Soil Shake

Materials:
- Trowels
- Clear glass or plastic jars with lids
- Water
- Access to different types of soil and water
- Masking tape and permanent markers
- Soil Shake worksheets
- Optional: hand lenses, powder laundry detergent

Overview & Objectives
“The soil is the great connector of our lives, the source and destination of all.”
- Wendell Berry, The Unsettling of America, 1977

Healthy soil is an essential part of a healthy garden. Nutrient-rich soil leads to nutritious food! This soil shake lesson introduces organic matter and the three mineral particle sizes of soil texture: sand, silt, and clay. Students will see the particles separate by weight. Follow-up activities at the end of the lesson help students to determine which soil types are best for gardening and healthy plants.

Students will:
- Recognize the three particle sizes of soil structure
- Understand how soil structure affects plant growth

Pre-Activity Questions:
1. What do you think makes up the soil in the garden and schoolyard?
2. Where can we find soil?
3. Is all soil the same? Does all soil feel the same?

Soil Shake How-to:
- Collect soil samples from five different locations around the schoolyard (a garden bed, the bottom of the compost, the field, etc). You can bring in soil samples from outside locations to vary the soil structure shown.
- Use hand lenses to make observations about soil texture and predictions about the soil structure. What does the soil feel like?
- Fill one third of each container with a soil sample and label with tape and permanent markers where it came from.
- Fill the remainder of each container with water and shake. (Optional - add a small pinch of powdered laundry detergent to help soil components separate)
- Do not disturb the container for the remainder of the lesson.
Soil Shake

Resources


Soil Shake cont.

- While waiting for the soil to settle, review soil structure. Sand is the largest soil particle. It easily drains water but cannot hold many nutrients. Silt is the medium sized particles. Silt is the soil found at the bottom of rivers and blown around by wind. Clay is the finest particle in soil. Sand, silt, and clay are made up of weathered rock. Organic matter is the part of the soil that did not come from rock. It is made of dead and decomposing organisms. St. Louis area soil typically has a high concentration of clay. It has few air spaces and water moves very slowly through it. A compost bin is all organic matter.
- Check on the soil containers. If the soil has not separated, you may need to check on it a day later. When the layers have separated, students will see sand at the bottom, then silt and clay. Some clay will be suspended in the water and organic matter will float on top.
- Have students complete the diagraming the Soil Shake worksheet. How could their soil sample affect plant growth? Healthy loam soil is 40% sand, 40% silt, and 20% clay.

[Image of jars with layers of soil labeled sand, silt, and clay]

Soil samples from (left to right) the garden, below a compost pile, and the schoolyard. Note the jar on the right is mostly clay.
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Gateway Greening

Resources
Connect with us on Facebook to discover upcoming Youth Garden Institute workshops or join the Gateway Greening Educators Group to connect with other teachers:

Facebook @ GatewayGreening

Discover season-specific gardening how-to's and examples of current lessons:

YouTube @ gatewaygreening

Looking for Field Trip opportunities or need to ask a question about our education services? Please contact education@gatewaygreening.org or 314-588-9600 ext 107

Additional Activities & Follow Up
- Transplant the same type of plant into soil from the garden, potting mix, and soil from another place in the schoolyard. Label the plants and observe their growth. Pay particular attention to plant water needs. Determine if certain soils are better for plant growth.
- If the soil in the soil shakedown experiment showed a high percentage of clay, have students research how to improve the soil. Create a composting system to add more organic matter to the soil.
- If space allows, have students first dig in soil and make observations about the soil in different parts of the garden and schoolyard. See if they can predict what makes up soil - minerals, water, air, and organic matter. Create a chart of worm size or population size at different soil sample sites. Compare to the soil layers and draw conclusions about relationships between invertebrate and soil structure.
Soil Shake

Soil Location________________

Draw the and label the **sand, silt, clay, and organic matter** layers of your soil shake.

Estimate the percentage of the soil that is sand, silt, clay, and organic matter.