SOILS

Soils – Learning Station Topics

1. Soil Formation

Study how the 5 soil forming factors (climate, living organisms, parent material, topography, time) influence soil appearance and properties. Learn the how these factors affect the appearance of forest and prairie soils. Learn to identify basic soil horizons (O,A,E,B,C) and which are organic layers, topsoil, subsoil, and unweathered zones. Become acquainted with alluvial and glacial landforms and hillslope positions.

2. Soil Properties

Study basic soil properties such as texture, structure, and color. Learn how soil scientists determine the color of soil. Learn and practice the "feel' method of texturing a sample. Be able to identify the difference between loamy sand, loam, clay loam and organic soils. Learn how to use a textural triangle. Study the influence of texture on permeability. Study the color characteristics of horizons that are saturated with water for extended periods during the growing season. Study how this "high water table" affects root growth. Be able to identify peat soil and how it's formed. Learn how soil properties affect septic systems, dwellings with basements and other land uses common in your area.

3. Interpretive Soil Resource Data

Student needs to gain an understanding of "raw data" as Ksat, % clay, bulk density, plasticity, pH, or soil moisture status by month and how these properties link with soil interpretations. Understand depth to depleted matrix color and Fe concentrations directly related to soil moisture status. Be familiar with how these depleted matrix color and Fe concentrations directly relate to the interpretive table for on-site septic system "standard trench vs. mound system". Learn how to use the Web Soil Survey or study a Soil Survey report for your County or local area. Learn about soil maps and other soil information that can be found in the report.

4. Environmental/Economic Impacts from Soil Erosion

Not only economic impacts on the field where the soil came from (in lower yields) but environmental and economic impacts on where suspended sediment goes once it runs off the field (ditch to tributary to major river). Degradation of fisheries downstream from "the field" affects livelihood of others. Learn to identify types of soil erosion. Study the influence of slope on runoff and water erosion. Study effects of soil erosion on water quality and land use. Be able to identify some basic conservation practices that control soil erosion in both an agricultural and urban setting. Learn about essential plant nutrients and how to read a fertilizer recommendation. Learn about cover crops and green manure.

5. Soils Relating to Career Opportunities

Know how soils relate as a medium for growth for agriculture, as a structural foundation for construction, as a binding site for chemicals, and as a marker for geologic processes. Know the importance of soils and how their used in science and engineering for building and construction of roads, best management practices, septic systems, housing, etc…

Soils – Resource Materials List

1. United States Department of Agriculture. 1994. "From The Surface Down – An Introduction to Soil Surveys For Agronomic Use". Soil Conservation Service. (available from local or State Natural Resources Conservation Service offices and on the web)
http://urbanext.illinois.edu/soil/Surface/surdown.pdf

2. The 2000 Soil Survey report for Rice County, MN. Become familiar with the area around North Alexander Park, Faribault, MN. This should be available at the public library or from your

local Soil and Water Conservation District (SWCD). The web based soil survey manuscript is also available at: http://soils.usda.gov/survey/online_surveys/minnesota/

3. More information on soils from the USDA. Be sure to check out the web soil survey website: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

ftp://ftp-fc.sc.egov.usda.gov/NSSC/GDS/GDS_v4_11.pdf

http://soils.usda.gov/education/

4. New Jersey Envirothon Soils Training Website:
http://www.nj.nrcs.usda.gov/partnerships/envirothon/soils
This is an excellent site with information on Soils, Aquatics, Forestry, and Wildlife. There are links to the national Envirothon web site. Study points and study guides are available.

5. A good website from the University of Minnesota:
http://www.swac.umn.edu/classes/soil2125/doc/labunts.htm

The following websites are interesting, but are not critical

6. Various USDA publications that may be available from any SWCD office:
- "Soil Erosion By Water" – Agricultural Information Bulletin 513
- "Soil Erosion by Wind' – Agricultural Information bulletin 555
- "Buffer Strips: Common Sense Conservation" (pamphlet)
- "Conservation Choices" (pamphlet)
- Some urban erosion control practices:
http://www.metrocouncil.org/environment/Watershed/BMP/CH3_BMPIntro.pdf

7. Soil Biology: http://soils.usda.gov/sqi/concepts/soil_biology/biology.html. From this site, information on soil biology (including a Soil Biology Primer, and Soil Quality can be obtained. This is an excellent reference.

8. Minnesota Pollution Control Agency:
www.pca.state.mn.us/index.php/water/water-types-and-programs/water-nonpoint-source-issues/nonpoint-source-issues.html

www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/low-impact-development-stormwater-management.html?menuid=&redirect=1

www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/minnesota-s-stormwater-manual.html

www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/stormwater-best-management-practices-manual.html

www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/assessment-and-listing/303d-list-of-impaired-waters.html

9. Environmental Protection Agency:
www.epa.gov/owow/NPS/lid

www.epa.gov/owow/NPS/lid/costs07/q-and-a.html

www.epa.gov/owow/NPS/qa.html