

SOILS STATION STUDY GUIDE

2014 STATE ENVIROTHON

Learning Station Topics

1. Soil Formation

Study the 5 factors of soil formation (climate, living organisms, parent material, topography, time) and the 4 processes of weathering (additions, losses, translocation, transformation). Learn how these factors and processes affect the appearance of a highly weathered Minnesota soil formed under forest vegetation versus a less weathered soil formed under grassland vegetation (prairie). Learn to identify basic soil horizons (O,A,E,B,C) and which are organic layers, topsoil, subsoil, and unweathered zones. Identify the Minn. State Soil and determine its relative crop productivity and parent material. (resource items 1, 8, 9)

2. Soil Properties

Study basic soil properties such as texture, structure, and color. 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 and “anaerobic” for extended periods during the growing season. Study how saturated soils affect various land uses. 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. (resource items 1,2, 3, 7, 8, 9)

3. Soil Conservation and Soil Health

Learn to identify types of soil erosion and how they are affected by slope steepness and length, texture, structure, and permeability. Study effects of soil erosion on water quality. Be able to name some conservation practices that control soil erosion in both agricultural and urban settings. Learn about essential plant nutrients such as nitrogen (N), phosphorus (P), and potassium (K). Learn what cover crops are and how soil health is improved through: keeping the soil covered, increasing diversity in the crops grown, minimizing soil disturbance from tillage, and keeping living roots in the soil. Learn about some vital functions that soils perform. (resource items 4, 5, 6, 8, 10, 11, 12)

4. Soil Survey and Land Use Interpretations

Learn what a “land use interpretation” is and use the Web Soil Survey to make one. (res. items 1, 2)

Resource Materials List

1. Soil formation, soil properties, interpretations, and soil survey: “From The Surface Down – An Introduction to Soil Surveys For Agronomic Use”:
ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational_Resources/surdown.pdf
2. Web based soil survey information: (Web Soil Survey):
<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
3. Soil Risks and hazards: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052508.pdf
4. Soil Erosion – Causes and Effects: <http://www.omafra.gov.on.ca/english/engineer/facts/12-053.htm>
5. Soil Conservation practices on agricultural land: http://runoffinfo.uwex.edu/pdf/farm_lofarmla.pdf
6. Some urban erosion control practices: ftp://ftp-fc.sc.egov.usda.gov/IL/pdf/pubs/Urb_ErosSedim_Control08.pdf
7. Flow diagram for soil texturing: <http://cmase.pbworks.com/f/Soil+Texture+By+Feel.pdf>
8. Soils information from USDA: <http://soils.usda.gov/education/>
9. Soil fundamental concepts (power point and handout):
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051950.pdf

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052549.pdf
10. Info. on soil health: http://soilcarboncoalition.org/files/21st_century_soil_health_factsheet.pdf
11. Good soil health videos:
<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1048858>
12. Plant nutrients: <http://www.ncagr.gov/cyber/kidswrld/plant/nutrient.htm>