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# Soil Texture Feel Test

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## Activity Overview

Students collect soil samples and classify soil texture using a soil texture field test key.

## Objectives

Students will:

- Manipulate and feel soil to classify soils by texture using a key
- Understand the relationship between soil particle size, plant Growth and water

## Subjects Covered

Science

## Grades

1 through 12

## Activity Time

1 hour

## Season

Any

## Materials

Soil samples, spray bottles of water, paper towels, Key to Soil Texture by Feel

## State Standards

\*Adapted to California by Save The Bay

## Background

Soil is made up of three particle sizes—sand, silt and clay. Sand is the largest particle (0.05 to 2 mm diameter); silt is intermediate (0.05 to 0.002 mm); and clay is the smallest (less than 0.002 mm). Soils have different textures depending on the proportions of sand, silt, or clay particles in the soil. A soil texture is graded into fourteen texture classes such as sand, sandy loam, silty clay loam, loam, sandy clay, or clay. Sandy soil is any mix with over 90% sand; sandy loam is 70% sand, 15% silt, and 15% clay; clay soil is 50% clay, 25% silt and 25% sand; heavy clay is any mix with over 60% clay.

The texture of the soil influences the moisture-holding capacity of soil, the drainage rate, and the soil's ability to hold nutrients. Coarse, sandy soils drain water quickly and are poor storehouses of nutrients. Plants must be able to tolerate droughty conditions in most sandy soils. In clay soils water drains slowly; as a result, soil remains wet for long periods and often root development is hindered. Plants growing in clay must be able to tolerate long periods of excessive moisture with low oxygen conditions or to endure dry, hard soil. The medium texture of silt-sized particles creates a loamy soil that is well-drained and holds nutrients. It is ideal for most plant growth. Consequently, different soils support different plant species or communities. Determining the soil texture of your restoration plot is one of the informational tools for assessing which community type the soil will sustain.

Soils can be classified into texture classes by the way they feel and respond to handling. Sand feels gritty and the grains do not stick together when squeezed. Silt feels velvety or flour-like when dry and forms a weak ribbon when wet. Pulverized dry clay feels smooth; aggregates and clods are very hard and difficult to crush by hand. Wet clay feels sticky or very smooth and satin-like when rubbed and forms a long, flexible ribbon.

## Activity Description

Collect soil samples from different areas around the school grounds. Collect 1.5 cups of soil per sample for your classroom.

Use the Key to Soil Texture by Feel to help classify your soil. Step-by-step directions are written on the key.

## Extensions

- Soil textures vary from one horizon (soil layer) to the next; therefore, try to determine the texture in each of the A, B, and C horizons. Learning the soil texture of each horizon will help you assess the soil's permeability at different levels. In some soils, the water drains quickly in the topsoil but drains poorly in subsoil. In this example, plant/community selection would be modified due to the change in soil texture. See "Soil Profile Investigations" for information about soil horizons.

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- Classify and compare soil texture from different plant communities. Have students note differences in plant communities and locations.

- Take soil samples in the schoolyard and send samples to a soil testing lab for professional testing and analysis. In the Bay area, contact <http://www.soilandplantlaboratory.com/> or for more detailed analysis contact <http://www.soilfoodweb.com/>.

- Classify and compare soil texture at different locations on a slope or in eroded areas. Which particles collect at the base of the slope or remain on top? Which particles erode first? Is the pattern similar to particle movement on a slope? Can you predict which soils are more susceptible to erosion?

## Additional Resources

- Hausenbuiller, R.L. (1972). *Soil Science: Principals and practices*. Dubuque, Iowa: WM. C. Brown Company Publishers.

Websites:

- Clymire O. *A child's place in the environment series: Unit 2 protecting the soil*. Lakeport, CA: Lake County Office of Education and Konocti Unified School District. <http://www.acpe.lakek12.ca.us/>

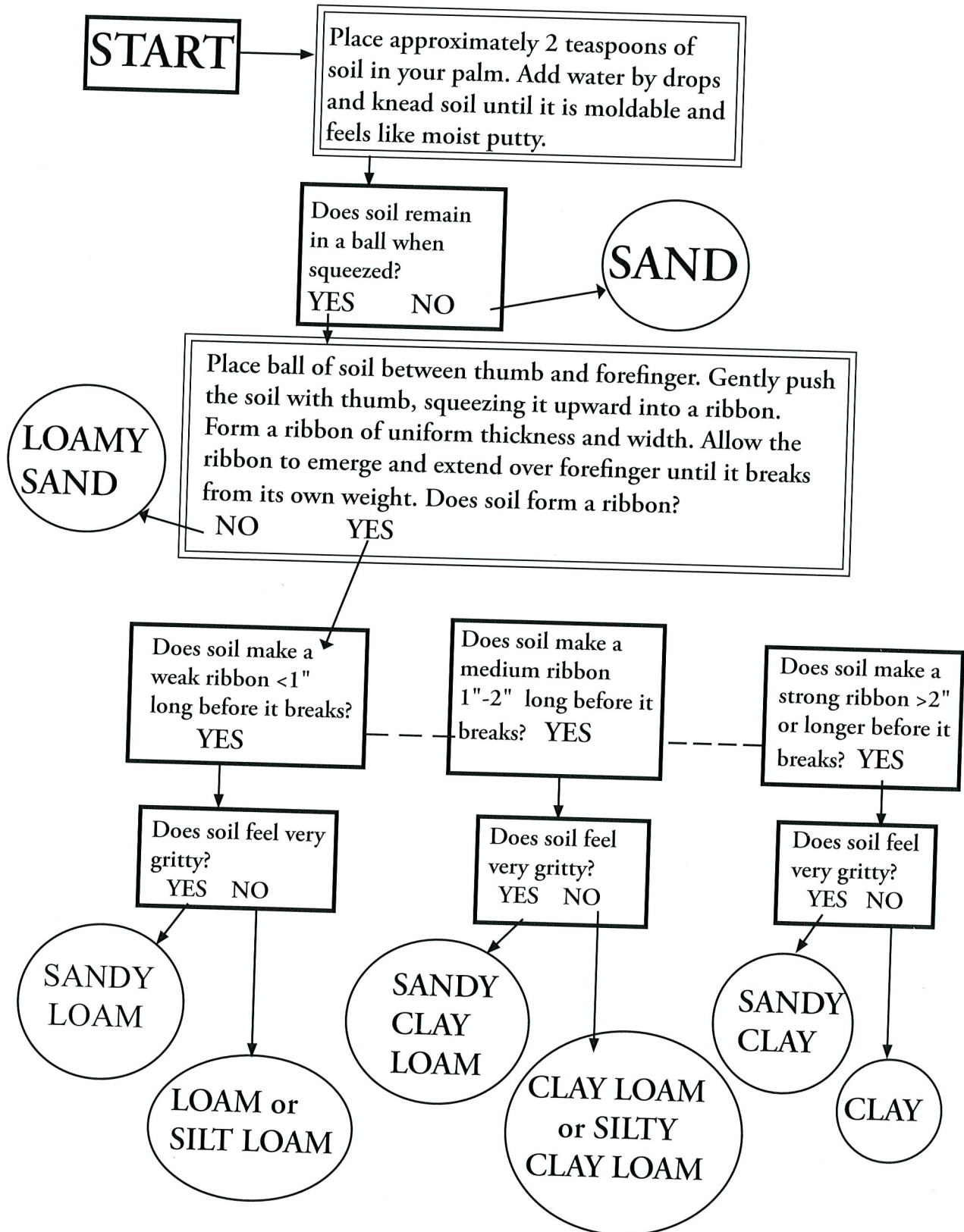
- Soil Science Society of America's comprehensive website has a wealth of resources, lessons and links. <https://www.soils.org/lessons/resources/>

## Assessments

- Explain how soil is classified and two to three properties of each type of soil texture.
- Explain the relationship between soil particle size and plant growth and water.
- Determine the soil texture of three soil samples.

# Key to Soil Texture by Feel

Begin at the place marked "start" and follow the flow chart by answering the questions until you identify the soil sample. Please note that soils having a high organic matter content may feel smoother (siltier) than they actually are.



Source: Adapted from WOW!: The Wonders of Wetlands, Environmental Concern Inc.