

# Soil Turmoil

## Goals:

Students learn about soil and its importance in the ecosystem.

## Time:

Variable (can be done along trail or as standalone activity, or choose certain parts)

## Materials:

Soil core sampler, vials, ruler, soil chart, water, tin can open at both ends, soil thermometer, magnifying glasses

## Procedure:

- Explain that soil is nonliving but has lots of things living in it, particularly decomposers which recycle nutrients from dead things into the soil. Ask students how humans and other animals need soil (because we need plants, but also minerals, e.g. salt mined from rock). Discuss how soil is made of ground-up rocks, and the mechanisms by which rocks get crumbled into bits (erosion). Discuss particle sizes – large particles are sand, medium size particles are silt, very small particles are clay.
- **Soil layers.** Use soil corer to obtain a sample as deep as you can push it in. Discuss layers of soil, how more organic material is in the top layer, how soils build up over time, soil colors (esp. red from iron oxide). In some areas you may find that the soil is wet below the surface. Discuss how far they were able to push in the corer in and why, in different areas (soil compaction).
- **Soil type.** Take a small amount from each layer you find and put into a vial with water. Shake up and let settle, then measure the height of each layer to determine proportions of clay (top), silt (middle) and sand (bottom). Divide the height of each layer by the total height of the stack to get the percentage of each component. Check the soil triangle chart to find out the type.
- **Percolation.** Ask students which type (clay, silt or sand) water would move through faster. Press a tin can with both ends open into the soil about halfway, pour water in and time how long it takes to sink in. Repeat this in different areas to see if there is a difference. Discuss how this affects plants (most like well-drained soil, some are adapted to grow in sand where water drains away very fast, and some like boggy conditions). Also mention how this affects septic systems.

- **Erosion.** On a slope, pour water on soil and measure how far it runs. Try this in different areas of about the same slope, using about the same amount of water each time. Discuss how this affects plants, and how plants can prevent erosion. Discuss the Dust Bowl during the Great Depression if desired (topsoil blew away due to bad farming practices – now they leave dead plants’ roots in the ground to hold soil down). Discuss arroyos and how water runs off the landscape. Ask students whether they think that more finely ground soil will be in arroyos, or that fine soil will be washed away by the water, leaving coarser material. Test this by doing shake test in vials.

### **Variations & Extensions:**

Divide class into 4-5 groups and have each do a different procedure, then get back together and discuss findings. Can do scientific method with soil and/or quadrats: Observe – hypothesis – experiment – analyze data – results – conclusion (& experimental error)

### **Other Considerations:**

Good to combine with quadrats activity.



## The Textural Triangle

Soil classification is typically made based on the relative proportions of **silt**, **sand** and **clay**. Follow any two component percentages to find the nominal name for the soil type.

For example, 30% sand, 30% clay and 40% silt:

Find 30% along the bottom (sand) line, and follow the slanted line up and to the left. Stop at the horizontal line for 30% clay, and find the soil type: **clay loam**.

