

A Tour of Soils

Target Grade Level: 1st-2nd

Created and Adapted by:
Jeff Piotrowski



UNIVERSITY OF MONTANA GK-12 PROGRAM

1. CONTRIBUTOR'S NAME: JEFF PIOTROWSKI

2. NAME OF INQUIRY: "A tour of soils"

3. GOALS AND OBJECTIVES:

a. Inquiry Questions: How many soil types can be found in the schoolyard

b. Ecological Theme(s): Diversity of soil types results in diversity of plants

c. General Goal: Discovery and name five different soils types around the schoolyard

d. Specific Objectives:

Academic: Students learn about different soil types, soil classification, and how soil type influences plant and microbe communities

Experimental: students learn basic soil sampling techniques

Procedural/technical: Students use hand lenses, sieves, shovels and all their senses to investigate the different soil types.

Social: Students work individually in this inquiry but group discussion is encouraged

Communication: Students must written and graphic descriptions of the soils from each site. Also they must generate a descriptive name of each soil.

e. Grade Level: 1-2

f. Duration/Time Required: 3 hours

→ Prep time 1 hour

→ Implementing Exercise During Class 1 hour minutes

→ Assessment 30 minutes

4. ECOLOGICAL AND SCIENCE CONTEXT:

Background (for Teachers and students):

All soils are not equal; there are thousands of soil types that result from different parent materials, plants, rivers, glaciers. Different types of plants grow better in different soils

Scientists have systems of naming and classifying soils based on certain characters.

The plants we grow may be selected based on the soil types they prefer.

5. MOTIVATION AND INCENTIVE FOR LEARNING:

This is an outdoor field trip around the school, which all kid enjoy

Kids get to name the soils themselves which makes the experience more personal.

Kids get to dig in the dirt and collect soil samples.

6. VOCABULARY:

soil classification: The systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

soil type: Formerly in the U.S. soil classification systems prior to publication of USDA *Soil Taxonomy* (1975). (i) The lowest unit in the natural system of soil classification; a

subdivision of a soil series and consisting of or describing soils that are alike in all characteristics including the texture of the A horizon or plow layer; (ii) In Europe, roughly equivalent to a great soil group.

soil characteristics: Soil properties which can be described or measured by field or laboratory observations, e.g., color, temperature, water content, structure, pH, and exchangeable cations.

soil qualities: Inherent attributes of soils which are inferred from soil characteristics or indirect observations (e.g., compactibility, erodibility, and fertility).

7. SAFETY INFORMATION: Make sure the kids are a safe distance while the teacher is digging at each site

8. MATERIALS LIST (including any handouts or transparency masters):

Shovel

Sieve

Hand lenses

Bags

Cups

Student's notebooks

pencils

9. METHODS/PROCEDURE FOR STUDENTS:

a. Pre-investigation work:

Before the field trip the teacher should initiate a discussion of soil, how soils may differ (minerals, litter, color). They should introduce the concept of soil classification and show pictures of soil maps, tell them their state soil make predictions on how soils around the school will differ

b. Investigation work:

1) What evidence (data, samples) do students collect? Written and pictures of soils from each sample site, student may take a small personal sample for close investigation

2) How do students present the evidence (data)? Written descriptions of the soils found and their personal descriptive name for each soil

3) What conclusions are drawn from the evidence students collect? They students should realize that there are different types of soils in the schoolyard, and different plants grow in different soils

10. ASSESSMENT:

For this grade level the student's learning is assessed by their descriptions and drawings of the soils they discover. Additionally, their descriptive names give insight to what characters they deem important in soil classification.

11. EXTENSION IDEAS:

This field trip could be extended to a much longer investigation with numerous soils. Also soils samples could be collected for further analysis. Soils could be used to grow plants to show how certain plants prefer certain soil types.

12. SCALABILITY

This exercise is scalable to any grade level depending on how in depth you look at the soils. High school students could even measure soil pH, nitrogen, etc.

13. REFERENCES:

<http://www.soils.org/sssagloss/>

14. LIST OF EXPERTS AND CONSULTANTS

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

<http://tpwww.gsfc.nasa.gov/globe/>

15. EVALUATION/REFLECTION BY FELLOWS AND TEACHERS OF HOW IT WENT:

Anytime we can get the students outside is a good investigation. By charging them with the task to find as many different soils as possible made a game out of the inquiry. The students were always on task and generated very specific drawings of their soil types.