

**Study Guide – Soil Quiz II and
Soil Nutrient Experiment Setup**
Field Biology

1. What is the importance of the nitrogen cycle?
What role do soil organisms play in the nitrogen cycle?
2. Explain how soil organisms can contribute to the decomposition of organic material at the surface of the soil.
3. Why is it that plants can use nitrogen in the form of ammonium (NH_4^+) and nitrate (NO_3^-) but not organic nitrogen?
4. Draw a simplified diagram of the nitrogen cycle (as discussed in class). Be able to identify the role of different organisms at each stage of the cycle.

Information for Soil Nutrient Experiment:

Nitrates (NO_3^-) and ammonium (NH_4^+) are charged molecules. Soil also has a charge – most soils are negatively charged, and clay particles are more negatively charged than silt and sand. Remember that like charges repel each other, and unlike charges attract each other. Using this information, answer the following questions:

1. Are soils more likely to be able to retain nitrate molecules or ammonium molecules? Why?
2. How would you expect that clay soils would compare to sandy soils in terms of their ability to retain nitrate molecules and ammonium molecules? Why?

On Tuesday, you will have the opportunity to test the abilities of different soils to retain different types of substances. You will have the following materials available to you:

- a) Clayey soil from CV's campus
- b) Sandy soil from the Willamette River
- c) A blue dye – the dye particles are positively charged (like ammonium)
- d) An orange dye – the dye particles are negatively charged (like nitrates)
- e) Funnels, beakers, flasks, graduated cylinders, filter paper, and other miscellaneous supplies.

Using the materials described above, explain how you can test your answers to #5 and #6 above.