

Practice Questions for Schuur lectures

1. Compare how layered silicate clays and variably-charged clays affect the retention of base cations in the soil solution. How does a change in soil pH affect the behavior of these clays?
2. Please identify the soil orders to which the following soils belong & write a general statement that characterizes that soil order.
 - a. Arenic Plinthic Kandiuustult
 - b. Udic Haplustoll
 - c. Petroferric Sombriperox
 - d. Acrudoxic Vitric Melanudand
 - e. Chromic Haploxerert
 - f. Oxyaquic Fraglossudalf
3. List and explain three ways that phosphorous cycling differs from nitrogen cycling.
4. What are the 5 state factors? How does each of them influence ecosystem structure and function?
5. Please evaluate the following statement: All tropical soils have low fertility and are poor for agriculture. Is this statement is true or false? Explain your reasoning.
6. 4. In the mid 1800's in subtropical South Florida, dunes were stabilized so that people could build houses on the barrier islands. Trees, grasses and other species were planted in an effort to stabilize the dunes. Over a hundred years later there are now oak forests, pine forests, and some small areas that remain as original, intact dunes. You have just completed a survey of the soil in this region, and have collected the following data:

Dune			Oak			Pine		
Depth	BD	%C	Depth	BD	%C	Depth	BD	%C
0-10	1.4	0.05	0-3	1.3	8.20	0-13	1.3	0.50
10-29	1.4	0.02	3-18	1.5	1.90	13-48	1.4	0.61
29-41	1.4	0.03	18-60	1.6	0.21	48-100	1.5	0.06
41-53	1.4	0.02	60-84	1.6	0.12			
53-64	1.4	0.03	84-100	1.7	0.07			

64-78	1.4	0.07
78-100	1.4	0.03

BD=bulk density (g/cm³)

Depth = cm

6cont. As part of your survey, you have determined that this area ($4.1 \times 10^6 \text{ m}^2$) is 65% covered by oak forests, and 30% covered by pine forests. The original dunes that remain cover only 5% of the total area. Using these data, how much carbon has accumulated in the top 1m of mineral soil as a result of the dune stabilization? For this calculation, you can ignore the carbon accumulated in living biomass and just focus on the mineral soil reported in the table.

Some hints: You need to calculate the total amount of C in a square meter, to 1 m depth (effectively 1 cubic meter). So, you need to figure out how many cubic cm (cc) are in that cubic meter. The bulk density tells you how much soil weight is in each cubic cm. (What else is contained in a cc besides mineral soil?). Then, the % C can be used to figure out the quantity (grams) of C in each cc of soil. Do this calculation for each individual horizon (because they have different BD and %C) and add them up for the whole soil profile. Then compare the different soils types and the how vegetation distribution has changed over time to determine the amount of C. Try this yourself, and/or work with a partner to figure this out.