

## Soil Chemistry

Name \_\_\_\_\_

This is an individual project. When applicable, show clearly your calculations and underline the final result. Make sure that the instructor can follow your answers.

1. **(10 pts.)** Water of composition A (see below) is purified by infiltration in dune sand containing pyrite ( $\text{FeS}_2$ ) and  $\text{CaCO}_3$  (shells), abundant organic matter, and ferric ( $\text{Fe}^{3+}$ ) oxide. After flowing through the sand, water has composition B. List the processes that may have affected the water composition.

Water Composition	$\text{O}_2$	$\text{SO}_4^{2-}$	$\text{HCO}_3^-$	$\text{Ca}^{2+}$	$\text{Fe}^{2+}$	$\text{NO}_3^{2-}$	pH
	mmol/L						
A	0.245	0.791	3.231	2.350	0.00	0.149	7.6
B	0.00	0.922	3.640	2.612	0.036	0.056	7.7

2. **(10 pts)** Calculate the amounts of  $\text{CaCO}_3$  required to raise the pH from 5.6 to 7.6 in the first 0.3 m of soils B and C (Fig. 9.5). Consider a bulk density value of  $1.4 \text{ Mg/m}^3$ .