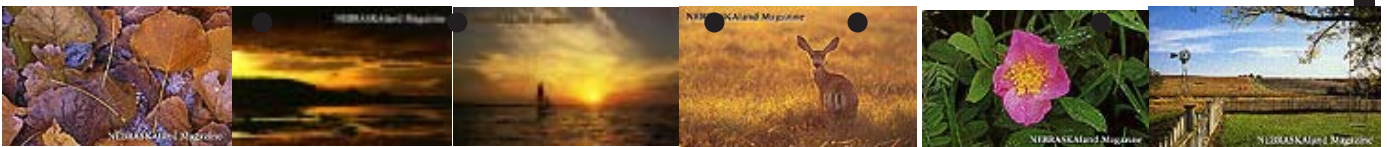


# Soil

*Information Provided By:*  
**Natural Resource Conservation Service**  
**Nathan McCaleb**



policy range aquatics soil forestry wildlife

# Start “digging” Soils



Did you know that dirt, mud, ground, and soil – are mixtures of minerals and organic particles of varying sizes and matters. These particles comprise about 50 percent of the soil’s volume while pores containing air and water fill the remainder. Because soil is so common, it is often taken for granted even though life as we know it exists because of the soil. Soil is the basis for our food and fiber production; the foundation for our roads, schools and churches. One spade full of soil supports more species of organisms than can be found in the entire Amazon rain forest. Soil supports life.

## **Here in Nebraska...**

Soil is a very important natural resource. As you look around on your drive home from school, notice all of the plant growth. In order for these plants to grow, they take in water and the roots absorb the proper amount of nutrients and oxygen from the soil. Just think of all of the fields and gardens in Nebraska that produce food for the whole world. Not only does soil support plant growth, but it also provides a foundation for the school that you attend. Soil is all around. By understanding soil characteristics, you will be better able to identify the importance and necessity of conserving our soil.

**That is why it’s time to start “digging” Nebraska’s soil!**

# Soils

\*Questions and References located in back of this Section\*

## Objective #1: What is Soil?

### **Principles to Know**

--Definition of Soil

--Soil Forming Factors

<http://soils.usda.gov/education/facts/formation.html>

1. Parent Material

2. Processes of Development (Distinct Soil Horizons) [ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational\\_Resources/surdown.pdf](ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational_Resources/surdown.pdf)

3. Soil Orders <http://soils.ag.uidaho.edu/soilorders/> [http://soils.usda.gov/technical/soil\\_orders/](http://soils.usda.gov/technical/soil_orders/)

## Objective #2: Soil Characteristics

### **\*Look these up and understand them\***

—Composition —Chemistry (pH, Cat-ion Exchange Capacity Reduction and Oxidation)

—Texture —Horizons/Profile [http://soils.usda.gov/education/resources/k\\_12/lessons/profile/](http://soils.usda.gov/education/resources/k_12/lessons/profile/)  
[http://soils.usda.gov/education/resources/k\\_12/lessons/texture/](http://soils.usda.gov/education/resources/k_12/lessons/texture/)

—Structure —Permeability/Percolation <http://soils.usda.gov/technical/manual/contents/chapter3g.html>

—Slope —Soil Water & Drainage <http://soils.usda.gov/technical/manual/contents/chapter3a.html#6>

—Color <http://soils.usda.gov/technical/manual/contents/chapter3f.html#55>

### **Reference Material**

[ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational\\_Resources/concepts.ppt](ftp://ftp-fc.sc.egov.usda.gov/NSSC/Educational_Resources/concepts.ppt)

## Objective #3: Soil Maps

--Soil Series (A level of Soil Taxonomy) <http://soils.usda.gov/technical/manual/contents/chapter2a.html#2>

--Map Symbols (Soils as they are mapped on a Landscape in nature) <http://soils.usda.gov/technical/manual/contents/chapter2b.html#3>

--Slope Classes (A grouping of Soil Slopes)

--Soil Survey Reports

1. What are they

2. How to use them

[http://soils.usda.gov/education/facts/soil\\_survey.html](http://soils.usda.gov/education/facts/soil_survey.html)

<http://soils.usda.gov/technical/manual/contents/chapter1.html>

## **Objective #4: Soil Use**

- Agriculture
- Forestry
- Wildlife Management
- Recreation
- Building Site Development
- Conservation Planning

### **Reference Material**

\*Use Reference #14

## **Objective #5: Erosion and Sedimentation**

- Definitions
- Types of Erosion
- Economic Impacts
- Prevention

### **Reference Material**

<http://soils.usda.gov/technical/manual/contents/chapter3b.html>

<http://soils.usda.gov/technical/manual/contents/chapter3b.html#18>

<http://ianrhome.unl.edu/search.shtml>

<http://www.maf.govt.nz/MAFnet/schools/kits/soil/html>

## **Objective 6: Hydric Soils**

- Definition
- Characteristics
- Uses/Limitations
- Economic Value

### **Reference Material**

\*Check out reference #3

\*<http://www.ianrhome.unl.edu/search.shtml>

# Get your hands dirty and start “digging” for information!

The references listed below are some that will play an important part in learning about soils and preparing for the Envirothon Contest.

1. National Soil Survey Center - <http://soils.usda.gov/>
2. Soils Data- <http://soils.usda.gov/survey/nscd/>
3. Official Series – Holdrege series  
<http://www2.ftw.nrcs.usda.gov/osd/dat/H/HOLDREGE.html>
4. USDA – NRCS, Nebraska - [www.ne.nrcs.usda.gov](http://www.ne.nrcs.usda.gov)
5. Soil Survey Manual - <http://soils.usda.gov/technical/manual/>
6. Keys to Soil Taxonomy [http://soils.usda.gov/technical/classification/tax\\_keys/](http://soils.usda.gov/technical/classification/tax_keys/)
7. “The Nature and Properties of Soils, 11th Edition”, Brady, Nyle C. and Weil, Ray R., Prentice Hall Press, 1996
8. “PCA Soil Primer”, Portland Cement Association –
9. Soil and Water Conservation Society— <http://www.swcs.org/>
10. Tools for educators [http://soils.usda.gov/education/resources/k\\_12/tools.html](http://soils.usda.gov/education/resources/k_12/tools.html) –
11. Soil Facts- <http://soils.usda.gov/education/facts/>
12. S K Worm answer your questions about soil and stuff <http://www.nrcs.usda.gov/feature/education/squirm/skQstns.html>
13. Soils Glossary <http://www.soils.org/sssagloss/?check>
14. Local Soil Survey Reports – contact local county NRCS offices for a copy.
15. Institute of Agriculture and Natural Resources Website at:  
<http://ianrhome.unl.edu/search.shtml>
16. Web soil survey <http://websoilsurvey.nrcs.usda.gov/app/>

## Sample Questions

1. Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. One of the most important soil properties that affect the available water capacity is:
  - a) the amount of rainfall the soil receives
  - b) the flooding frequency of the soil
  - c) the type of bedrock
  - d) the soil texture (the % of sand, silt, and clay in the soil)
2. Which of the following soil textures probably has the highest permeability?
  - a) loamy sand
  - b) sandy loam
  - c) silt loam
  - d) loam
3. Which of the following factors does not affect the permeability of the soil?
  - a) soil texture
  - b) depth to soil water table
  - c) size of soil pores
  - d) soil structure
4. Which of the following is not one of the five factors of soil formation?
  - a) time
  - b) topography
  - c) climate
  - d) parent material
  - e) all of the above are factors of soil formation.
5. The relative proportions of sand, silt, and clay particles in a mass of soil is called?
  - a) soil permeability
  - b) soil tilth
  - c) soil texture
  - d) soil consistence
6. Soil scientists classify soil particles in the categories of \_\_\_\_, \_\_\_\_, & \_\_\_\_.

7. Crops grown in rotations to maintain or improve soil productivity and fertility is called
- a) contour farming
  - b) conservation tillage
  - c) crop rotation
  - d) none of the above
8. Which of the following drainage classes would a hydric soil most likely have?
- a) well drained
  - b) excessively drained
  - c) moderately well drained
  - d) very poorly drained
9. Which of the following soil consistence terms would probably describe a sand texture?
- a) firm
  - b) plastic
  - c) friable
  - d) loose
10. Sediment from erosion can be reduced by
- a) planting grass and trees
  - b) digging ditches
  - c) mulching areas
  - d) a and c
  - e) all of the above

answers: d, a, b, e, c, (sand, silt, clay), c, d, d, d