UT Extension
W 292-F

Environmental Science

Wonderful Wetlands

Project Area: Environmental Science

Skill Level: Intermediate

Learner Outcomes:

Be able to identify wetland characteristics

Be able to identify ecoservices provided by wetlands

TN Science Curriculum Standard GLEs:

S7. The Earth 0707.7.7.6

Success Indicator:

Students understand the ecological services a wetland provides and explain that wetlands are comprised of hydric soils, hydrophilic plants and water.

Science Skills: Design a model, observe, reflect

Life Skills: Observing, reasoning

Tags: Wetlands, water cycle

Materials

Sponge

Pillow (or pillow case)

Whisk

House (or photo of a house)

Bar of Soap

Colander

Food Packet

Bottle of Antacid Tables

Do you know all the wonderful powers of wetlands?

Wetlands are the kidneys of the earth, soaking up water and pollutants. To have a wetland, you need three things: soil, plants and water.

Term	Definition
Wetland	A landscape with unique soils, specialized plants and water.
Hydric Soils	Soil that is permanently or seasonally saturated by water.
Hydrophilic Plants	Plants that have adapted to living in aquatic environments.
Ecological Services	The benefits arising from the functions of a healthy environment.

Introduce Key Concepts:

Introduce the metaphor and allow the students times to interpret it: "Wetlands are the kidneys of the earth." Ask them what do kidneys do in our bodies. Relate the purpose of kidneys to that of wetlands in the landscape; wetlands filter out contaminants and toxins from water. Talk about how wetlands are unique features in the landscape that are created by the combination of hydric soils, hydrophilic plants, and water.

Many insects and amphibians depend on wetlands during various stages of their life, and many reptiles and mammals use wetlands for food and cover.

ACTIVITY, Part 1: Wetland Metaphors

Pass out only the first page of the activity guide (the one that shows the schematic of ecological services in the wetland). Refer to the figure at the bottom that shows all the different ecological services that a wetland may provide. Spread the materials out on a table and ask the students to each choose a metaphor item (or group students in pairs as needed). Explain that each item they hold is a metaphor for an ecological service that a wetland provides. Ask them to think about that service and then go around the group sharing about each metaphor item and the service it represents. Then pass out the remainder of the student guide and have the students answer the matching table below. Ask them if they can think of any additional services wetlands provide to us and to wildlife.

Answer key:

Sponge	**Resting place for migrating birds**
Pillow	**Purifies water of contaminants**
Whisk	**Removes sediment from water**
House	**Absorbs runoff and floodwater**
Bar of Soap	**Provides nourishment for wildlife**
Sieve (or colander)	**Habitat for wildlife**
Food	**Mixes nutrients**
Antacid tables	**Neutralizes acids**

Credits: Andrea Ludwig and Jennifer DeBruyn

The University of Tennessee Institute of Agriculture

Wonderful Wetlands

Materials

Foil box with rigid frame
Gravel, sand, soil
Trowel
Large sponge
Scissors
Spray bottle or small watering can
Spoon
Toothpicks
Foil

Activity, Part 2: Wetland in a Box!

Create a model with your students to show how wetlands act like sponges to soak up rainwater, filter runoff, and slowly release clean water into streams.

1. Gather materials and start with an empty foil baking pan placed on an incline (using a board on a book or something similar).
2. Place two heaps of gravel at the sides of the box, making two mountain peaks or hills.
3. Place a layer of sand between the two rock heaps, like a river channel. This gravel and sand base will be where most of the water gets captured during the demonstration.
4. Cover the entire box with a mixture of topsoil and clay and compact it down. Fill the pan enough so that the "ground" is below the lip of the pan so that water doesn't overflow the pan. Ask the students to help compact and smooth out the landscape with their hands. Make sure that water would flow from the peaks to the middle stream and over the lip of the pan
5. Use a watering can with small holes or a spray bottle to "rain" on the landscape. Allow the students to observe cloudy runoff from the mountains into the stream channel. Don't rain so much that the pan fills with water.
6. Now dig a small trench at the bottom of each mountain (but uphill from the sand in the valley) and place a piece of sponge at the bottom of each mound, between the peak and the valley. These represent the wetlands.
7. Secure sponge tightly against the soil surface with toothpicks. Make sure that the sponge is in tight contact with the soil surface (e.g. so water doesn't run under it).
8. Optional: Use aluminum foil and other materials (like moss from the yard) to create a unique watershed landscape. The aluminum foil acts like impervious surfaces (like concrete parking lots) and the moss acts like grasslands or prairie fields.
9. "Rain" again on the landscape.
10. Finally, remove the toothpicks and take out the "wetlands" (or sponges), and wring them out onto the white plastic tray. Observe the sediment, or cloudy water, that the wetland sponges had absorbed. Discuss how these wetlands absorbed the sediment and contaminants, protecting the stream from pollution.

Step 2. Laying the geology of the watershed.

Step 3 & 4. Creating the river or lake and adding the soil layer.

Steps 6 & 7. Adding wetlands to the watershed.

Credits: Andrea Ludwig and Jennifer DeBruyn

Environmental Science

Wonderful Wetlands

Do you know all the wonderful powers of wetlands?

Project Area: Environmental Science

Skill Level: Intermediate

Learner Outcomes:

⇒ Be able to identify three wetland characteristics.

⇒ Be able to list ecoservices provided by wetlands.

⇒ Be able to identify wetlands in their surroundings.

Science Skills: Make connections, observe, reflect

Life Skills: Observing, Valuing

Tags: wetlands, ecological services

⇒ Did you know that over half of the naturally occurring wetlands in Tennessee have been drained?

Wetlands are the kidneys of the earth, working to remove toxins and cleanse the landscape. Wetlands occur in low–lying areas in the landscape, and often around rivers, lakes and oceans. Wetlands are unique and a natural part of our environment.

Wetlands do many important jobs called *ecological services*. An ecological service is a benefit that we as humans get from the environment around us. Just as a dry cleaner provides the service of cleaning clothes, the environment provides services like cleansing water and giving wildlife places to live.

⇒ Wetlands are like sponges soaking up water and pollutants.

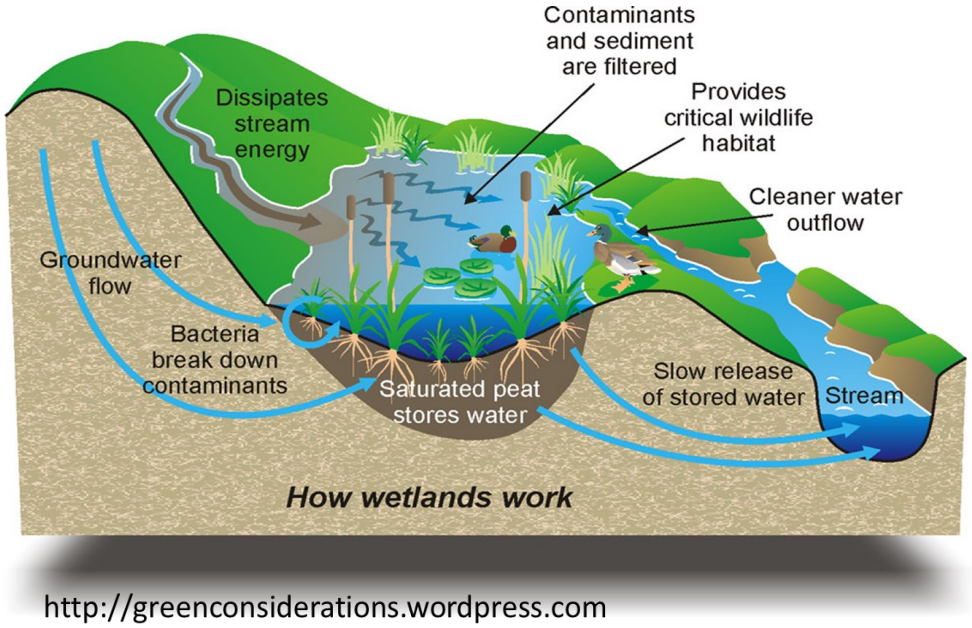
⇒ Wetlands are transitions, or *buffers*, between waterways and the surrounding land (such as fields, neighborhoods and forests).

⇒ Wetlands provide habitat for many different types of wildlife. Birds, amphibians, fish, insects, mammals, reptiles and many types of plants can be found in wetlands.

Did you know?

Wetlands have many names. They are also called:

⇒ Swamps
⇒ Marshes
⇒ Bogs
⇒ Fens
⇒ Quagmires
⇒ Bayou
⇒ Everglade



http://greenconsiderations.wordpress.com

Credits: Andrea Ludwig and Jennifer DeBruyn

Activity, Part 1: Wetland Metaphors

Many common household items are metaphors for ecological services provided by wetlands. Draw a line from the household item to the ecological service provided:

Household Item	Ecological Service
Sponge	Resting place for migrating birds
Bed	Purifies water
Whisk	Removes large sediment from water
House	Absorbs runoff and floodwater
Bar of Soap	Provides nourishment for wildlife
Sieve (or colander)	Habitat for wildlife
Food	Mixes nutrients and other compounds
Antacid Tablets	Neutralize

What makes a wetland a wetland?

There are three critical components of wetlands: **soil, plants** and **water**. Water is what makes wetlands wet. Wetlands may be saturated with water for the entire year, or permanently, or for only part of the year, or seasonally. The soil in a wetland is saturated with water either permanently or seasonally. These soils are called *hydric soils.* Plants that grow in wetlands are adapted to living in aquatic environments and can thrive in hydric soils. These plants are called *hydrophilic plants*. The soil and plants help perform the ecological services wetlands provide.

Before the settlement of America in the 1600s, there were more than 221 million acres of natural wetlands. About 85 percent of these wetlands have been lost due to human activities like farming, cities and industry.

Credits: Andrea Ludwig and Jennifer DeBruyn

Materials

- Foil baking pan
- Gravel
- Sand
- Soil
- Hand shovel
- Large sponge
- Scissors
- Spray bottle or small watering can
- Toothpicks
- Aluminum foil
- White plastic tray

Figure 2. States with notable wetland loss, 1780's to mid-1980's. *(Source. Modified from Dahl, 1990.)* www.usgs.gov

Activity, Part 2: Wetland in a Box!

Create a model to show how wetlands act like sponges to soak up rainwater, filter runoff, and slowly release clean water into streams.

How does the water moves across the clay, soil and sand as it "rains?" Does it always move downhill? Why or why not?

_____

Was your runoff water clean or dirty?

_____

What happened during the second "rain" storm? How did water move?

_____

What happened when the runoff hit the sponges? How did the sponges change the way water moved into the valleys?

_____

After you squeezed out the sponges, what did you see in the tray? What types of things did your wetlands absorb?

_____

Apply: Next time you are on a drive, look out the window and notice where you see wetlands. Do they have grasses, or shrubs, or trees, or all three? What kinds of ecological services are the wetlands providing your community? How can we help preserve wetlands?

ag.tennessee.edu

13-0164 08/15