WETLANDS, USA - MORE THAN SWAMPS!

9-12

OBJECTIVES

The student will do the following:

1. Define wetlands.

2. Construct a wetlands model.

3. Explain the importance of wetlands as ecosystems.

4. Defend the need to preserve wetlands.

SUBJECTS:
Science (Biology, Ecology),
Social Studies (Geography),
Language Arts
Extensions for: Science, Math, Social Studies, English, Art, Journalism, Business, Music

TIME:
1-2 class periods
plus extension or homework

MATERIALS:
copies of student sheets
for model:
pan
modeling clay
piece of indoor-outdoor carpet
jar of muddy water

BACKGROUND INFORMATION

Wetlands are a prime natural resource and include such areas as swamps, bogs, prairie potholes, cypress domes, riverine bottomlands, coastal marshes and tundral wetlands. Many wetlands are transitional areas located between dry lands and deeper aquatic systems like rivers and lakes. Wetlands are located in various parts of the U.S. All of these damp areas have tremendous importance in terms of productivity. Wetlands provide feeding, spawning, and nursery grounds for finfish and shellfish. They provide habitat for about half of all endangered species of plants and animals. Wetlands lessen global warming by locking up huge amounts of carbon in peat rather than allowing CO_2 to be released in the atmosphere. They also clean the water by absorbing and filtering pollutants and stabilizing shore lines, and they provide a buffer against floodwaters and storm tides. They may serve as "holding" tanks to recharge wells and aquifers.

Some wetlands develop in low-lying areas where water drains and collects. Others border salt or fresh bodies of water, such as oceans, rivers, or ponds, while still others are isolated in forests and urban areas. As transitional zones between upland and aquatic systems, wetlands often support both terrestrial and aquatic species, contributing to the local and regional diversity of plants and animals.

Two hundred years ago, the United States had 220 million acres of wetlands. Now we have less than 100 million acres. As of 1996, the loss was around 300,000 acres each year. Half of the Florida Everglades is gone; half of Connecticut's coastal wetlands and 2/3 of the prairie potholes are gone. California has only 9% of its wetlands remaining, Iowa 11%, and Indiana and Missouri 13%. Students must learn about wetlands so they can be involved in legislative efforts to halt their loss. Any legislation that weakens the definition and regulation of wetlands will probably cause greater loss.

Terms

bog: freshwater marsh with build-up of peat and high acidity that typically supports mosses adapted to acidic soil conditions (particularly, sphagnum); many are located in colder regions

bottomlands: lowlands along streams and rivers that are typically flooded

cypress domes: small, depressional swamps, typically with tall cypress trees at center, characterized by subsurface hardpan overlain by organic matter

estuary: a marine ecosystem where freshwater enters the ocean. The term usually describes regions near the mouths of rivers, and includes bays, lagoons, sounds, and marshes.

forested wetland: wetland dominated by trees. "Trees" (for the purpose of this definition) are defined as woody vegetation with diameter greater than 3 inches at breast height (approx. 4 feet from ground level).

freshwater marsh: a wetland frequently or continually inundated by freshwater, characterized by emergent herbaceous vegetation

mangrove swamps: tropical, wet, coastal areas dominated by mangroves (trees). Mangroves have extensive root systems which form a dense thicket, providing cover for aquatic life.

prairie potholes: shallow, marsh-like ponds which serve as primary breeding grounds for ducks and migratory birds found in North Dakota, South Dakota, Minnesota, and Canada

runoff: water (originating as precipitation) tat flows across surfaces rather than soaking in; eventually enters a waterbody; may pick up and carry a variety of pollutants

salt marsh: estuarine habitat submerged at high tide, but protected from direct wave action, and overgrown by salt-tolerant herbaceous vegetation; aquatic grasslands (coastal "prairies") affected by changing tides, temperatures, and salinity

swamp: wetland dominated by shrubs and trees

wetland: areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions. Wetland areas typically support plant life that are adapted to life in wet environments.

ADVANCE PREPARATION

A. Copy Student Sheets.

B. Have terms and definitions on the board.

C. The teacher may want to show a video of wetlands. Some suggestions are listed below.

The Realm of the Alligator (Okefenokee Swamp)
Creatures of the Mangrove
Life on the Edge
There is a Place

PROCEDURE

I. Setting the stage

A. Discuss terms.

B. Allow students time to read the two student sheets. Discuss the student sheets and Background Information. Ask students how controlling pollution in a watershed helps protect wetlands.

C. Have students describe and discuss conditions of wetlands within their areas (state, county) or other wetland areas with which they may be familiar.

D. To demonstrate how wetlands slow water movement and trap pollutants and sediment, do the following:

1. Using a metal pan or plastic container, spread a layer of modeling clay in the bottom forming a hill in one end. This section will represent the land. Leave the other end of the pan empty to represent a lake or ocean. Make a slope on one side with the modeling clay.

2. Place a piece of indoor-outdoor carpeting to fill the space across the pan along the edge of the clay. The carpeting represents the wetland buffer between dry land and open water. Set the model aside.

3. After reviewing what wetlands are, explain the characteristics of the wetland life, the variety of habitats, and the complexities within.

4. Demonstrate the wetland model by pouring water slowly in the pan on the higher side of the clay. Let students observe where water has settled and where it has been trapped in the piece of carpeting. The water that is slowed in the carpeting represents different functions of the wetland.

5. Apply the slow-moving water notion to the different functions performed by the wetland.

6. Lead a classroom discussion on why wetlands are essential and important in the natural settings and environment.

II. Activity

Have students:

A. Construct an exhibit for the school library that includes maps of local wetlands and explanation of differentiating characteristics.

B. Construct a poster/collage with the following theme: The Importance of Wetlands. Include newspaper/magazine articles and at least 10 illustrations.

C. Write a five-paragraph essay on the importance and the need to preserve wetlands. Additional information from your school/city library may be helpful. Consult English text for correct format.

D. Prepare a lesson on wetlands that you could present to a middle school science club or class. Include visuals.

III. Follow-up

Play a game with the terms. Write definitions for each word on separate 3x5 cards and do the same with the terms. Give each student one definition and one term. Start game by one person reading his/her definition. The person in the room who has the matching term must say it and then read his/her definition. The game continues until all definitions have been read and identified.

IV. Extensions

A. Science: Make posters illustrating the different kinds of wetlands.

Marshes (palustrine)
Swamps and Floodplain forests (palustrine)
Bogs (palustrine)
Rivers and Streams (riverine)
Lakes and Ponds (lacustrine)
Coastal Wetlands (marine)
Tidal Marshes (marine)
Tundral Wetlands
or
visit and study a local wetland. Identify birds and wildflowers that live there.

B. Math: Find out how much wetland area your state loses per year. (Contact EPA or Geological Survey). Figure how long it will be until your state (if it continues at its present rate) has no wetlands left.

C. History: Choose one diminished wetland area in your state. Research its demise and prepare an "obituary."

D. English: Create a scenario where "progress" demands that a wetland be drained. Students should write persuasive essays (pro or con) about the situation. Give them enough information so that they can internalize and generate a viewpoint.

E. Art: Create a mural (all students can contribute) to celebrate the beauty and diversity of a wetlands area. The mural can be created on heavy white paper and displayed in a common area in your school.

F. Journalism: Publish a "Wetlands Watch" pamphlet with articles, pictures, and interviews about wetlands' problems.

G. Business: Create a scenario where business people must choose between gross profits and the integrity of vital wetlands. Have your students write a thesis statement. Make sure the scenario has balance.

H. Music: Have your students do some creative song writing celebrating the beauty of or mourning the loss of America's wetlands. Recordings of these songs can be played near the mural (art) and the poster display.

RESOURCES

"Consequences of Wetland Loss and Degradation," United States Environmental Protection Agency, March, 1993.

"Economic Benefits of Wetlands," United States Environmental Protection Agency, March, 1993.

EPA Wetlands Hotline - 1-800-832-7828

"More Facts About Wetlands," United States Environmental Protection Agency, March, 1993.

"Values and Functions of Wetlands," United States Environmental Protection Agency, March, 1993.

FUNCTIONS OF WETLANDS

1. Wetlands provide habitats for fish, wildlife and plants. They are critical to the survival of a wide variety of organisms. They also provide food, water, or cover for many species.

2. Wetlands provide critical habitats for endangered species. A number of rare and threatened species depend on wetlands for their survival.

3. Wetlands provide flood control and protection. Some wetlands store flood waters or water that collects in isolated depressions. Wetland plants can help to slow the speed of flood waters to protect nearby properties.

4. Wetlands improve water quality serving as excellent water filters to remove nutrients, wastes, and sediment from runoff water before they reach an open body of water. These nutrients, wastes and sediment may cause algae blooms or decrease the volume of a lake, pond, or river.

5. Wetlands provide shoreline erosion control. Those located between rivers and high ground can help to buffer shorelines against erosion. Wetland plants strengthen the sediment by binding soil with their roots. They also dampen wave action.

6. Wetlands reduce storm damage by serving as buffers between the winds and waves of storms and the coastal areas. Property located behind wetlands along shorelines and large lakes often fares much better during storms than unprotected areas.

7. Wetlands facilitate groundwater recharge. As the water moves slowly through or sits in the wetlands, some will seep down into aquifers below.

8. Wetlands provide a variety of natural products. These range from fish, shellfish, and wildlife to timber, berries, and wild rice.

9. Wetlands provide areas for recreation, rest, and enjoyment. Hunting, boating, and fishing are allowed in many wetland areas. Artists and photographers enjoy capturing the beauty of wetlands in their crafts. Tourists and visitors often find peace and appreciation for these natural areas.

10. Wetlands facilitate education and research. Although much is known about the functions of wetlands, researchers are still studying these environments and the species that thrive there in an attempt to discover more fully the benefits that they bring to humans.

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WETLANDS

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Some wetlands develop in low-lying areas in the landscape where water drains and collects. Others border salt or fresh bodies of water, while still others are isolated in forests and urban areas. As transitional zones between upland and aquatic systems, wetlands often support both terrestrial and aquatic species.

Wetlands have the ability to filter runoff water as it flows back toward sources of surface water. They can serve to remove natural and man-made pollutants from the water cycle. However, they cannot remove them all. As more and more pollutants are added to the environment by the activities of people, the wetlands are less and less effective in purifying water.

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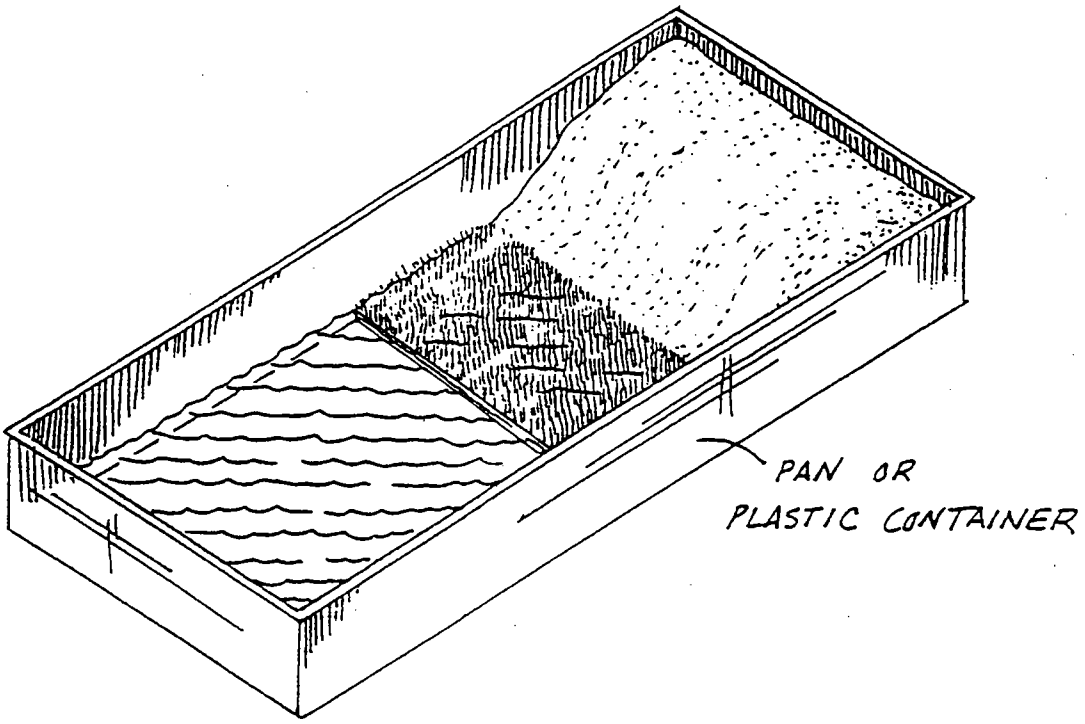
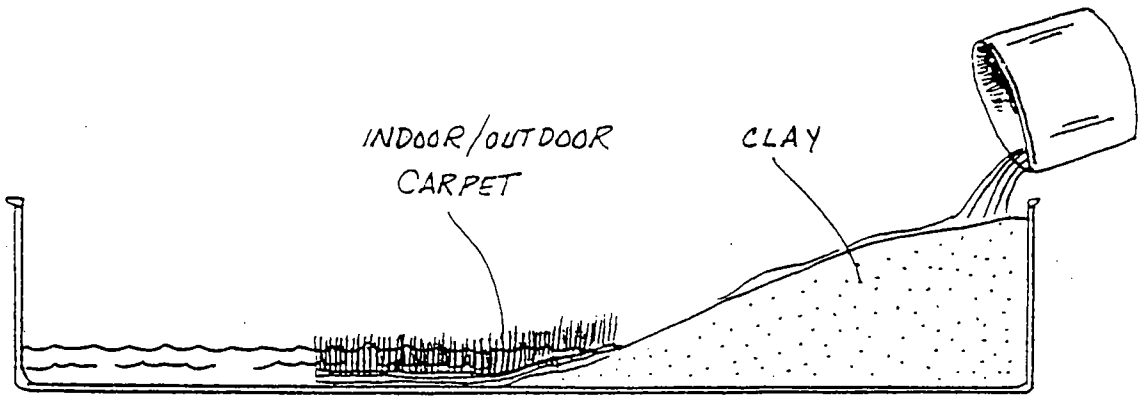
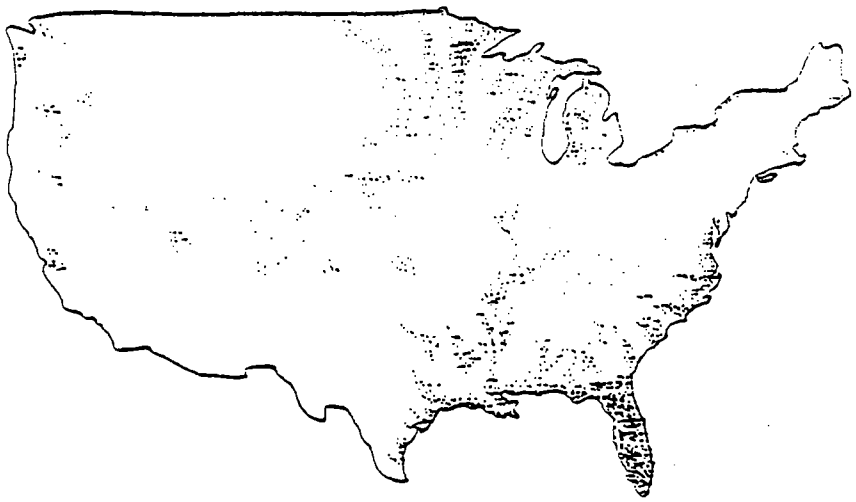
WETLANDS MODEL





WETLANDS IN THE UNITED STATES



MARSH

BOG

LAKE / POND

SWAMP

RIVER / STREAM

COASTAL