

SOILS STATION
Minnesota State Envirothon 2013

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 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.

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. Soil Erosion and Soil Conservation

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 such as nitrogen (N), phosphorus (P), and potassium (K). Learn what “green manure” is and what cover crops are.

4. Soil Survey and Landuse Interpretations

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. Learn about the level of detail that the report is suited for. For example if you can identify soil conditions within 1 acre or just over several acres.

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)

ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational_Resources/surdown.pdf

2. Soil Survey report for a County or area near you. Preferably newer than 1970. These should be available at the public library or from your local Soil and Water Conservation District (SWCD)
3. Web based soil survey information: (Web Soil Survey)

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

4. 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: ftp://ftp-fc.sc.egov.usda.gov/IL/pdf/pubs/Urb_ErosSedim_Control08.pdf

5. Thein, Steve J. 1979, “A Flow Diagram For Teaching Texture – By Feel Analysis” – Journal of Agronomic Education. 8:54-55.

On web at: <http://soils.usda.gov/education/resources/lessons/texture/>

6. Info. on soils from USDA: <http://soils.usda.gov/education/>