Soil Slurry

Use soil to learn about the structure and properties of matter!

Grade Level: 4-8
Background Information:

What is Soil?
One of the most important natural resources is soil. Most life on earth depends upon the soil for food. Plants are rooted in the soil and get nutrients (nourishing substances) from it. Animals also get nutrients from eating the plants that grow in the soil. Soil is home to many organisms such as seeds, spores, insects, and worms. We build sidewalks, roadways, and homes on the soil. Soils also help filter out pollutants that could contaminate our drinking water. Everyone can take an active role in improving and preserving our Earth's soil.

Soil Particle Size
Try to remember some times when you played in soil. Did it feel soft sometimes and gritty at other times? Soil can feel different from one time to another depending on what's in it.

Sandy soil is made up of mostly sand. Sandy soil feels gritty and allows water and air to move through it.

Silt feels like flour when dry and is very smooth and soft when moist. Silt particles keep the soil softer and easier to plow than soils with too much clay.

Clay soil has mostly clay, some organic matter, silt, and a little sand. Clay particles are very fine and are the smallest of the three types of soil particles. Clay is sticky when wet and hard like bricks when dry.

Soil Has Three Layers!
Topsoil– Here is where the plants grow. Wind or water erosion can wash away this valuable layer if farmers don't protect it. In fact, it takes nature over 500 years to replace one inch of soil. Most nutrients, organisms, and roots are in this layer.

Subsoil– This layer is about one foot below the surface. Deeper tree roots and earthworms live here.

Parent Material– This is the bottom layer, about three feet below the surface in the Midwest. It is more compact and often has stones and rocks in it.

Did you know?
The Illinois State Soil is Drummer-Flannagan, a fertile soil that grows our agricultural crops.

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Materials Needed:

- 2 quart jars with lids
- Masking tape, to label jars
- Dishwashing liquid
- Plastic rulers
- Student Worksheet
- Dry soil sample from garden, flowerbed or field (Sample A)
- Soil sample from roadside, gravel pit or housing development, completely dry (Sample B)

Directions:

1. Before the experiment come up with a hypothesis of what you think will happen to the soil when the dishwashing liquid is added. Write this down on your student worksheet.
2. Make sure that all dried soil clumps are crushed and that any rocks, roots and litter are removed from the samples.
3. Use the masking tape to label one jar "Sample A" and the other jar "Sample B".
4. Fill the first jar ¼ full of soil Sample A.
5. Fill the second jar ¼ full of soil Sample B.
6. Add water to the jars until they are about ½ full.
7. Add 1 teaspoon of dishwashing liquid to each jar.
8. Making sure the lids are on securely, shake them hard until the particles have completely separated from each other. This should take about 3 minutes.
9. Set the jars on a table. Observe them closely for 5 minutes. (The sand should settle to the bottom in approximately 1 minute.)
10. Measure any layers and record the data in the table on your student worksheet.
11. Observe the jars after 30 minutes. (The silt will settle out in 30 – 60 minutes.)
12. Measure any layers and record the data in the table on your student worksheet.
13. Observe the jars after 24 hours. (The clay will take about 1 day to settle.)
14. Measure any layers and record the data in the table on your student worksheet.
15. Observe the jars after 48 hours. (The final sample should have a layer of sand on bottom, followed by silt, with the clay at the top. Any floating material should be considered organic matter.)
16. Measure any layers and record the data in the table on your student worksheet.
17. Once all the information is recorded on your data sheet, write a paragraph explaining exactly what happened. Include ways that you could change the experiment and what you think would happen with the changes.

Post Activity Discussion:

- What did you observe happening to the soil each time you checked and recorded data? Why was this happening?
- What were the differences in change between Sample A and Sample B?
- Why were there differences between the two samples?

Student Worksheet

Hypothesis:

	Sample A	Sample B
# of Layers (5 Minutes)		
Layer Measurements (5 Minutes)		
# of Layers (30 Minutes)		
Layer Measurements (30 Minutes)		
# of Layers (24 Hours)		
Layer Measurements (24 Hours)		
# of Layers (48 Hours)		
Layer Measurements (48 Hours)		