

## Texture This

**Duration:** variable

**Group Size:** 8-24 students

**Setting:** Classroom

### Goals:

Students will:

- Understand how larger diameter particles like sand settle more quickly than silt and clay, and to understand what Particle Size Distribution means.
- Understand how the distribution of different sized particles in the natural environment affect how the landscape appears and how soil can and cannot be used.
- Learn about soil texture.

### Materials Needed:

- Potting Soil - 1 1/2 cups
- Sand - 1/2 cup
- 2 juice bottles with wide mouths and lids
- Paper or plastic cups
- Masking tape
- Pen
- Metal teaspoon
- Water

### Background:

Conduct a discussion about sand, silt, and clay, where they are found in the natural environment.

Discuss that knowing how much sand, silt and clay are in a soil help determine how much water and heat will be held in soil and move through soil, and also how well nutrients will be held in soil for plant use.

### Process:

1. Use your masking tape and pen to label one bottle soil and the other bottle soil and sand
2. Put about one cup of soil in a cup
3. Fill the soil bottle about 3/4 full of water. Very slowly pour the soil into the water. What do you notice about the way the soil particles sink in the water? Do the different sizes seem to sink at different speeds?

4. After all the soil is in the water, fill the rest of the bottle with water if the water is not to the top already. Put the lid tightly on the bottle. Shake the bottle back and forth several times. Place the bottle on a flat surface where it will not be disturbed.
5. Take your remaining 1/2 cup of soil and add 1/2 cup of sand to the soil. Mix thoroughly with your spoon.
6. Repeat steps 1 and 2 with the soil and sand bottle and the soil and sand mixture. Wash hands after handling soil. Allow both bottles to stand overnight. Observe the bottles the next day. Look at the bottles from the side.

Class investigation- Do you notice any layers in the bottles? How would you describe the particles that make up these layers? Are some layers thicker than others? Do you think this is a good way of finding out the amount of different size particles in soil? Why or why not?

### Variations:

1. Using the Textural Triangles 1 and 2 in the Soil Characterization Field Protocol, determine the texture of soil sample(s) by feeling the moistened soil sample(s).
2. Students can practice determining the percent sand, silt, and clay in samples using the hand texturing method along with Triangle 3. They can accurately verify their estimations by performing the Particle Size Distribution Protocol, which is more quantitative.
3. Develop a set of 12 standard soil texture samples that students can use to practice determining soil texture. List the percent sand, silt, and clay (from actual values determined using each standard soil sample in the settling method) next to each appropriate standard.
4. Once the students have had enough practice referring to the list, have them determine the soil texture of each standard without referring to the list.
5. Challenge students to think of and write about the different uses of soils, based upon soil particle size distribution characteristics.

### References:

Adapted from *Soil Sizes-Some Surprises!*, WonderScience magazine on soil science. Also adapted from L.J. Johnson. 1979. *Introductory Soil Science: A Study Guide and Laboratory Manual.*, MacMillan Publishing Co., Inc., N.Y.