Healthy Soil Pie

Introduction

To demonstrate the volume composition of typical soil by percentages in a literal pie chart constructed from real material in a cake pan. The "soil pie" shows the percentage composition of soil components and emphasizes the significant presence of air and water. The percentages may be adjusted to demonstrate the impacts of organic matter, sand, and adjustments in porosity/compaction. Rather than illustrating the A horizon, other horizons with higher mineral portions and less air and water may be illustrated for comparison.

Materials

- 8 - 9" round, straight-sided, metal cake pan
- Small amount of crushed dry degraded soil or subsoil to represent the soil mineral fraction
- Small amount of dry organic matter (dried dark-colored compost works well)
- Heavy cardstock or poster board
- White paper
- Blue paper or a picture of water from a magazine
- Clear tape
- Glue or paste
- Wooden sticks – popsicle or coffee stirs

Method

1. Line the pie plate with white paper, securing with tape or glue.
2. Cut some strips of cardstock to use as vertical dividers in the cake pan. Make the strips the same width as the depth of the cake pan. (You can "dress up" the display by color coordinating the cardstock or gluing on colored paper: e.g.: blue for the water, white for the air, tan for the mineral, and dark brown for the organic section.)
3. Use the cardstock strips to divide the cake pan into wedges to represent the proportions of the different soil components. While soils vary a great deal, a typical loam surface soil is 45% mineral matter (gravel, sand, silt, and clay), 5% organic matter, 20-30% water, and 20-30% air. For simplicity, construct the pie so the air and water slices each represent 25%.
4. Secure the dividers to the bottom of the pan (and to each other) with clear tape. The tape keeps the dividers in place and prevents the mineral and organic portions

of the soil pie from escaping into the other compartments.
5. Cut and paste a blue paper wedge into the bottom of the water section of the pie.
6. Fill the mineral and organic matter wedges with appropriate materials. If possible, use sand, silt, and clay or at least separate out the sand portion.

Tips and Tricks

1. Break down the mineral fraction into sand, silt, and clay and adjust the concentrations to illustrate different soil textures. If you have done the soil texture measurement, have the students make their pies to match.
2. Vary the percentages of air and water to illustrate the differences in porosity and compaction.
3. Vary the mineral, air, and water portions to illustrate different horizons.
4. Students could also do similar percentages of sand, silt, clay and organic matter in jars to further illustrate porosity and compaction.