

Water Chestnut & Hypoxia

Time: 1 class period

National Benchmarks: Benchmarks 5A: Diversity of Life; 5D Interdependence of Life; 5E: Flow of Matter and Energy; 9B: Symbolic Relationships; 9D: Uncertainty; 12B: Computation and Estimation; 12D: Communication Skills; 12E: Critical-Response Skills.

National Science Content Standards: *Science as Inquiry: A; Life Science: C:* Biological Evolution; The Interdependence of Organisms; Matter, Energy, and Organization in Living Systems; *Science and Technology: E:* Abilities of Technological Design; Understandings about Science and Technology; *Science in Personal and Social Perspectives: F:* Population Growth; Natural Resources: Environmental Quality; Natural and Human-induced Hazards; Science and Technology in Local, National, and Global Challenges

New York State Standards: 1, 2, 4, 5, 6, 7

Objective: Students will know how a water chestnut bed changes the dissolved oxygen levels during the year and will be able to explain changes using graphs.

Lesson Outline:

1. Students predict changes in dissolved oxygen during the year
2. Students use scientific data to answer questions about water chestnut

Materials: copies of “Water Chestnut Beds & Dissolved Oxygen” worksheet-color copies are necessary unless you can project color images of the graphs while students are working

Engage: Ask for student volunteer to come up to the board and draw the changes in dissolved oxygen in a water chestnut bed over 24 hours. If you did not complete the previous lessons related to water chestnut, use the visualizations to help students understand how dissolved oxygen changes over 24 hours.

Explore: Using the worksheet, students will answer questions to understand how water chestnut plants change the dissolved oxygen over an entire growing season.

Explain: As water chestnut leaf out in late spring, they grow underwater, releasing oxygen into the water column. However, by mid-summer, water chestnut have leafed out completely, forming a dense bed of floating vegetation through which little sunlight can penetrate. The oxygen that these plants release mainly goes up into the atmosphere, instead of into the water itself.

Students may need some help interpreting the graphs. The graphs show two years of data; the blue lines are from 2005, while the red lines are from 2006. Dotted lines are the channel, and solid lines are the *Trapa natans* (water chestnut). The students should be able to understand that the DO is much lower within the water chestnut bed once the plants leaf out. As the summer progresses, it is very obvious that the dissolved oxygen levels within the beds drop dramatically, even though the channel itself never becomes hypoxic.

The photos of the water chestnut bed along with the accompanying graph of the DO measurement change as you move from the shore to the main channel should solidify students' understanding of the way the plants affect DO levels.

Extend: Students can use the HR-ECOS website (www.hrecos.org) to compare a site that has water chestnut in the summer (Norrie Point) to a site that doesn't have water chestnut.

Evaluate: Students complete worksheet.

Comments: