**Due:** 8 April 2010 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The most revealing insights about the nature of soils come from the comparison of many datasets. The more soil attributes we understand, the closer we get to knowing the true soil solution. Via geochemistry we can even get to know a soil with which we’ve never physically interacted!

After mixing the conductivity buffer, choose and complete one of the five tasks. (It’s best to discuss scheduling and organization of lab-time/space with your classmates prior to taking action.) Then create a visual representation of your data to share with the class. We’ll analyze the data as a group during our next lab.

*Conductivity Buffer Solution*

How much 1 M KCl solution do you need to make 1 L of 0.02 M KCl buffer solution (known to have an electrical conductivity of 2.76 mS/cm)?

*Conductivity*

Mix **20 mL distilled water** with **10 g soil**. Measure EC of buffer solution and sample, and record.

*Acidity*

Mix **20 mL distilled water** with **10 g soil**. Let soil settle. Measure pH of buffer solutions and sample, and record.

*Mineralogy*

Grind sample completely to a powder. Pack sample in aluminum holder. Place holder in the XRD and close shutter. Turn on X-ray tube, set scan range to 2-70°2θ, browse to appropriate save file, and run. When scan completes, open file in MDI Jade, remove background, run search-match, and print results.

*Grain Size*

Weigh out **~100 g soil**. Sieve-shake mechanically for **10 min**. Weigh each fraction and record.

*Loss-on-Ignition*

Weigh out **~2 g ground soil** into crucible. Place in furnace. Combust for at least **two hours** at both 450°C and 950°C, recording weight after each combustion.

*Reporting*

Create a graph or other visual representation of your data.

|  |  |
| --- | --- |
| **Sample** | **Conductivity** |
|  | Buffer reading | Sample reading | Corrected sample EC |
|  |  |  |  |
|  |  |  |  |
|  | **Acidity** |
|  | pH 4 reading | pH 7 reading | pH 10 reading | Sample reading | Corrected sample pH |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | **Mineralogy**- list the most likely minerals with their chemical formulae |
|  |  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |
|  | **Granulometry** |
|  | < |  |  |  | > |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | **LOI** |
|  | Crucible weight | Sample + crucible weight | Post-450°C weight | Post-950°C weight | SOM % | Carbonate % |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |