Soil Water Content

Field Biology

Using your data from last Thursday's class and some additional data you collect today, you can calculate the amount of water that each of your soil samples held. Since the soil samples have been drying for several days, almost all of the water in the samples has evaporated. Therefore, you can use subtraction to figure out how much water was in the sample to begin with. Find your Petri dishes from last Thursday and find the mass of the Petri dish with the now dry soil. Use that information to complete the following data table (items in **bold** indicate data you collected in class on Thursday).

	Mass of Empty Petri Dish (g)	**Mass of Petri Dish + Wet Soil (g)**	Mass of Petri Dish + Dry Soil (g)
CV Soil			
CV + River Soil			

Using this information, you can calculate the amount of water that was originally in each sample by subtracting the mass of the Petri dish + the dry soil from the mass of the Petri Dish + the wet soil:

	Mass of Water in the Sample (g) = (Mass of Petri Dish + Wet Soil) – (Mass of Petri Dish + Dry Soil)
CV Soil	
CV + River Soil	

You can also use the data above to calculate the mass of the dry soil in each sample by subtracing the mass of the empty Petri dish from the mass of the Petri dish + the dry soil:

	Mass of Dry Soil in the Sample (g) = (Mass of Petri Dish + Dry Soil) – (Mass of Empty Petri Dish)
CV Soil	
CV + River Soil	

You can use the last two calculations you made to make your final calculation of the water holding capacity of each soil. The water holding capacity of a soil is equal to the amount of water held by the dry soil expressed as a percentage of the dry soil's mass:

	Water Holding Capacity of the Sample (%) = (Mass of Water in the Sample) ÷ (Mass of Dry Soil in the Sample) ✕100
CV Soil	
CV + River Soil	

Now, answer the following questions to summarize and analyze your results.

1. Which soil had a higher Water Holding Capacity – the CV soil or the CV soil mixed with the river soil?

2. Why do you think the addition of the sandy river soil changed the water holding capacity of the CV soil? What physical property of the sand might have affected the water holding capacity of the soil?

3. If you had a plant that needed lots of available water, would you want to plant it in the CV soil or the CV soil mixed with the river soil? Explain your response.

4. Explain why a soil with a very high water holding capacity might be GOOD for plants to grow in.

5. Explain why a soil with a very high water holding capacity might be BAD for plants to grow in.

6. Imagine that you collected a soil sample from Cheldelin Middle School. You found the mass of an empty Petri dish (46.2 g). Then you put the soil sample into the Petri dish and found the mass of the dish plus the soil (141.2 g). Finally, you dry the soil sample for 48 hours and find the mass again (98.3 g). What is the water content of the soil? (Use the same methodology that you used above.)