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Lesson Plans in Conservation of Earth's Natural Resources

Per the NGSS standards revision on April 16 2016

MA DESE template

Strand: Earth's Systems

Standards Covered: 7.MS-ESS2-2 and 7.MS-ESS2-4

Essential Question: How is a Wetland classified?

Introduction:

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season (US EPA). Wetlands are found throughout the state, from the Atlantic coast to the Berkshires. Wetlands help to clean water supplies, prevent flooding and storm damage, act as a nursery to wildlife and a habitat to many species.

Coastal wetlands are directly adjacent to the ocean and include salt marshes, dunes, intertidal areas and barrier beaches. Wetlands that are inland are where the water is at or just below the surface of the ground. These wetlands may appear dry during some seasons, but they contain enough water to support certain species of plants and animals. Inland wetlands include marshes, wet meadows, bogs, swamps and vernal pools.

In 1973 the benefits of wetlands were acknowledged at the first wetland conference. Since Colonial times, almost one third of Massachusetts' wetlands have been destroyed. (Mass.gov)

Note: Students could research that the first wetland protection laws were adopted in the early 1960s. The MA Wetlands Protection Act, Chapter 131, Section 40 was enacted in 1972, giving conservation commissions the regulatory responsibility to implement the Act.

They could also research that cities like Boston were all filled in marsh in Colonial times.

Land claims for recreational or commercial building use often appear in court or as bills in the legislature. One way to designate whether a piece of property is a wetland is by soil classification. These areas are usually flooded, saturated or partially covered by water. The upper soil layers then lack oxygen and become *anaerobic*. The anaerobic soil has different colors and textures and odors than terrestrial (land) soils. The color of soil can identify the area as a wetland, even if the area is dry.

Note: Students could research the different types of soils found in a wetland (organic soil which is black and mucky and the mineral soil which is clay, sand or silt)

They could also research that Geologists classify any soil as a non-renewable resource as it can take 500+ years to form an inch of topsoil. This is an opportunity to discuss the glacial origins of Cape Cod and addresses the standard 7.MS-ESS2-2 on the Earth's changing surface.

Content vocabulary:

Anaerobic, aerobic, organic, wetlands, ecosystem

Materials:

Shovel, clipboards with data tables (They can be made with a cedar shingle and a clothespin if not available), a cellphone or camera, pencils, a heavy duty roasting pan to carry the soil profile or soil samples from each layer back horizontally to school or to place on the ground for observation, a meter stick

The Data Table should contain the location, time of day, animals and plants observed, areas to record the texture, color, wetness, odor of each layer of soil, a space to draw the soil profile, the measured depth of each layer and the weather.

Procedure:

If possible, dig a hole that is 60 cm or 2 feet deep. Record observations of the layers and take photos. An alternative is to take a core sample, by using a piece of PVC pipe and driving it into the soil with the shovel. This can be carried back to the classroom and cut open with a hacksaw or push out with a dowel. Please note that there is one sample needed per class.

Results and Discussion:

1. How were the layers different in your soil profile?
2. Can you explain why the layers were in that particular order?
3. Was the soil aerobic or anaerobic? What was your evidence?
4. Wetlands are vital pieces of land as an important *ecosystem*. Just from your observations outside today, what do you observe that supports that statement?

Further Extensions:

If wetland areas are not close by, this activity can be done in other areas such as a meadow or forest or even in the lawn area behind your school.