



Soils Activity

Recommendations: For students Grades 3-6. Adult supervision is recommended. Can be done indoors or outside.

Purpose: To examine and identify different types of soil based on composition.

Materials:

- 3 clear mason jars with lids (*same size jars are ideal*)
- Water
- 3 different soil samples (*ie. backyard garden, front yard garden, forest floor, from a field etc.*) If soils are taken from places close together, they will likely be very similar so getting soil from different locations is important for comparing soil samples.
- Masking/duct tape and writing utensil for labelling jars
- Ruler

How it Works:

Context: This experiment will allow students to examine and identify what type of soil is around their homes. Knowing what type of soil you are working with can help you decide what plants to grow in that type of soil or can help you identify what needs to be added to the soil in order to grow specific plants in it. Sand, silt and clay are the 3 types of soil. Each sample you collect will have a different percentage of each of these within it. The percentages of sand, silt and clay will determine what type of soil you are working with.

Example: Roses and lilies both prefer loamy soil for optimal growth. Loamy soil has roughly the same amount of sand, silt and clay along with organic materials (10-30% clay, 30-50% silt and 25-50% sand). This mixture is optimal because it has the benefits of all 3 types of soils with few disadvantages.

Step 1: Allow students time to collect 3 different soil samples from different locations. Fill each mason jar halfway with the different soil samples.

Step 2: Label the 3 jars (front garden, back garden, field etc.).

Step 3: Fill the remainder of the jars with water leaving about an inch of air at the top of each jar.

Step 4: Secure lids on jars tightly and vigorously shake to ensure big clumps of soil are broken up.

Step 5: Set jars somewhere they will not be disturbed and allow them to sit for at least 24 hours

Step 6: Find out what type of soil you have in each jar. To do this you will need to use some math skills! You will need your ruler and a piece of paper.

- Measure the height of the layers together and write your measurement down
- Now measure each layer of soil individually
- Figure out the percentage of each layer

Remember that sand will always settle at the bottom because it has larger particles. Therefore, all jars from the bottom to top will be in the order of sand, silt and then clay on top.

Example: Total of **all layers** = 5cm

Sand = 3 cm - 3 divided by 5 times 100 = **60%**

Silt = 1 cm - 1 divided by 5 times 100 = **20%**

Clay = 1 cm – 1 divided by 5 times 100 = **20%**

Conclusion:

Soil is made up of minerals, water, air and organic materials.

There are 3 types of soil – Sand, silt and clay. Each type of soil has advantages and disadvantages. Different plants prefer different types of soils.

	Particle size:	Benefits:	Disadvantage:	What can grow in it?
Sand	Large	Allows water and air to move freely between particles (<i>good drainage</i>).	If the soil has too much sand, water is not held long enough for plants to absorb nutrients and the soil can be too unstable to support larger plants.	Cactuses, small plants and shrubs.
Silt	Medium	Very fertile, retains water and allows for airflow.	Silt is prone to water erosion, too much silt in soil can make the soil unstable. Needs to be mixed regularly to avoid being too dense eliminating airflow.	Trees, shrubs and crops that prefer more water do well in silty soil.
Clay	Small	High in nutrients that plants need.	Can become so compacted and waterlogged, preventing plant roots from getting oxygen.	Grasses and shrubs.

By adding different soils or organic materials, soils can be manipulated to make the perfect soil for the types of plants you are wanting to grow in an area.

Resources:

Check out this YouTube video! It outlines the soil testing activity in a different format.

<https://www.youtube.com/watch?v=UoD-cUMkRZY>