DISCUSSION QUESTIONS: CH. 1

1. Explain the “rock cycle”; give an example of how each type of rock can be transformed into another type.

2. Give an example of where in Georgia you might go to find each of the three types of rocks (igneous, metamorphic, sedimentary). Explain briefly how each type of rock got there.

3. What forces power “plate tectonics”? Explain briefly how it works to make continents “drift”.

4. How, and why, has sea level changed over geologic time? How has that change affected the geology of Georgia?

5. Contrast nearly level landscapes with steep landscapes, in terms of: relief, stream gradient, soil wetness, and soil development, using Georgia landscapes as examples.

6. Explain the differences between “depositional” vs. “erosional” landscapes. Where in Georgia do these occur? Explain why/how.

7. Compare “upland” soils with “bottomland” soils. What are the parent materials of these two landscape positions? How does this affect soil profile features/development?

8. What kind of geologic formation is Stone Mt.? What does it tell us about the history of the Piedmont landscape?

9. What does soil color (e.g., red vs. grey) tell you about a soil? Explain why this is true in terms of Fe chemistry.

DISCUSSION QUESTIONS: CH. 2

1. You are at a friend's house, looking at their vegetable garden. They give you a handful and ask, "What do you think of my soil?" What factors would you consider in your answer?

2. Compare physical and chemical weathering of rocks; which do you think is actually more important in creating parent material? Defend your answer.

3. Discuss how oxidation and reduction of iron (Fe) works, and why it is important in soil formation and in determining soil properties.

4. How does climate affect the weathering rate of parent materials? Give some specific examples of how climatic factors influence weathering reactions.

5. What is the idea behind *transported* parent material? Give some examples of transported parent materials, and where in the landscape you would find them.

6. Compare soil formation on nearly level land with land that has a steep slope. What processes associated with slope affect things like soil depth and B horizon thickness?

7. Compare/contrast soils that have formed on felsic-type rocks with those that form on mafic-type rocks. Explain why these differences occur.

8. Tell the story of the bison, the Indians, and the prairie soils of the Great Plains.

9. Define *translocation*; describe its role in creating soil horizons within a soil profile.

DISCUSSION QUESTIONS: Ch. 3

1. Define “pedon”; what is its role in soil classification (e.g., Soil Taxonomy)?

2. Compare/contrast the properties of the following horizons:
    A. mollic vs. umbric
    B. argillic vs. oxic

3. For each of the soil orders listed below, define their *diagnostic horizons*, say something about which *Soil Forming Factors* are important in their formation, and give a *state in the US* where you might find them.
    A. Entisol
    B. Inceptisol
    C. Alfisol
    D. Spodosol
    E. Mollisol|
    F. Ultisol
    G. Oxisol
    H. Histosol

4. Which of the above soil orders above are either rare or not found in Georgia (probably 3 of them). Explain why, based on the Five Factors.

5. A fresh pile of weathered parent material is deposited in a subtropical climate like Georgia. Trace how soil horizons and soil orders develop over a million years or so in this material. Assume the site is initially well-drained, with hardwood native vegetation.

6. Explain what a “seasonal high water table” is. How does this idea explain the occurrence of low-chroma redox features and gleyed horizons along a hillslope catena?

DISCUSSION QUESTION: CH. 4

1. Explain why soil texture is the most important soil property in terms of use and management.

2. Compare the surface areas (in m^2/g) of sand, silt, and clay; what is the importance of this difference?

3. What is the importance of soil structure? What does structure have to do with porosity, especially macroporosity?

4. How does granular structure form, and what makes it stable, in topsoils?

5. How does stable granular structure in A horizons increase infiltration and reduce soil erosion?

6. Explain the relationship between total porosity and bulk density of soils.

7. What soil and management factors determine a soil's bulk density? What types of soils tend to have high bulk densities, and what types tend to have low BD's?

8. Define the term "pan". What is the difference between a *tillage* pan and a *traffic* pan?

9. Describe and explain several management practices that can improve granular structure in topsoils.