas. Ask them why this would be.

Explain

1. Explain to students they will be working in small groups to create a proposal for cleaning up the banks of lakes, rivers and ponds throughout Orange County. (Alternatively, you may wish to contact Orange County Environmental Protection Division and arrange for students to participate in the County’s storm drain marking or stream cleanup program.)
2. Divide students into small groups and assign each group to a lake. To create relevance, students may be assigned to their community lake(s).
3. Tell students to brainstorm and create a list of equipment and materials that will be required to conduct a lake clean-up. Remind students that they will only be cleaning up the land areas surrounding these waterways.
4. Groups should then share their equipment and material list with the entire class for clarification and input from each group as well as the teacher.
5. Students should then share their step-by-step proposal with the entire class for clarification and input from each group as well as the teacher.

Extend

1. Have students work in their groups to create an item collection card for recording debris collected.
2. Have students brainstorm to identify possible funding sources for their clean-up campaign. Follow up by having students draft formal letters to these sources, asking for donations to help in the purchasing of equipments and materials for clean-up campaign.
3. Have students create posters and newsletters inviting others to join in the clean-up campaign.

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4. Encourage students to estimate the size of the area they will clean, then estimate the volume and weight of debris they expect to collect. Have them show the assumptions they make in arriving at their estimates.
5. Use an EnviroScape® Model to increase awareness of water pollution and overall watershed concept. The model is designed to be an interactive demonstration to show how waterways flow into a larger water body, which is representative of a lake, river, bay, or ocean. The unit can be “rented” by teachers for classroom use (for free) from the Orange County Environmental Protection Division and comes complete with a kit containing everything you need to demonstrate the movement of water through a watershed and the pollution that runoff may cause. (See references for rental information and a lesson plan.)

Exchange/Evaluate

1. Have students share their completed proposal including donation letters with the entire class for input from classmates and teacher(s).
2. Have students compare their final proposal to those that are created by large clean-up organizations such as the [Ocean Conservancy's Coastal Cleanup](#) program.

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