

Activity 17 - Determine the Amount of Sand, Silt, and Clay in Soil

Topic: Soil Composition (extended)

Learning Outcomes:

To understand that soil contains various amounts of sand, silt and clay, and that these particles are different from one another.

Time: 15-30 minutes for quick activity
Extended activity will take place over a day (or have members complete at home)

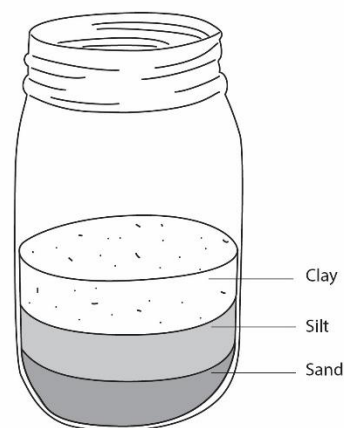
Materials:

- 1 - 3 quart glass jars (with lids)
- Water
- 1 cup of soil

Instructions:

Quick Activity

1. Fill a quart glass jar halfway with water.
2. Add one cup of soil. Crush the lumps of soil before adding to the water.
3. Cover the jar tightly and shake vigorously for 2 to 3 minutes.
4. Place the jar on the table and allow the soil particles to settle.
5. Notice that the large sand particles settle to the bottom rapidly. The smaller silt particles take much longer, and the clay particles remain suspended in the water. The suspended clay particles cause the water to be cloudy.

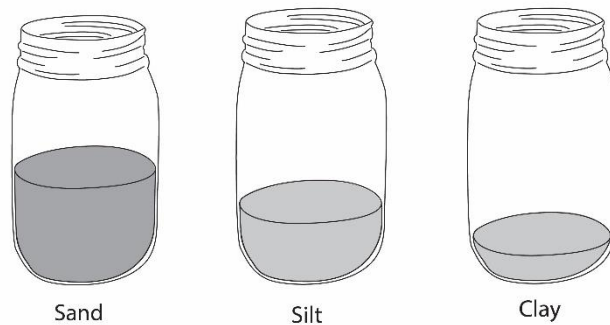


Extended Activity

Separate the sand, silt and clay

1. Use three quart jars labeled 1, 2 and 3.
2. Fill a quart glass jar halfway with water, then add one cup of soil (making sure lumps are crushed before soil is added).
3. Cover Jar 1 tightly and shake vigorously for three minutes.
4. Allow Jar 1 to settle for 20 seconds, and then pour the liquid into Jar 2. Be careful to leave the sand in Jar 1.
5. Add one cup of water to Jar 1, shake and allow to settle for 20 seconds. Pour the liquid into Jar 2. Repeat this until Jar 2 is about 2/3 full. This removes most of the silt from Jar 1, leaving only sand.

6. Cover Jar 2 tightly and shake for three minutes. Place the jar on a table and allow it to settle for 3 ½ hours. Carefully pour the liquid from Jar 2 into Jar 3, making sure to leave silt particles in Jar 2. Let Jar 2 settle 3 ½ hours each time.
7. Add one tsp of table salt to Jar 3. Shake and let it settle for one day. The salt causes the clay particles to clump together and settle. The liquid in Jar 3 may be a stained brown colour because of organic matter that remained in solution.
8. Carefully remove the water from Jar 3.
9. You now have sand, silt and clay.



10. Examine each fraction of soil carefully. Soils will differ greatly e.g. sandy soil may not have clay.

Suggestions:

Prepare jars from extended activity ahead of time as an example for members. Complete this activity with a number of soil samples taken from different locations – one member per different soil sample. Then compare.

Discussion:

What did you notice about the soil in this activity? (Weight, other particles that were sand, silt or clay)

Did everyone have the same percentage of each soil component?

Processing Prompts:

- How could you improve sandy or clay soil to better suit your growing needs?

Soil Improvement:

If you have sandy or clay soil, the soil quality can be improved by adding organic matter. The organic matter is broken down by bacteria, fungi and earthworms, creating humus, a nutritious, fibrous material. Humus promotes good air flow through the soil and improves soil texture.

Humus makes sandy soils hold more moisture. Heavy clay soils are more workable with humus. When growing plants, humus is being used and must be replenished.