

Soil Texture

READ



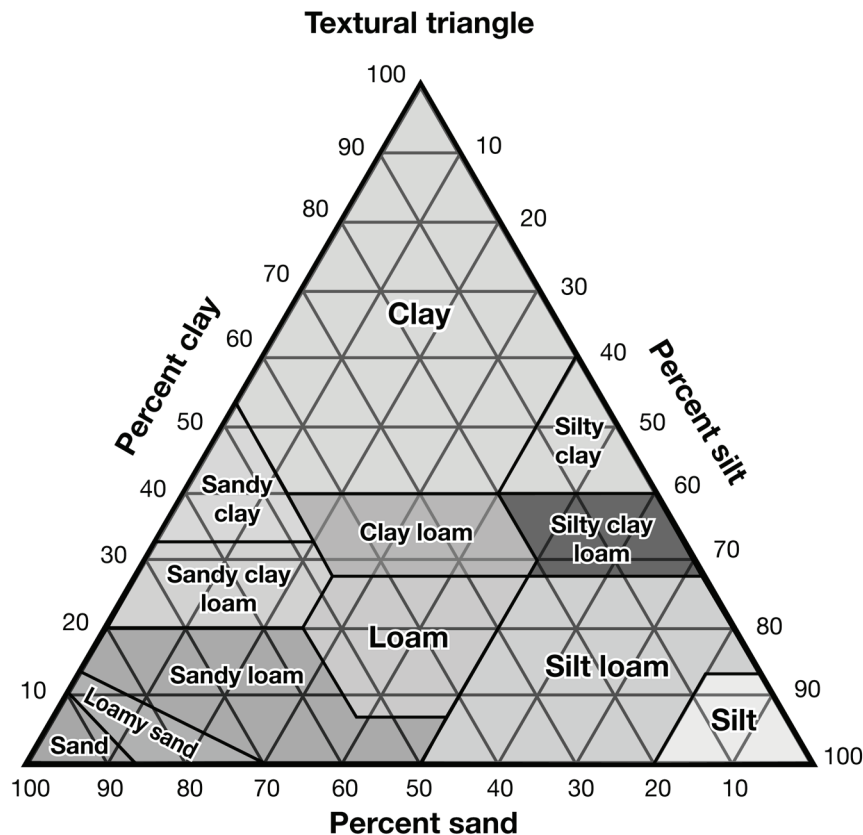
What determines a soil's texture? It's the percentages of sand, silt and clay that are mixed together to form the soil. Scientists, gardeners and engineers are all interested in soil texture for different reasons. Soil texture affects things like drainage, nutrient availability, how well the soil can support buildings, and how likely it is to be affected by erosion.

Of the three kinds of soil material, sand particles are the largest. They range in size from 0.05 mm to 2 mm. The irregular shapes and sizes of sand particles make it easy for water and dissolved nutrients to drain quickly through sandy soils. As a result, sandy soils are less fertile.

Clay particles are the smallest of the three types of soil material. Clay particles are no larger than 0.002 mm. The particles are flat and closely packed. Because of these characteristics, clay does not allow water to easily flow through. Nutrients don't drain away quickly either—however, plant roots have a hard time growing through the closely packed particles to get to the nutrients. Wet clay tends to be sticky and dense, and dry clay is hard—almost brick-like.

Silt, the intermediate particle, has some characteristics of each of the other soil ingredients. Like sand, it is irregularly shaped, and it tends to have a coating of clay on it.

Soils are almost always a combination of these three particles. In order to describe soil texture, a textural triangle like the one shown below is used. For gardeners, the “ideal” soil is loam. Loam provides enough water and nutrients for plants, but also allows for some drainage. Both of these properties are helpful for plant growth.

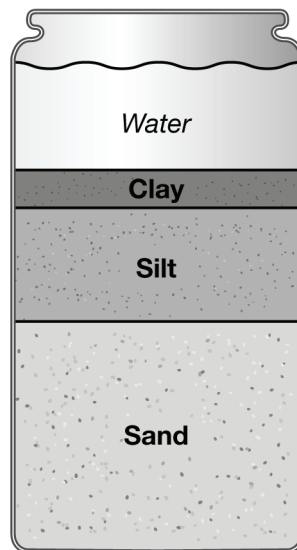


PRACTICE

To use the textural triangle, find the percentage of each soil particle type on the sides of the triangle. Follow the lines until they intersect. Find the soil type at the point of intersection.

Using the textural triangle, answer the following questions. The particle type percentages should always add up to 100 percent.

1. If a soil has 30 percent sand, 60 percent silt, and 10 percent clay, what is its soil texture?
2. If a soil has 40 percent clay, 50 percent sand, and 10 percent silt, what is its soil texture?
3. What percentages could be used to describe loam?
4. Based on what you know about things that live or are found in and around the soil environment, name three living things that could help improve soil texture, and describe how they do so.
5. If you were outside and didn't have a way to figure out the exact percentages of sand, silt, and clay, how could you use water and your hands to get an idea if the soil was mostly silt, sand, or clay? Use the information you learned in the reading section to help you answer this question.
6. Below is an image of a jar with soil that has been collected from a specific location. The soil was put in the jar and covered with water. The jar was shaken vigorously to break up all the clumps of soil. After a few days had passed, the sand, silt, and clay particles settled to the bottom of the jar. The sand, because it is largest and heaviest, settled first, then silt, and finally the clay. It is your job to figure out the percentage of each particle type in the soil. Hint: you will need a ruler and a calculator.



7. Now, use those percentages to figure out the texture of this soil.

Supplying Our Energy Needs

READ



Do you know where your electricity comes from? Do you know what kind of power plant produces it? In this research project, you will investigate energy sources used to generate electricity. Each group in the class will research one type of power plant. When all the groups have completed their work, the class will review and discuss the information. Each group will be responsible for providing evidence that demonstrates the pros and cons of their energy source.

The final goal of this project is for your class to determine the best energy source for generating electricity in your community, considering questions of efficiency, cost-effectiveness, and environmental impact.

Possible sources of energy for generating electricity include coal, oil, natural gas, nuclear, hydroelectric, solar, wind, and geothermal.

Where to find information on the Internet:

www.energy.gov	www.fe.doe.gov/education/index.html	www.eere.energy.gov/biomass
www.ase.org	http://energy.inel.gov/renewable	www.eia.doe.gov
www.energy.ca.gov	www.ne.doe.gov	Use a search engine with your energy source as the keyword.

PRACTICE



- Choose one of the energy sources listed in the introductory paragraph.
- Make a list of facts about this energy source. Come up with at least 10 pros and 10 cons. Cover these topics:
 - How much does it cost to build a power plant for generating energy using your source?
 - How much does it cost to maintain this type of power plant?
 - How much does the energy source cost to use?
 - How energy-efficient is this source?
 - How does the use of your energy source affect human health?
 - What are the environmental issues associated with using your energy source?
 - How long into the future is this source projected to last?
- As you make your list, fill in details to explain each point.
- Prepare a one-page handout for your classmates which summarizes each point.
- Prepare a poster highlighting two or three of the most important things you would like classmates to remember about your energy source.

Share your results

1. Decide as a class how you would like to learn about all of the energy sources. Some ideas include:
 - Have each group make a five-minute presentation to the class.
 - Make a booklet for each student that contains the summary sheet from each group. Each student should come up with a list of three questions they have after reading the booklet. Then give each student an opportunity to ask one question of another group.
2. Once you are familiar with the pros and cons of each source, consider these three questions separately:
 - a. Which one is the most efficient for your area of the country?
 - b. Which one is most cost-effective?
 - c. Which one is the safest for your environment?
3. If you were part of a commission studying which type of power plant to build in your community, how would you balance these three concerns? Is there one source which is best in every category?
4. Come up with a final recommendation for the best energy source for your community. Your class might choose to:
 - Form new groups, each with one person who studied each energy source. Each group should act as a commission responsible for making a recommendation to your community.
 - Have each person submit a statement about the best overall energy source for your community. Your teacher can divide the class into groups of students who share the same conclusion. Then, hold a debate among the groups.