

SOIL TEXTURE Teaching Tips



LEARNING OBJECTIVES

Youth will be able to:

- * Classify soil particles as sand, silt, or clay.
- * Explain how soil texture affects how fast water drains through a soil, and how much water a soil can hold.
- * Describe an ideal soil for a garden.
- * Determine the texture of a soil by feel and by settling in water.



HOW TO USE THE SOIL TEXTURE SCIENCE PAGE

Bring in several soil samples with clearly different textures. Possibilities might include loamy topsoil from gardens, lawns, or fields, and subsoils high in clay from pits or road cuts. You could also try collecting soil from different places along the bank of a stream. Places where the water runs faster, such as on the outside of a bend, will be higher in sand. Places where the water runs slower, such as on the inside of a bend, will be higher in clay. Let the soil samples dry on newspaper before doing the activity.

Have youth read the Science Page. Discuss the information presented. Explain that our fingers are very sensitive to differences in how soil feels. Thus, with practice, you can accurately judge soil texture by feel. Show youth three different soil samples — one high in clay, one high in silt, and one high in sand. Have them feel each dry sample. Wet the samples with a spray bottle. Have the students feel each wet sample, and classify them as sand, silt, or clay, based on the information on the Science Page. Allow youth to discuss their results with each other, and come to a consensus.

Emphasize that loam is an ideal soil for growing plants. It is a mixture of all three different size particles — sand, silt, and clay. The

sand keeps the soil looser, and allows for adequate drainage. The clay and silt hold water and nutrients in the soil that plant roots can take up and use. Discuss the consequences of too much clay or sand in a soil.



PUZZLE

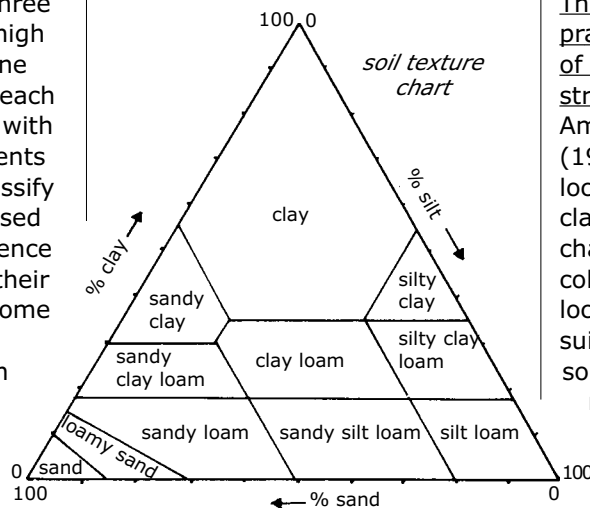
Answers: 1. clay loam; sandy loam; 2. sandy loam; clay loam; 3. sandy loam; clay loam; 4. clay loam; sandy loam.



TRY THIS!

Once youth are familiar with the feel of clay, silt, and sand, present them with this bigger challenge of classifying soil samples by feel. You may wish to invite a soil scientist or a college student who is studying soil science to work with youth on this activity. You could contact your Cooperative Extension service or a local college to locate someone who might be willing to do this. Soil scientists are very skilled at judging soil texture. Students learn this skill in college, and even compete in national soil judging competitions.

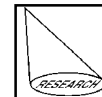
Explain that soil texture by settling is a way of dividing the soil into its component parts using gravity and water to separate the particles. Ask: Which particles will settle first? (answer: sand)



Which particles will settle last? (answer: clay)

It may take several days for clay particles to settle, so plan on allowing the jars of water and soil to sit undisturbed for several days before measuring the relative amounts of sand, silt, and clay in each sample.

After the soil particles have settled, students can calculate the percentages of each component — sand, silt, and clay — in each soil sample. To calculate the percentage of sand in a soil sample, they could measure the volume of the sand layer in the jar, then divide it by the volume of all the soil layers combined, and multiply by 100. (The volume is the area of the cross-section of the jar multiplied by height. As the area is the same for both the sand sample and the soil sample as a whole, the calculation can be simplified by dividing the height of the sand by the height of the soil, and then multiplying by 100.) If desired, the students can use the soil texture chart below to determine the overall soil texture of each sample. Then they can compare their results using the two different methods of measuring soil texture.



SPOTLIGHT ON RESEARCH

This article is based on a PhD dissertation by B.E. Dialla entitled, The adaption of soil conservation practices in Burkina Faso: The role of indigenous knowledge, social structure and institutional support Ames: Iowa State University (1992). Dr. Dialla reported on how local, or indigenous, farmers classify soils. Local farmers use soil characteristics, such as texture, color, consistency, geographical location, drainage, fertility, and suitability for crops, to classify soils. Scientists increasingly are recognizing the importance of these "indigenous soil taxonomies," and are learning from local farmers.