

Is it a Wetland? Soil Horizons

Teacher's Guide

Subject: Integrated Science (Life; Earth-Space; Physical)

Topics: Wetlands, Soil, Abiotic Factors, Classification

Summary: Students examine and classify the soil at two different locations along the nature trail to determine which site is a wetland.

Objective(s): After completing the field lab, students will be able to:

1. Identify wetland soil based upon its characteristics (moisture, texture, etc.)
2. Discuss the advantages and any disadvantages of wetland areas

Ecosystem(s): Freshwater Wetlands, Uplands

Equipment:

- soil probe
- Munsell charts (10YR)
- GPS
- Sand Gauge Card
- data sheet & pencil
- meter stick
- Petri dishes
- tables
- spray bottle
- cardboard

Background (Pre-field Classroom Activity)

- Reference Material: Soil profiles and horizons introduction, Wetlands of Florida (poster), *Wetland Soils in Living Color, Part I*(Project WET), Fabulous Wetlands (Video)
- Vocabulary: Crossword, Vocabulary, Word Search (Pre-activities)
- Equipment: Munsell Color Chart, GPS Practice Activity

Field Lab Procedure/Steps

1. Just by looking around you, write down whether this is a wetland or not. How can you tell?
2. Students are divided into two groups. Both groups begin at the first location along the nature trail.
3. Half the students move to the left of the boardwalk to examine the 60 cm deep **soil profile hole**.
Note that a meter stick has been placed vertically inside the pit.
4. Students look closely at the face of the pit to observe the different horizons (layers) marked with golf tees.
5. Students record the depth in centimeters where each horizon begins and ends. Also at this time students should record the presence of rust streaks or dark mottles under Color.
Note: Students may not observe 4 layers when examining the profile. If standing water is observed in the hole, record the last visible measurement followed by the words “water table” under depth.
6. The other group will be to the right of the boardwalk using a **soil probe** to extract three 20 cm cores from the same hole. Mark the location the probe is used with a flag so that the same hole can be located again.
7. Students place the cores on a labeled piece of cardboard in the same order and direction in which they were removed from the ground, then separate the soil into the different observable layers.
8. Students **swap activities** then both groups move to the tables carrying the cardboard with their samples.
9. Once situated at the tables, students place soil from each layer in the corresponding Petri dish.
10. Students at **Table 1** use the *Munsell Color Chart* to find the closest match to the soil in each dish. The corresponding numbers along the left and bottom of the chart are recorded as value/chroma (i.e.: 5/2)
Again, students should record the presence of rust streaks or dark mottles if observed in any of the layers.
11. Students then refer to the *Color Name Diagram* to get an accurate color description (i.e.: grayish brown).
12. Next, the soil from each dish is squeezed tightly in the hand to determine its’ moisture. Record “wet” if water squeezes out, “damp” if soil holds its shape or “dry” if sample will not hold shape and crumbles.
13. At **Table 2** students mist each sample lightly with water then rub a small amount between the fingers to determine how it feels. Record texture as gritty, slippery, sticky or some combination (i.e.: gritty/ slippery).

14. Determine content as follows; if gritty = sand, if slippery = silt, if sticky = clay or if gritty with organic material (bits of plants) mixed in = topsoil.
15. Using their clean hand, students feel the different grain sizes on the left side of the sand gauge card and compare to the sample in their other hand. Record grain size as coarse, medium, fine or very fine.
16. Students **swap tables**, following same procedures described above.
17. Students remain in the same groups, move to the second location and repeat steps 2 – 15.

Sunshine State Standards

Science: SC. A.1.3.1; SC.D.1.3.1-4; SC.G.1.3.4-5; SC.G.2.3.2-3; SC.H.1.3.4-7; SC.H.2.3.1

Language Arts: LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1

Mathematics: MA.B.2.3.1;

Social Studies: SS.A.6.3.2; SS.B.2.3.9

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Student Data Sheet

General Information

Full Name:		Date:	
School (teacher):		Time:	

Student Hypothesis and Rationale:

If soil type is determined by color texture and moisture, than I hypothesize that I (Choose one: **will/will not**) observe difference between an upland soil and a wetland soil because... _____
 _____.

Field Observations/Measurements/Data

Location 1:

Latitude:	Longitude:
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Soil Profile and Core (Identifying different layers)

Distinct Layers or Horizons (measured in cm from the surface)	Soil Profile (existing soil pit)	Soil Core (extracted by students)

Table 1 (soil color and moisture)

Layer or Horizon (from soil core info above)	Munsell Chart (value/chroma)	Munsell Chart Color Description	Moisture (wet, damp or dry)

Table 2 (soil texture and composition)

Layer or Horizon (from soil core info)	Texture (gritty, slippery, sticky)	Content (Sand, silt, clay, or topsoil)	Grain Size (coarse, medium, fine, or very fine)

Location 2:

Latitude:	Longitude:
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Soil Profile and Core (Identifying different layers)

Distinct Layers or Horizons (measured in cm from the surface)	Soil Profile (existing soil pit)	Soil Core (extracted by students)

Table 1 (soil color and moisture)

Layer or Horizon (from soil core info above)	Munsell Chart (value/chroma)	Munsell Chart Color Description	Moisture (wet, damp or dry)

Table 2 (soil texture and composition)

Layer or Horizon (from soil core info)	Texture (gritty, slippery, sticky)	Content (Sand, silt, clay, or topsoil)	Grain Size (coarse, medium, fine, or very fine)

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Assessment

1. What was the color, texture, and moisture of the third layer or horizon in Location #2 (refer to your data sheets)?

2. Did either of the two locations have gleyed soil (mottled or marked with blotches or patches of color) or have wet soil?

3. Do your data support your hypothesis? Whether your hypothesis was supported or not, what can you infer from your observations, measurements, and results?

4. If wetlands are found near water bodies such as rivers and lakes, where else might we find wetlands?

5. If wetlands help to capture, store, and slowly release excess water in the environment, what would happen if we removed wetlands from a particular area?

Portfolio Journal Prompt

Plants that live in wetlands have to adapt to regular periods of being flooded or immersed in water. Before you begin writing think about if you were a plant that lived in wetlands. Describe some of the structures and mechanisms you would want to have to survive these conditions?