

Name: _____

Date: _____

Exploring Soil Properties

What differences do you see among soil types? Why is understanding basic soil properties important in managing erosion? The following field tests on soil texture, structure and pH will build your knowledge of soil properties.

Do ... the activity

Soil Texture

Soil texture refers to the percentage of soil particles (sand, silt and clay) in a given sample. To determine soil texture: Soil scientists use a field test called hand texturing to determine what soil texture they have.

1. Watch the video titled, "Hand Texturing by Feel" (www.youtube.com/user/soiltoseed). Share your observations with the class.
2. Watch a demonstration of hand texturing of soil by your teacher.
3. Determine the soil texture of samples given to you by your teacher. Use the Hand Texturing by Feel handout for step-by-step instructions.
4. Take a sample of soil that will be used in the Rainbox Throwdown and determine the texture and record it on the "Rainbox Throwdown Lab Sheet."

Sandy soils have the largest particles and they feel "gritty."

Silty soils have medium sized particles, and they feel soft, silky or "floury."

Clayey soils are the smallest sized particles, they feel "sticky" and they are hard to squeeze.

Soil Structure

Soil structure is the aggregation of soil particles into groups or clumps called peds based on physical and chemical properties. Soil structure is arranged into five primary shapes: granular, blocky, columnar or prismatic, platy, and two structureless conditions: massive, and single grained.

1. Watch the video, "Soil Structure." (<http://www.youtube.com/user/soiltoseed>) and make observations and notes on what you observe.
2. Go outside with your teacher and observe a demonstration of how to determine soil structure.
3. With your group, take a shovel and dig a large scoop of soil.
4. Break off a clump of soil and hold it in your hand to observe it closely. Using the illustrations in the student handout "Exploring Soil Properties" and from what was shown in the video, determine the type of soil structure you have.
5. Determine the structure of the soil you will be using in the rainbox throwdown experiment and record it on the "Rainbox Throwdown Lab Sheet"

Infiltration Demonstration

Infiltration is the process of water entering the soil surface.

1. Observe a demonstration of water infiltration on different soil textures. Which soil do you think water will infiltrate the fastest? The slowest?
2. Think about what factors might change infiltration rates in a soil. What variable might slow water infiltration? Increase infiltration?
3. Watch an additional demonstration of infiltration on compacted soils. What do you think will happen? What did you actually observe?
4. What does the chart below tell you about the relationship between soil erosion, texture and infiltration?

Soil type	Infiltration rate (inches per hour)
Sands	Sands > 0.8
Sandy and silty soils	0.4-0.8
Loams	0.2-0.4
Clayey soils	0.04-0.2

Soil Fertility

Nitrogen (N), phosphorus (P), and potassium (K) are essential plant nutrients found in the soil. pH levels determine whether the nutrients are available for plant uptake.

To test soil nutrients and pH:

1. Obtain a soil sample from the rainbox used for the demonstration or that will be used in the rainbox experiment.
2. Using the instructions provided with the soil test kit (see Resources Appendix); measure the amounts of nitrogen, phosphorus, and potassium present in the soil and also measure the pH.
3. Record your findings on the Rainbox Throwdown Lab handout.

Talking it Over: Soil Properties

Share ... what you did

What are the different types of soil texture and soil structure? Does structure depends on soil texture? How susceptible are different soils to erosion? What additional soil characteristics contribute to erosion? How?

Reflect ... on the results

How does soil texture and structure play a role in soil erosion? What does degrees of expression mean? Why is this important as it relates to erosion? Why is it important to know about soil infiltration and fertility?

How were each person's viewpoints in your group the same? Different? What did you learn about the science process with these experiments?

Generalize ... to your community

Are soil properties the same across the state? Country? Throughout the world? Does erosion happen across the world? Are contributing factors the same?

Why is knowing about soil properties important to your community? Where can you go in your community if you need to find more information?

Apply ... to your community

What did you learn today that you can use in your community? What skills do you think you learned during this activity?