

Wetland in a Pan

Overview: Students construct a model of a wetland to show how it filters runoff into the Bay.



Background

Wetlands, such as the salt marshes around San Francisco Bay, play an important role in watersheds. Water—including urban runoff—that flows to the Bay through rivers or creeks passes through wetlands before entering the Bay and ultimately the ocean.

- Wetlands act as sponges, absorbing the water and slowing the flow of water. Sediment or pollutants in the water are filtered by the wetland.
- The soil, plants, and animals in wetlands act as filters and purifiers.

Without a wetland at the base of the watershed, the water entering the Bay would be full of sediment and pollutants.

- Pollutants that enter the food web would be more likely to harm wildlife and people who eat fish and ducks.
- Sediment would be more likely to cause turbidity, reducing the sunlight available to underwater plants and clogging the gills of fish and shellfish.

Ninety percent of the historical wetlands around San Francisco Bay have been destroyed. Humans have paved them over for development and road construction, and built salt ponds and landfills on top of wetlands.

Method

Ask

? What is a watershed? (A watershed is the region that drains into a creek, river, river system, or body of water. The San Francisco Bay watershed reaches all the way to the Sierra Nevada. The water in this watershed runs through rivers and creeks to the San Francisco Bay and eventually the ocean.)

Read

“The wetlands around the San Francisco Bay are at the bottom of the watershed. Water draining down through creeks and rivers run through wetlands before entering the Bay and ocean.”

Ask

? How do you think wetlands are like sponges? (Wetlands absorb water like a sponge—and slow the flow of water into the Bay.)

Grades: 3–8

Key Concepts: Wetlands act as sponges and filters, absorbing water and filtering pollutants and sediment. Without wetlands, pollutants and sediment run directly to the San Francisco Bay.

Objectives:

Students will be able to:

- Describe wetlands role in the watershed
- Explain how wetlands filter sediments and pollutants from water that runs to the Bay

Materials:

Per group of 3–5 students or do one model with all the students.

- 1 paint roller pan (or roasting pan or other shallow, rectangular container)
- 2 sponges or florist foam
- 1 spray bottle (or styrofoam cup with pen holes poked in bottom)
- Small amount of dirt
- 2 tsp. powdered drink mix
- Clay
- Pocket knife to cut sponges or florist foam
- Copies of data sheets

Time: 40–60 minutes

Credits: Adapted from “Wetland in a Pan”, p. 95, *WOW!: The Wonders Of Wetlands*, Environmental Concern Inc., 1991.

? Wetlands also act like a filter; what does this mean? (Wetlands filter out pollutants and sediment - like a coffee filter would.)

Do

Either make one model for the entire class or divide the students into small groups that will each make a model. Hand out a data sheet to each group or to each student.

Read

“First we are going to build an upland. The upland will be the top of the watershed. When rain falls on the upland, the water will wind down through rivers and creeks toward the Bay.”

Do

Spread a layer of clay over half of the paint roller pan or roasting pan. Leave half of the pan empty to represent the Bay. Shape the clay so that it slopes down to the Bay, and smooth it along the sides of the pan to seal the edges. You can also form meandering rivers or creeks in the clay that lead into the Bay.

Ask

? Where do the wetlands go on this model? (At the base of the upland, the edges of the Bay.)

Do

Cut sponges or florist foam to completely fill the space across the pan along the edge of the clay (Make sure the wetland fits well — the model won’t work if there are spaces under the wetland or at the sides.)

Ask

? What will happen if it rains on our model— where will the rainwater go?

Do

Create rain on the upland with the styrofoam cup or a spray bottle. Observe what happens to the water. (The water should be absorbed by the sponges or foam, with some water slowly entering the Bay.) Have the students write their observations on their data sheet. Pour the water out of the pan (squeeze out the sponge or foam).

Ask

? What do you think will happen to the rainwater if the wetland is removed?

Do

Remove the wetland and again make it rain on the upland. (The water should run directly to the Bay.) Have the students write their observations on their data sheet. Pour the water out of the pan.

Read

“Let’s put the wetland back and do another demonstration. We’ll put some dirt on the land and some pollutants.”

Do

Sprinkle a small handful of dirt over the land and then pour about one teaspoon of powdered drink mix somewhere on the land. The colored powder represents pollution, such as pesticides or motor oil that get washed into rivers or creeks when it rains.

Ask

? What will happen to the dirt and pollutants when it rains?

Do

Rain on the upland and observe. (The dirt and pollutants will be filtered by the wetland.) Have the students fill out their data sheets.

Ask

? What will happen if the wetlands are removed?

Do

Remove the wetlands; put the same amount of dirt and pollutants on the upland and rain on the upland again. Observe what happens. (The dirt and pollutants will run directly to the Bay.) Have the students fill out their data sheets.

Ask

? How do you think wetlands absorb water and filter sediment and pollutants? (The soil, plants, and even animals such as crabs, mussels, and clams, can absorb and filter. The entire wetland ecosystem acts as a sponge and a filter.)

? When sediment flows directly to the Bay, what are some of the bad things that can happen?

(Sediment can block sunlight, making it difficult for plants such as phytoplankton to grow. Sediment also decreases visibility, making it difficult for animals to find food. Sediment can also clog fish gills, making it hard to breathe.)

? What harm can pollutants cause? (Pollutants can enter food chains and become very concentrated in animals at the top of the food chain, such as fish, ducks, hawks, seals, and even humans who eat fish or ducks from the Bay.)

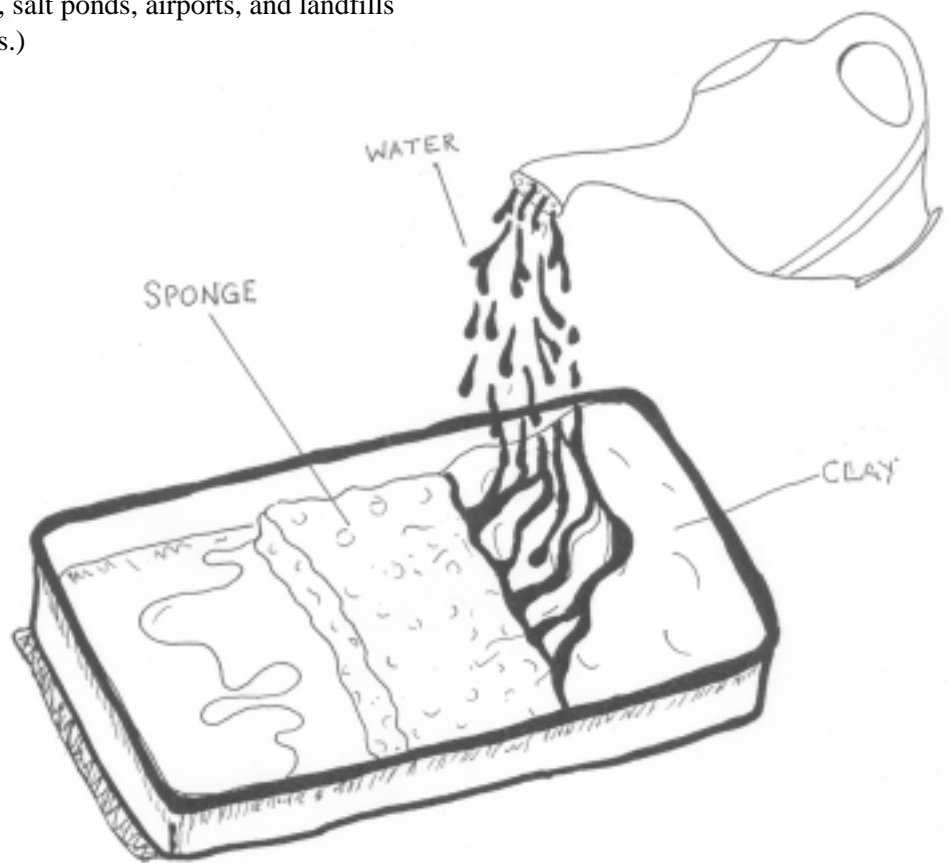
? 85% of the wetlands around San Francisco Bay have been destroyed. How has this happened?

(Humans have drained and filled wetlands and built houses, highways, salt ponds, airports, and landfills on top of wetlands.)

? How does this loss of wetlands hurt the San Francisco Bay watershed? (The natural sponge and filter has been removed and pollutants and sediment run directly to the Bay.)

? Knowing that wetlands are effective filters, do you think wetlands often become polluted? (Yes. The Refuge monitors pollutants in the marsh and their effects on wildlife.)

? What can you do to help preserve wetlands? (Learn about wetlands and teach others, write letters to legislators, and don't dump anything down storm drains, which run directly to creeks and the Bay.)



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Data Sheet

What
happened
when it
rained?

With the wetland in the watershed?

Without the wetland in the watershed?

What
happened
when it
rained
on the dirt
and
pollutants?

With the wetland in the watershed?

Without the wetland in the watershed?
