



School Forest Soil Study

Synopsis: School Forest Soil Study will allow students to learn about the importance of our soil resources to the forest community. Students will sample soil from multiple places in the school forest to understand how the mixture of sand, silt, and clay create a soil composition that has a unique texture and water holding capacity. This information will then be utilized to explain why certain plant communities are found within the school forest.

Objectives:

Students will be able to...

- * Define soil
- * Identify soil texture at the school forest
- * Describe how soil texture impacts water absorption
- * Explain how soil texture influences the plant communities found at the school forest

Wisconsin Model Academic Standards:

Science –

C.4.2 Use the science content being learned to ask questions, plan investigations, make observations, make predictions, and offer explanations

C.4.5 Use data they have collected to develop explanations and answer questions generated by investigations

E.4.1 Investigate that earth materials are composed of rocks and soils and correctly use the vocabulary for rocks, minerals, and soils during these investigations

E.4.2 Show that earth materials have different physical and chemical properties, including the properties of soils found in Wisconsin

C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected

Environmental Education –

B.4.8 Describe and give examples of natural resources;* e.g., water, minerals, soils, air

A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations

A.8.4 Use critical-thinking strategies to interpret and analyze gathered information

A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding



Activity 1: Soil Texture

Supplies Needed:

- Spray bottle, Water, Soil Texture Flow Chart, Data sheet

Procedure:

1. Previous to a field trip, mark designate areas where students will be sampling soil
2. At each designated area, students should place about two teaspoons of soil in one hand.
3. Spray water from a spray bottle to moisten the soil enough to form a ball. If the soil becomes too wet, just add more soil.
4. Use the Soil Texture Flow Chart to determine soil type. The step by step instructions on the key will guide you through the process of soil identification.
5. Record soil texture type on the data sheet.
6. (You may want to practice this activity in the classroom with known soils before performing the field test.)

Activity 2: Water Absorption Test

Supplies Needed:

- Spade, Ruler, Watch, Water, Data sheet

Procedure:

Perform the following test at each identified location within the school forest

1. Using a spade and ruler, dig a hole 6 inches deep by 6 inches in diameter.
2. Fill the hole with water and let stand for one hour.
3. After the water has drained from the whole, refill hole with water.
4. Measure depth of water with a ruler.
5. Let water begin to drain again and measure every 30 minutes
6. Use the following chart to determine soil types based on the rate at which water soaks into the soil.
7. Record water absorption information on the data sheet.

Soil Type	Sand	Silt	Clay
Rate	2.5 inches/hour or 4 hours total	0.5 inches/hour or 12 hours total	1/3 inches per hour or 18 hours total

Activity 3: Identifying Plant Communities

Supplies Needed:

- Plant identification books
- Data sheet

Procedure:

1. Use a field guide to identify some of the plant species in the soil sample areas. Be sure to record the correct species next to the correct soil sample site.
2. Research the soil and water preferences of the plants found in each site.
3. Discuss the relationship between soil type, moisture content, and plant species found at each sample site.



School Forest Soil Study Data Sheet



Sample Site: _____

Soil texture type: _____

Soil's condition: (compacted, fluffy, slightly compact) _____

Moisture content before adding water (1=bone dry, 5=soaking wet): _____

Water absorption rate: _____ (inches/hour)

Soil type based on water absorption rate: _____

Plant species found in the area:

Research each plant species you identified and record any soil or water preferences you learned about below. Soil preferences refer to a plants preferred soil type. Water preferences refer to whether a plant likes dry, moist, or wet (saturated) soils.



Plant Species	Soil Preference	Water Preference



Soil Texture Flow Chart

Start

Place about 2 tablespoons of soil in the palm of your hand. Use the spray bottle to add water and knead soil until it is moldable and moist like putty.

Does the soil remain in a ball when squeezed?

YES

NO

→ SAND

Place a ball of soil between your thumb and forefinger. Gently push the soil with the thumb, squeezing it upward into a ribbon. Form a ribbon of uniform thickness and width. Allow the ribbon to emerge and extend over forefinger, until it breaks from its own weight. Does the soil form a ribbon that extends past your fingers?

YES

NO

→ LOAMY SAND

Does the soil make a weak ribbon < 1" long before it breaks?

YES

Does the soil feel very gritty?

YES

NO

SANDY LOAM

LOAM or SILT LOAM

Does the soil make a weak ribbon < 1" long before it breaks?

YES

Does the soil feel very gritty?

YES

NO

SANDY CLAY LOAM

CLAY LOAM or SILTY CLAY LOAM

Does the soil make a weak ribbon < 1" long before it breaks?

YES

Does the soil feel very gritty?

YES

NO

SANDY CLAY

CLAY

Adapted from the EPS curriculum