

Lesson 5: Organic Matter & Soil Compaction

Science Lessons | Grades 6-8



Overview:

The leaf litter around a tree adds organic matter. Leaves that decompose into the soil store carbon. This process is part of the carbon cycle, but it also enhances the soil and creates space for water to be stored and food for decomposers (like fungi). In this activity, students will use a hole they dig next to their tree to take a soil sample to measure the level of organic matter in the soil and look at other markers of soil composition.

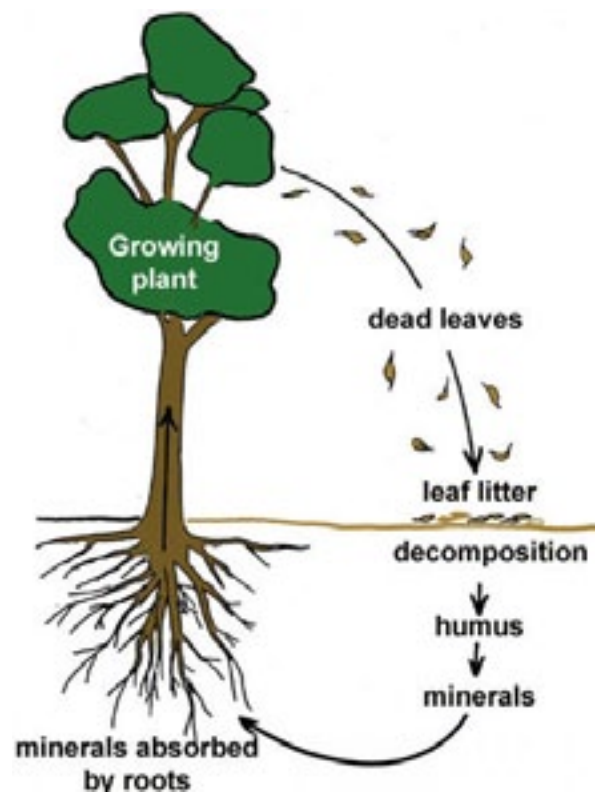
Background:

The particles that make up soil are categorized into three groups by size: sand, silt, and clay. Sand particles are the largest and clay particles the smallest. Although a soil could be all sand, all clay, or all silt, that's rare. Instead most soils are a combination of the three.

Materials:

- A small shovel or spoon for soil sample
- A canning jar or recycled jar with lid
- Water
- 24 hours to allow sample to rest

Soil particles of different sizes serve various purposes in the soil, some trapping water and others allowing for air and space in the soil. Some plants are adapted to heavy clay or loose sand but most plants/trees prefer a mix of soil. The organic matter in particular feeds the mycorrhizae and other decomposers while creating space in the soil and adding nutrients. Balance can be achieved through the addition of organic matter.



Activity:

1. Collect two inches of soil (from four inches below the surface of the ground) into the bottom of the jar.
2. Place a lid tightly on the jar.
3. Fill the jar with water and shake vigorously for 30 seconds?
4. Let the soil settle for at least an hour, or, even better -- overnight.
5. When you return, draw, label, and measure the layers you see. Try not to move your jar because it will stir up the layers!



Questions: what is your soil telling you?

- Do you see organic matter floating on the top?
- Is there any organic matter just above the clay?
- Does it seem like there is balance in the levels of clay, silt, and sand?
- Can you calculate the percentages of soil particles and organic matter using your measurements? Keep in mind the largest soil particles are in the sand and the smallest are in the clay.

Bottom to top: sand, silt, clay, clay & water, organic mater.

Take it further:

- How would various particle sizes affect the storage of water or the health of the roots?
- Consider what happens if you pour water into sand.
- Can roots grow in clay?
- Can you change the soil composition?
- What is nature's way of balancing the soil composition?
- Are there actions you can take on your campus to improve the soil around your tree and enhance its ability to sequester carbon?

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