

Sand, Silt and Clay

Skill: Science

Objectives

Students will:

- Become aware of the variety of particle sizes present in soil and be able to predict their influence on water movement.

Procedure

- Divide the class into several small groups of two to four students. Ask each group to collect soil from a different area, filling a tall glass jar one-quarter full of the soil and then adding water until the jar is two-thirds full. A small amount of water softener should also be added.
- Ask the students to shake each of the jars vigorously for two minutes, and then allow the contents to settle for the next 15 to 20 minutes.
- Now ask the students to hold a piece of paper against the side of each jar; draw a diagram showing the different layers; and label each layer based on its particle size.
- Soil particles differ considerably in size and weight because some rocks and minerals are harder than others and do not break apart as easily as do the softer rocks or minerals. The largest (heaviest) pieces of soil in the glass jars will settle to the bottom first. These may be identified as "sand." The smaller pieces settle very slowly and may be identified as "silt." Some particles never settle but stay suspended in the water and are "clay." Clay eventually will settle but rarely within the 15 to 20 minute time period. You may want to observe the jars over a longer period and graph the buildup of the clay layer to see just how slowly it forms.
- Most soils contain a mixture of sand, silt, and clay in different amounts. The size of the particles is important because it has a lot to do with how well the soil holds water for plants and how well water moves through the soil. To test this, allow the water in the jars to evaporate completely and the soil to dry. Separate the sand, silt and clay layers and place them in funnels lined with filter paper. Pour equal amounts of water into the funnels and record the time it takes for the first water to drop out of the bottom of the funnel. The students may predict which particle size will allow the water to pass through the fastest, the second fastest, and the slowest.

Vocabulary

- Softner
- Diagram
- Funnels
- Particle
- Sand
- Silt
- Clay
- Predict

Materials

- Tall glass jar for every two to four students
- Soil from different areas of the school yard or from home
- Funnels
- Paper filters (coffee filters work well)
- Watch for timing
- Water softener (liquid or powder such as Downy)
- Paper and pencil

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Discussion and Evaluation

Following these investigations, the students might discuss:

Which type of soil they think would be best to have in a garden, explaining their reasoning. (Encourage students to plant seeds in each type of soil to test their choices.)

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P.A.S.S.

Grade 4

Science

- Process 1.2, 2.2, 3.1,3, 4.1,4, 5.4
- Earth/Space 1.1

Grade 5

Science

- Process 1.2, 2.2, 3.1,3, 4.1,4, 5.4
- Physical 1.1
- Earth/Space 3.1

Grade 6

Science

- Process 2.2, 3.1,5, 4.1,5, 5.4
- Physical 1.1

