Western Upper Peninsula Center
for Science, Mathematics and Environmental Education
A partnership of
Copper Country & Gogebic-Ontonagon Intermediate School Districts and Michigan Technological University
Serving schools and communities in Houghton, Baraga, Gogebic, Ontonagon and Keweenaw Counties

Wetland Ecology

Duration: 1-2 hours **Grade: 4**

Summary: Students will study wetland ecology by studying soil samples, indicator plants, and the hydrology of wet areas. Students will be able to describe the essential components of a wetland and classify wetland soils. *Standards:* SCI: I.1.3-4,6, II.1.4, III.5.2,4; MAT: II.3.E.6 ; III.1.E1 ; SOC : I.2.LE1 ; I.2.EE3.

Objectives

Students will:

1. Describe physical differences between wetland and upland soils.
2. Use keys to recognize wetland soils.

Materials:

- Sponge (Wetland metaphor)
- Pillow (Wetland metaphor)
- Egg beater (Wetland metaphor)
- Strainer (Wetland metaphor)
- Coffee (Wetland metaphor)
- Antacid (Wetland metaphor)
- Wild rice (Wetland metaphor)
- Soap (Wetland metaphor)
- Baby bottle (Wetland metaphor)
- Wetland sampling data sheets
- Magnifying glasses
- Pond sampling box
- Key to Soil Texture by Feel
- Soil Color Charts
- Wetland Plants of Ontario field guide

Background Information:

What is a Wetland?

Wetlands have:

• water • wet soils • water-loving plants (sedges, willow, cattails)

What are some other names for wetlands? Different wetlands types have different amounts of water and different types of vegetation. Some wetlands aren't even wet year-round!

• ***marsh*** - mostly water-loving rushes, sedges, grasses, and other

plants growing in the water. May dry up in late summer.
• ***swamp*** - mostly water-loving shrubs and trees
• ***pond*** - open bodies of water less than 20 acres in size, with some floating vegetation around edges.
• ***bog*** (acidic) or ***fen*** (alkaline) - floating mat of vegetation
• ***vernal pond*** or spring puddle (results from spring rains and snow melt, eventually disappears in summer)

Wetland Benefits & Functions

- Act like giant sponges to soak up water, reduce floods, and recharge groundwater.
- Provide resting place for migrating birds.
- Filter out pollutants, trap sediments, and improve water quality.
- Provide water, food, protective cover and breeding areas for wildlife.
- Reduce soil erosion by slowing runoff from storms and spring runoff.
- Provide nursery areas and protection for fish.
- Supply agricultural products for people: cranberries, peat, blueberries
- Provide recreational, educational, and scientific study opportunities.

Wetland Soils

There are many different kinds of soil. How is soil made? Explain that most soil types are well-drained, and not in wetlands. However, soil that is in wetlands is always wet, and is physically different from other soils.

Wetland soils are saturated long enough in the growing season that they become "anaroebic" in the upper layers. These soils cannot hold much oxygen, if any. This leads to chemical rxns that affect the color of the soil.
There are 3 main kids of wetland soils:

- Organic Soils: contain noticeable amount of decomposed plants (10%+). In waterlogged spots, organic material accumulates. The lack of oxygen leads to decrease in bacterial decomposition, and plants don't decompose like they do in aerated situations. Wet organic soils look like black much or black to dark brown peat.

- Mineral Soils: Usually consist of a wide range of materials such as sand, silt, and clay. Mineral wetland soils can be gleyed or mottled. Gleyed soils are usually formed when the soils are saturated all of the time (anaerobic). These soils are usually neutral gray, greenish, or bluish gray.

- Mottled Soils: Formed in areas that have wet (anaerobic) conditions, followed by periods of dry (aerobic) conditions. These conditions alternated continuously, possibly seasonally. The soil color often includes concentrated splotches of brown, orange, red, or yellow. When very wet, minerals such as iron and manganese collects in spaces in the soil. When air moves into the soil during dry periods, these mineral concentrations oxidize. The iron rusts, leaving a permanent indicator of this process. Oxidized iron concentrations are various shades of red, orange, and yellow, while manganese mottles are black.

Wetlands Provide Habitat for Wildlife
Wetlands provide **habitat** for lots of different animals.

What are the 4 parts of habitat?
• food • water • shelter • space
These must be in the proper amounts and arrangement for each type of plant or animal, i. e. . too much water v. too little water. Different animals have different needs for space, i. e. bear v. ant.
Lots of different kinds of plants and animals live in a wetland habitat. Let's list some:

frogs	turtles	birds	beaver	alder	cattails
tadpoles	fish	insects	moose	willow	sandhill crane
sedge	water lily	algae	duck weed	heron	Canadian geese

(encourage students to research additional plants and animals that live in wetlands)
Wetlands contain the most biodiversity. Why? There are so many niches that animals can occupy in wetlands.

Activities:

Wetland Functions
Wetlands help wildlife and people in lots of different ways. Play ***Wetland Metaphors (attached – from WOW? The Wonders of Wetlands).*** Divide students into groups. I have a bag with different objects inside that remind us how wetlands help people and/or wildlife. Each group is going to take turns picking an object out of the bag. Each group will tell us how the object could represent what a wetland is or does.

Sponge = soaks up water, helps prevent floods, adds to Groundwater.
Pillow = resting place for migrating birds. Wetlands are like MOTELS for migrating birds.
Egg beater = mixes nutrients and oxygen into the water.
Strainer = strains out dirt; keeps water clean.
Coffee filter = filters out pollution; keeps water clean.
Antacid = takes away (neutralizes) effect of acid rain.
Wild rice or cereal = provides food for wildlife and people. **W**etlands are like RESTAURANTS for wildlife.
Soap = helps clean the environment.
Baby bottle = wetlands are NURSERIES for raising baby insects (larva) and baby animals because there are lots of plants for hiding/shelter, food, and water nearby for drinking.

Pond/Wetland Sampling Activity
Today, we are going to be wetland scientists. What is a scientist (someone who asks questions and investigates to find answers). What do scientists use to study? They have special tools (sampling equipment - nets, magnifying glasses) and they look in books (field guides) to find out more about what they find.

Working in teams of two, lets find out what lives in this pond/wetland. Each team will get a net or scoop, and a tub/container to hold water. After 20 minutes of sampling, each student describes one organism/critter that they found.

Materials Needed:
Pond sampling equipment
Data forms

Summarize
Rephrase objectives as questions.