

Soils/Geology Learning Objectives & Resources

1. Recognize soil as an important resource.
 - ◆ *Soil Quality Concepts* – USDA Natural Resources Conservation Service (NRCS)
http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/co/home/?cid=nrcs144p2_063020
 - ◆ *Soil Quality Introduction* (Soil Quality Information Sheet) - USDA NRCS
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052207.pdf
 - ◆ *Helping people Understand Soils – Ten Key Messages*
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052550.pdf
 - ◆ *Sustaining Our Soils and Society – American Geological Institute, Chapter 1*
<http://www.americangeosciences.org/sites/default/files/soils.pdf>
2. Describe basic soil properties and formation factors.
 - ◆ *Bedrock Geology of Michigan* – Michigan Dept. of Natural Resources
http://www.michigan.gov/documents/CGI_1987_Bedrock_Geology_8X11_128879_7.pdf
 - ◆ *Geology of Michigan in Brief Soil Quality Information Sheets* – USDA NRCS
<http://soils.usda.gov/sqi/publications/publications.html>
Scroll down until you see the gray shaded box with the following title: “Note 8: Soil Quality Information Sheets”. There are fifteen information sheets total, starting with Soil Quality Introduction and ending with Salinization.
 - ◆ *Texture Flow Diagram & Textural Triangle* USDA, NRCS
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054311
 - ◆ *Characteristics of the Major Textural Classes*
http://www.crowcanyon.org/ResearchReports/FieldManual/34_Table_01.pdf
 - ◆ *Soil Formation & Classification* - USDA NRCS
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054278
 - ◆ *The Glacial Lakes around Michigan*
http://www.michigan.gov/documents/deq/GIMDL-BU04pixs_216120_7.pdf
 - ◆ *Sustaining Our Soils and Society – American Geological Institute, Chapter 1*(see link above)
 - ◆ *Urban Soil Primer – USDA NRCS, Chapter 2*
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052835.pdf
3. Understand soil drainage classes and know how wetlands are defined.
 - ◆ *Supplemental Key for the ID of Soil Drainage Class* USDA NRCS
<ftp://ftp-fc.sc.egov.usda.gov/ME/tech/NRCS%20Drainage%20Key.pdf>
4. Determine basic soil properties and limitations, such as mottling and permeability, by observing a soil pit or soil profile.
 - ◆ *A Guide for Land Judging in Michigan Part 1: Physical Features of Soil*
<http://macd.org/ME/Resource%20Material/Soils%20and%20Geology/A%20Guide%20for%20Land%20Judging%20in%20Michigan.pdf>
 - ◆ *The Twelve Orders of Soil Taxonomy – USDA NRCS*
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_053588
5. Identify types of soil erosion and discuss methods for reducing erosion.
 - ◆ *Soil Erosion* (Soil Quality Information Sheet) – USDA NRCS
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051278.pdf
 - ◆ *Water Erosion* (Soil Quality Information Sheet) – USDA NRCS
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051599.pdf
 - ◆ *Sediment Deposition on Cropland* (Soil Quality Information Sheet) – USDA NRCS
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052488.pdf

6. Utilize soil information, including soil surveys, in land use planning.
- ◆ *Online Soil Survey Manuscripts*
<http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=MI>
Find your county and click for specific information.
 - ◆ *Web Soil Survey*
<http://websoilsurvey.nrcs.usda.gov/app/>
 - ◆ *A Guide for Land Judging in Michigan* – MSU Extension
<http://archive.lib.msu.edu/DMC/Ag.%20Ext.%202007-Chelsie/PDF/e326.pdf>
 - ◆ *Land Judging in Oklahoma* http://www.landjudging.com/2009/land_judging_manual_2009.pdf
 - ◆ *Important Facts About Land Descriptions*
<http://www.rockfordmap.com/Submitted-Content/ImageGallery/Facts%20About%20Land%20Descriptions.pdf>
 - ◆ *Topographic Maps*
<http://macd.org/ME/Resource%20Material/Soils%20and%20Geology/Topographic%20Maps.pdf>
7. Discuss how soil is a factor in, or impacted by, non-point source pollution.
- ◆ *Managing Soil Organic Matter* – USDA NRCS Soil Quality Institute
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050965.pdf
 - ◆ *Sustaining Our Soils and Society* – American Geological Institute, Chapter 5
<http://www.agiweb.org/environment/publications/soils.pdf>
 - ◆ *Urban Soil Primer* – USDA NRCS, Chapter 3
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052835.pdf

Additional Internet Resources for Soils/Geology

USDA Natural Resources Conservation Service Soils

<http://soils.usda.gov/>

The Nitrogen Cycle – MSU Extension

http://msue.anr.msu.edu/news/the_nitrogen_cycle_explaining_where_your_lost_nitrogen_is_going

Kalkaska: Michigan State Soil

http://www.michigan.gov/documents/hal_mhc_mhm_kalkaska-sand_63853_7.pdf

Basic Biological Factors of Soil Carbon and Nitrogen

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051926.pdf