

WRAP-UP

To wrap-up the investigation, bring your students together for a group discussion to help them understand why and how they achieved their results. It is important to share results so that everyone has a clear picture of what happened. To help you facilitate the discussion, review the explanation in "The Why and The How" using the Group Discussion questions as a guide.

GROUP DISCUSSION

Explain to students that scientists learn from each other through discussion, and they build upon the work of others to make new discoveries. Just as scientists come to conclusions based on the findings of their experiments, students will now come together as a group to share their results and make conclusions about the investigations they've conducted. Have students record their final results and the explanation in their journals.

Ask students:

1. What did you learn about water in this investigation?
2. How do you think a wetland helps clean and filter water?

Answer: The dense plants and plant roots and soil help trap sediment and pollutants.

3. What do you think happens when people build homes or businesses on wetlands? What materials might pose a problem for the wetland environment?
4. What new things did you learn?

The "Why" and The "How"

Wetlands hold water and filter out sediment, pollution and decomposing plant matter from water. The sponge in your wetland model played a similar role. Wetlands help feed the underground water supply by collecting water from melting snow and rain, filtering out pollutants, sediment and decomposing plants; and controlling flooding by slowly releasing water into the surrounding land and bodies of water.

Many wetlands are found near floodplains that surround rivers. When these rivers overflow from heavy rainfall, wetlands store the excess water and release it gradually into groundwater. Human activities have destroyed and polluted many wetland habitats. We have built homes, shopping malls and factories on top of wetland areas. When ocean, lake or river levels rise, the excess water cannot go underground because the ground has been made impermeable, or solid, by concrete and asphalt. Instead, the water floods houses, roads and farmland. Many communities are beginning to realize how

References
<http://www.epa.gov/owow/wetlands/types/>
<http://vathena.arc.nasa.gov/curric/land/wetland/>
<http://www.uen.org/Lessonplan/preview.cgi?LPid=2484>
<http://dnr.state.il.us/lands/education/CLASSRM/AquaticLessons/U2L3A4.htm>
http://www.successlink.org/gti/gti_lesson.asp?lid=3300
<http://www.nhptv.org/Natureworks/nwep7f.htm>
<http://www.nwf.org/nationalwildlife/article.cfm?articleid=577&issuelid=46>
<http://www.dnr.state.mn.us/wetlands/>
<http://www.cotf.edu/ete/modules/everglades/FEwetlands1.html>
http://www.csc.noaa.gov/crs/ca/class_groups/essw.html
<http://www.deq.state.mi.us/documents/deq-ead-tas-wetland3.pdf>
<http://digitalsportsman.com/wetlands/plant.htm>
<http://www.physicalgeography.net/fundamentals/10t.html>
 Another Use For...101 Common Household Items: Vicki Lansky (The Book Peddlers, 1991)

important wetlands are to the environment and are trying to preserve them.

Wetland plants such as grasses, sedges and cattails reduce the impact of waves, currents and soil erosion. Their roots trap soil, preventing the loss of land. Wetlands also lessen the impact of coastal storms because tree roots are able to hold onto large amounts of soil. For this reason, coastal wetlands are often referred to as "speed bumps". However, wetlands along the southern coast of the United States in areas such as New Orleans have been deteriorating and shrinking for years because they no longer receive the large amounts of sediment and nutrients provided through natural river floods.

In addition, the building of shipping channels along the Mississippi River has caused saltwater from the Gulf of Mexico to penetrate freshwater wetlands. Plants and animals from freshwater wetlands are not salt-tolerant, meaning that they have not adapted to high levels of salinity from marine water flooding the wetlands. As a result, they are unable to control the amount of salt in their bodies, and are vulnerable to predation, competition from other species, sickness and death. As the loss of freshwater wetlands continues, future hurricanes will further damage the Gulf Coast region of the United States.

Curriculum Match-Up

- Use a Venn diagram to compare and contrast different types of wetlands. What plants and animals do they have in common? What are the differences?
- Write a magazine article about the importance of wetlands in your area.
- Do a mock interview of one of the wetland animals -- what does this animal have to say about what is happening in its habitat?
- Think of some of the ways that plants and animals would have to adapt in order to live in a wetland habitat. Adaptations can be physical (such as the size or shape of the teeth; the color, or the shape or type of the animal's body), or behavioral (activities that help an animal survive by avoiding predation or capturing prey). Make a list of your ideas in your student journals.
- Participate in a community project that improves habitats located near water sources such as wetlands.
- Get the New Jersey freshwater wetlands map from the NJ Department of Environmental Protection's Maps and Publications Office at (609) 777-1038, or, check to see if your public library has a GIS (Geographic Information System) to view the maps on its computer.

This lesson was funded in (whole or part) with federal funds from Title IV, Part B, 21st Century Community Learning Centers program of the No Child Left Behind Act of 2001 awarded to the New Jersey Department of Education.

Wetlands



wetland

Wetlands are low-lying areas of land that are covered by water for all or part of the year. There are different kinds of wetland habitats, including marshes, swamps, bogs, wet meadows, river overflow lands and tidal flats. Wetlands can be found in valleys and along the shorelines of oceans, lakes and rivers.

Wetlands provide many benefits to the environment. They are often described as the "kidneys" of the environment because they filter out sediment and pollution from the surrounding land, slowly releasing cleaner water into land and into neighboring bodies of water. Wetlands are densely populated with mosses and grasses that can absorb large amounts of water. These grasses help reduce the number of floods and effects of drought, hold soil in place to prevent erosion (wearing away), and protect land from drastic water level changes. Wetlands along the southern coastlines of the United States defend

the Gulf Coast against approaching hurricanes by depriving storms of warm ocean water and creating a physical barrier to flood waters generated by the storm.

Wetlands:

- are covered by water or have 'waterlogged' soil for all or part of the year. Waterlogged soil contains so much water that there is very little room for oxygen.
- have unique plants that have adapted (adjusted) to life in the wetlands. These plants can grow in soil with little oxygen.
- contain soil that is "hydric" (moist or wet). Wetland soil often does

not have enough oxygen for many types of plants to grow.

Wetlands are identified by:

- how long they are covered by water (year-round, when the tide is in, or during the rainy or growing season).
- the kind of plant life they support (grasses, mosses, shrubs or trees).
- by their water source (precipitation, surface water or groundwater). *Surface water includes ponds, streams, rivers, lakes, bays and oceans. Groundwater flows underground in spaces between soil, sand and gravel.*
- their salinity levels.

Learning Objectives

Students will:

1. Define what a wetland is and explain its important role in the environment.
2. Identify and discuss the characteristics that help aquatic plants and animals adapt to wetland habitats.
3. Build a model of a wetland habitat.

Vocabulary Ventures

adapt
 adaptation
 bog
 hydric
 marsh
 scrub/shrub
 swamp
 waterlogged
 wetland
 wet meadow

Time Needed to Conduct Investigation

This investigation has three parts.

Organize and set up materials: 10 minutes
 Introduce the lesson: 5 minutes
 Conduct the investigation: 35 - 45 minutes
 Student journaling/group reflection: 10 - 15 minutes
 Total estimated time: 60 - 75 minutes

Investigation: Wetlands Discovery

Materials

For groups of two to four
Student journals and writing tools

Part 1

- Small aluminum foil pan or food storage container
- 1 lb. Plasticine or Crayola clay
- Cellulose sponge with no scrub side cut to fit the pan
- ½ liter bottle of water or spray bottle of water
- Ruler (cm)
- Cup of potting soil
- Toothpicks or small craft (popsicle) sticks
- Permanent marker

Part 2

- Photos or pictures of different wetland habitats
- Photos or pictures of different wetland plants and animals

Part 1 Build a Wetlands Model

GET READY!

Inform students that they will create a model of a wetland to learn how it absorbs and filters water from the environment. Discuss some characteristics of wetlands and share the descriptions and photos of different wetlands and wetland plants and animals with students. Ask students to share some observations about the wetlands.

PROCEDURE

1. Students should measure the aluminum pan and divide the pan into three parts, identifying each part by marking a line on the side of the pan with a permanent marker.
2. Ask students to flatten a piece of clay and use it to cover 1/3 of the aluminum pan, being sure to seal the clay along the edges of the pan. This represents land.
3. Now, have students place the sponge firmly in the middle third of the pan. The sponge should fill the middle third of the pan and touch the edges of the pan.
4. Next, have students layer about 1 cm of the potting soil onto the clay bottom. This represents soil.
5. Leave the remaining third of the pan exposed/uncovered.



wetland model set-up

OBSERVE

Ask students to make and record the following observations:

- Which part of this model do you think represents the wetlands?
- How did you come to that conclusion?

PREDICT

Next, students will make it “rain” on their wetland model. First, they should predict what they think will happen when it rains. Remind students to record their predictions in their journals. Ask students:

- What do you think will happen when it rains on the wetland?
- Where do you think the water will go?

OBSERVE

Using the ½ liter water bottle or spray bottle, students should slowly pour water onto the land. Have students discuss the following observations with their partner. Ask students:

- What happened to the soil as you poured water onto the wetland model?
- What did you notice happening to the sponge as it “rained”?
- How do you imagine this model is similar to a true wetland habitat?
- What are the characteristics of a wetland? What items in your model represent some wetland characteristics?
- Explain why the sponge acts as a barrier. What part of a wetland has the same job?

After making observations, ask students:

- What would happen if you tried this experiment again without the sponge to act as a barrier?

Invite students to try the experiment again without the sponge. Have students remove the sponge and observe what happens when they pour water onto the soil. Ask students:

- What happened to the soil and the water after you poured water onto the model?
- What clues does this provide about the role of wetlands in the environment?

Part 2 Match-Making

Explain to students that they will now learn about plants and animals that make their homes in wetland habitats.

Show students pictures of different types of wetlands such as bogs, swamps and marshes. Read the description of each wetland type aloud. Ask students to match the pictures with the descriptions.

OBSERVE

Have students make and discuss the following observations:

- What characteristics do you observe about the different wetlands in each picture?
- What words would you use to describe these different wetland habitats?
- Can you identify the wetland that fits each description?

Now, show students some pictures of different types of plants and animals that live in or near wetlands. Ask students to try to match the plants and wildlife to each type of wetland. Have students make the following observations and record their matches in their journals:

- What characteristics do you see in the plants? What about the animals?
- Can you match the proper wetland to each plant, bird, fish, amphibian, and mammal?
- How much sunlight do you think each different wetland type receives?
- How does the amount of sunlight affect the plants and wildlife living in wetland habitats?



L. canadensis (Northern River Otter)