

Soil Science Curriculum

Content and lab derived from the USDA-NRCS Guides for Educators. Go to www.nrcs.usda.gov/soils for the Guides and additional pictures and diagrams. This lesson plan was adapted for South Dakota from the University of Nebraska Institute of Agriculture and Natural Resources, CROPWATCH.

January 2018

Web Soil Survey

Approximately 180 minutes

Objectives

By the end of the lesson, students will know or be able to:

- Explain the purpose of Web Soil Survey
- Use Web Soil Survey

Preparatory Work

- Make necessary copies
- Review Web Soil Survey
- Review and determine where and when “You’re the Developer” project will be completed

Materials

- Soil Survey Manuals
- Web Soil Survey Webquest – one per student
- My Home Soil Map – one per student
- You’re the Developer Rubric – one per student
- Computers with internet access
- Notecards – one per student
- Supplies for “You’re the Developer”



Enroll the Participants (Approximately 5 minutes)

Show students a soil survey manual and ask them to predict what information might be found within it. Ask students to give instructions on how to use the soil survey manual. Lead a brief discussion on soil survey. Explain that these manuals are used to determine soil type and characteristics but can be time consuming to use. Share with the class that the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) has created a site to make collecting this information easier. Explain that this lesson will allow students to explore Web Soil Survey.

Web Soil Survey

Provide the Experience – Explain the Purpose and Use of Web Soil Survey

(Approximately 45 minutes)

Provide each student with a copy of the Web Soil Survey Webquest and access to a computer with internet. They will need to visit <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/> and follow instructions on the Webquest. Consider allowing students to work with a partner as they navigate through this site.

Note: Consider reviewing a power point created by the USDA-NRCS to familiarize yourself with the Web Soil Survey: http://websoilsurvey.sc.egov.usda.gov/App/Help/WSS_HomePage_HowTo_3_0.pdf

Label the Information *(Approximately 45 minutes)*

Provide each student with a copy of “My Home Soil Map” and access to a computer with internet. They will need to visit <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/> and follow instructions on the handout.

Demonstrate the Relevance *(Times vary)*

You’re the Developer. Assign students to small groups and give them the “You’re the Developer Rubric.” Explain to the class that they have been hired by a developing company to develop a 10-acre area in your county. As the instructor, you can assign them a 10-acre plot or allow them to select their own plot. They must work as a team to research their land and determine a plan for development. They must create a map of their plan and a written statement justifying their development decisions. Upon completion of the project allow each team to present their development proposal to the class.

Review the Content *(Approximately 10 minutes)*

Provide each student with a postcard. Instruct the class to send a postcard to a student that missed this lesson. Encourage students to draw a postcard picture related to the Web Soil Survey lesson on the front of the card and write a note summarizing the lesson to the missing student on the back. Consider asking a few students to share their postcard with the class.

Celebrate Student Success *(Approximately 3 minutes)*

Thank students for their engagement, creativity, and participation. Congratulate them on their ability to properly use Web Soil Survey. Explain that this skill will be useful throughout their lives as they live and work on the land. Congratulate students on having a stronger understanding of soil management which will allow them to successfully participate in the land evaluation competition.

Web Soil Survey Webquest

Name: _____

Follow the instructions below to become familiar with Web Soil Survey. Open an internet window and go to <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/> . Answer the questions with each step to help you understand the Web Soil Survey.

1. Read through the introduction on the home page. Continue reading through “Four Basic Steps.

What does WSS stand for?

What does AOI stand for?

What percent of the country is covered by the WSS?

What will the soil map show you?

What is the cost to download a finished map?

2. Click green “Start WSS” button. A new window should open with Web Soil Survey.

3. Find your hometown using the quick navigation bar.

What options do you have for finding a specific area in the navigation section?

Web Soil Survey

4. Define your hometown as your AOI using the buttons at the top of the map.

List four buttons at the top of the map and describe how they are used.

5. Under AOI Information, give your map a name.

What is the size of your AOI?

When was the data collected for your AOI?

6. Continue by clicking on the “Soil Map” bar at the top of your screen.

Which soil types are the most common in your AOI?

7. Click the “Soil Data Explorer” bar at the top of your screen.

8. Use the “Suitability and Limitations” section to answer the following questions:

Identify the 10 categories of data included in this section.

Web Soil Survey

Using the specific categories, “View Rating” button, and the “Legend” identify five suitabilities and five limitations of your AOI.

| Soil in this AOI is suitable for... | Limitations for this soil include... |
|-------------------------------------|--------------------------------------|
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9. Using the “Soil Properties and Qualities” button, complete the chart for your AOI map. Identify two common soil types in your area and record the definition and rating for each listed soil health property.

| | pH | Erosion (T Factor) | Organic Matter Rating | Water Holding Capacity |
|----------------------------|----|-----------------------|--------------------------|---------------------------|
| Definition of the property | | | | |
| Soil Type | | | | |
| Soil Type | | | | |

10. “Finally, click on the “Shopping Cart” bar at the top of your screen.

11. Click “Check Out” and “get now” to generate your personalized report.

Web Soil Survey

12. Read through your Custom Soil Resource Report.

Identify specific information from your report and describe how the information can be used.

| Specific information from report | Page number | How can this information be used? |
|---|--------------------|--|
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Web Soil Survey

Web Soil Survey – My Home Soil Map

Name: _____

Follow the steps from the Web Soil Survey Webquest to help you navigate through this project.

1. Find your home, neighborhood, or land important to your family and describe how you navigated to this AOI. Include the address of this land.

2. According to your AOI, how many acres are included on your map?

3. Describe the soils found within your area:

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent AOI |
|-----------------|---------------|--------------|-------------|
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Web Soil Survey

4. Complete the chart below using each of the soils found in your AOI. Include the rating for each of the soil qualities listed.

| Soil Type | pH | Erosion (T Factor) | Organic Matter Rating | Water Holding Capacity | Parent Material Name | Flooding Class | Ponding Class |
|-----------|----|--------------------|-----------------------|------------------------|----------------------|----------------|---------------|
| | | | | | | | |
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5. Complete the chart below using each of your soils to determine the suitability and limitations of your soils.

| Soil Type | Dwellings with Basements | Lawns and Landscapes | Roads and Streets | Farmland Classification | Range Production (normal year) |
|-----------|--------------------------|----------------------|-------------------|-------------------------|--------------------------------|
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Web Soil Survey

You're the Developer

Student Name: _____

Activity Due Date: _____

You have been hired to develop a 10-acre plot of land in your county. You will create a map of your development proposal and a written justification of your plan. Use Web Soil Survey to determine the best uses of your land. Consider the needs of your county and the features of your land.

The rubric below will be used for scoring this activity.

| CATEGORY | 4 | 3 | 2 | 1 |
|-----------------------------|---|--|--|---|
| Title | Title tells the purpose/content of the map, is clearly distinguishable as the title (e.g. larger letters, underlined, etc), and is printed at the top of the map. | Title tells the purpose/content of the map and is printed at the top of the map. | Title tells the purpose/content of the map, but is not located at the top of the map. | Purpose/content of the map is not clear from the title. |
| Map Legend/Key | Legend is easy-to-find and contains a complete set of symbols, including a compass rose. | Legend contains a complete set of symbols, including a compass rose. | Legend contains an almost complete set of symbols, including a compass rose. | Legend is absent or lacks several symbols. |
| Neatness of Color and Lines | All straight lines are ruler-drawn, all errors have been neatly corrected and all features are colored completely. | All straight lines are ruler-drawn, most errors have been neatly corrected and most features are colored completely. | Most straight lines are ruler-drawn, most errors have been neatly corrected and most features are colored completely. | Many lines, corrections of errors, and/or features are not neatly done. |
| Scale | All features on map are drawn to scale and the scale used is clearly indicated on the map. | Most features on map are drawn to scale and the scale used is clearly indicated on the map. | Many features of the map are NOT drawn to scale even though a scale is clearly indicated on the map. | Many features of the map are NOT drawn to scale AND/OR there is no scale marker on the map. |
| Evidence and Examples | All of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author's position. | Most of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author's position. | At least one of the pieces of evidence and examples is relevant and has an explanation that shows how that piece of evidence supports the author's position. | Evidence and examples are NOT relevant AND/OR are not explained. |
| Accuracy | All supportive facts and statistics are reported accurately. | Almost all supportive facts and statistics are reported accurately. | Most supportive facts and statistics are reported accurately. | Most supportive facts and statistics were inaccurately reported. |