

READING GUIDE*

Soil Characterization and Composition

see Buol et al. (2011), Chapter 2, p. 62-76

OBJECTIVE: *To understand the methods commonly used to collect and analyze soil samples during routine characterization of pedons and to appreciate how this information is used to study soil genesis and classification.*

1. Why is the collection of the soil to be analyzed considered such an important first step in the soil characterization process? **Why are sample location and sample depths important data to record when collecting a soil sample?**
2. Why is it preferred to sample by horizons instead of by strict depth increments (e.g., 0 to 10 cm, 10 to 20 cm, 20-30 cm, etc.)? **When might it be preferred to sample defined depth increments? Give specific examples.**
3. **Why is it necessary to sample all horizons within a profile?**
4. Why is it preferred to collect samples from undisturbed sites, avoiding cultivated areas, developed areas, or exposed excavations?
5. Why are samples collected using an auger or probe not suitable for accurate characterization of a pedon?
6. Why is it normally best to sample a profile from the bottom up?
7. Why have specific methods of analysis been selected for use for routine pedon characterization? Why is it important to specify what method was used to collect the data when the data are presented?
8. For each of the following soil properties determined during a routine characterization of a pedon, describe what is being measured, the value or utility of the measurement (i.e., what information can be inferred from the data), and some of the potential problems or errors associated with the analysis: CEC, PBS, ESP, apparent CEC, pH, organic C content, extractable Fe and Al, phosphate retention, particle size distribution, bulk density, WRD, and COLE.
9. **What percentage of soil organic matter is C?**
10. What technique is used to identify the mineralogical composition of sand and silt particles?
11. How are data on sand and silt mineralogy used when studying soil genesis and classification?
12. What techniques are used to identify the mineralogical composition of clay particles? What minerals may be found in most soils?
13. Why is the identification of clay mineral species present in soils often difficult?
14. How are data on clay mineralogy used when studying soil genesis and classification?
15. What is *soil micromorphology*?
16. How are data on micromorphology used when studying soil genesis and classification?

SYNTHESIS:

17. How are the various soil properties determined during a routine pedon characterization used when classifying a soil in *Soil Taxonomy*? Why might each property be considered important enough to be used for this purpose?

* Questions in plain type represent basic facts and concepts. Questions in **bold** type are those that are answered in the text but require more careful consideration. The Synthesis questions at the end help you apply the facts and concepts to a relevant issue.