

Wetland in a Pan



[Adapted from the "Wading Into Wetlands" issue of *NatureScope*, copyright 1992. Questions and some text added. Used with permission of the National Wildlife Federation, Washington, D.C.]

Grade Level
3-12

Subject Areas
Environmental Science, Earth Science

Duration
90 minutes if students make model; 30-40 minutes for demonstration only

Setting
Classroom

Skills
Gathering and analyzing information

Charting the Course
Other activities that explore filtering effects of wetlands include "Water Purifiers," "Runoff Race," "Treatment Plants," "Recipe for Trouble," and "Water Under Foot."

Vocabulary
runoff, flood retention, sedimentation, wetland buffer

Summary

Students make a model that demonstrates the flood-buffering and filtering effects of wetlands.

Objectives

Students will:

- describe interrelationships among precipitation, runoff, and wetlands.
- relate the importance of wetland functions to their own needs and daily lives.

Materials

- modeling clay
- long shallow pan. *Tip: A long (13" x 9"), sturdy metal or glass pan with a smooth, flat bottom works well; or perhaps a rolling paint pan.*
- scraps of indoor-outdoor carpeting, florist's "oasis" foam, (or sponges)
- watering can or similar device
- cup of soil
- jar of muddy water

To make the model for the demonstrations:

1. Spread a layer of modeling clay in half of the baking pan to represent land. Leave the other half of the pan empty to represent a lake or other body of water such as a river or ocean.
2. Shape the clay so that it gradually slopes down to the water. Smooth the clay along the sides of the pan to seal the edges. You can also form meandering streams in the clay that lead into the body of water.
3. Cut a piece of indoor-outdoor carpeting [or a sponge or florist's foam] to completely fill the space across the pan along the edge of the clay (see diagram). This represents a wetland buffer between dry land and open water.

Tip: Make sure the wetland fits

well. The model won't work if there are large spaces under the wetland or between it and the sides of the pan.

Making Connections

Students will be able to discuss practical, everyday issues concerning the beneficial functions of wetlands.

Background

See information given in "Runoff Race" and throughout Procedure, below. (See chapter 3.)

Procedure

Warm up

Review with the students what they have learned about wetlands and their functional values. Show the class pictures of different types of wetlands including freshwater and salt marshes, swamps, and bogs. Have the students think about the animals and plants that might live in each kind of wetland.

The Activity

1. Present the wetland model and point out its features. Explain that wetlands, like all habitats, are very complicated natural systems. They perform some very important functions such as filtering pollutants, reducing flood damage, and preventing soil erosion. Some wetlands, at times, recharge underground water supplies. Explain that the model will demonstrate some of these functions in a very simplified way.

Ask: If I make it "rain" on the model, what do you think will happen to the rainwater? (Rain will run downhill and end up in the body of water.)

2. Fit the piece of carpeting or sponge into the wetland area, slowly sprinkle some "rain" on land, and let the students observe and describe what is happening. Some of the water is slowed down by the wetland (carpeting). The excess slowly flows into the body of water. Point out, if the students do not, that the wetland absorbed some of the water (pick up the wetland and squeeze some water out to prove it).

3. Ask: What do you think will happen if the wetland is removed? (The water will not be absorbed; it will flow more quickly into the body of water.) Remove the carpeting and water. Pour the same amount of water on the model at the same spot and rate as before. Have the students note any differences. The water should fill the body of water much more quickly and may eventually overflow and flood the land. That's because it is no longer buffered by the wetland.

Explain that most wetlands are shallow basins that collect water and slow its rate of flow and also retain water for a time. This slowing process helps reduce flooding and also helps prevent soil erosion.

Ask: If a wetland is destroyed and houses are built there, what might happen to the houses during a severe rainstorm? Why? (They might be flooded because the wetland will not be there to absorb and slow the rush of water from higher ground.) In many areas, wetlands are drained and filled in, and houses and marinas are built right along the water. Without a wetland buffer, these developed areas particularly

along the coast are often subjected to severe flooding and erosion, especially during violent storms.

4. Pour the water from the last demonstration out of the model and replace the piece of carpeting. Explain that this demonstration will be just like the first, except that soil will cover the clay. Ask: What do you think will happen to the bare soil when it rains? (The rain should pick up and carry some sediment over the land and into the body of water.)

5. Spread soil over the clay and make it rain, or pour muddy water from the jar onto the land. Explain that this water represents polluted runoff. Ask the students to compare the water that ends up in the body of water with the water in the jar. Explain that the soil particles were trapped by the carpeting, making the water in the body of water much clearer. The "uphill" side of the wetland should be coated with trapped sediment.

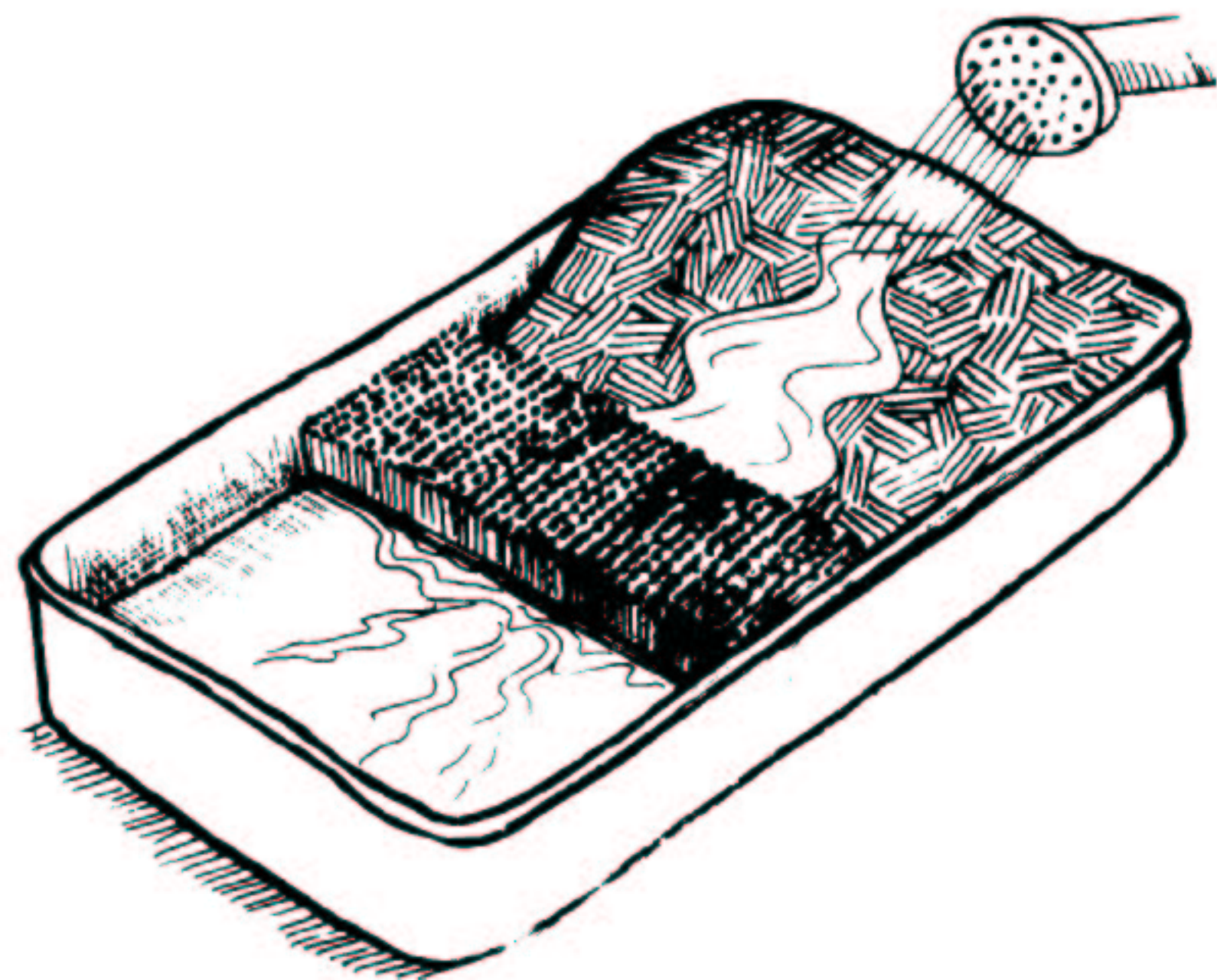
6. Remove the carpeting, pour out the water, and try the experi-

ment again. What happens without the wetland in place? Ask the kids why all the dirt particles end up in the body of water this time. The thick mat of plant roots in a wetland helps trap silt and some types of pollutants much as the carpet or foam did in the model. Without a wetland, excessive amounts of silt and pollutants can end up in lakes, rivers, and other bodies of water.

Wrap Up and Action

Ask students:

- How might muddy water affect fish? (Makes it harder for them to see and breathe with clogged gills, and could lead to their death.)
- How might other animals and plants be affected by the muddy water? (Settling sediment smothers oysters, plants do not get sunlight needed for growth, birds and other animals who eat fish or plants have less to eat if food sources die or can't be seen in muddy water, etc.)
- How would boats and ships be affected by muddy water? (The mud settles out and eventually



fills channels important for navigation.)

- How might all of this affect you? (Decrease in natural resources and food sources; decline in quality of drinking water; impacts on recreation such as swimming and fishing; change in aesthetics; change in community economy, such as shipping problems that affect jobs and industry, etc.)

- How can we prevent these undesirable effects? (By protecting wetlands and helping to make their benefits known!)

Assessment

Have students:

- describe how wetlands function to reduce flooding and retain sediments.
- analyze what would happen to water, sediments, homes, and wildlife if wetlands were destroyed.

Extensions

Students, individually or as small groups, can make their own, more

detailed wetland models using small aluminum foil pans, clay, and florist's foam. Then students can attach plants and animals to the model with toothpicks. They can make a freshwater or salt marsh, freshwater or mangrove swamp, or bog. Provide reference books with pictures of different types of wetlands (see magazines and field guides, p. 326). Students can use an assortment of materials, including natural ones they collect, to decorate their models. Some ideas:

- For cattails, use cotton swabs. Paint sticks green and cotton parts brown, or paint toothpicks green and stick bits of brown clay to the tops.
- Use long pine needles for reeds.
- Shape wetland creatures from clay, or cut them from paper and glue them onto toothpicks.
- Make trees by gluing pieces of green sponge onto twigs. Some dried flower heads also make nice trees; use a small pine cone painted green for an evergreen.

For those who don't wish to draw their own, use these patterns for toothpick animals. Color, then place a second piece of paper behind and cut them out double thickness, then glue the two pieces together with a toothpick stuck between.

