**Laboratory Format**

**Grain Size Analyses of Soils**

**Due Friday, October 11, 16:00**

Title (should be informative of what the project entails)

Introduction

* Who, what, when, where, why, other

A List of Your Team Members

Procedures

* A step-by-step bulleted outline or narrative of the procedures used in the laboratory; the text should be organized in a manner that you could reproduce your experiments five years from now.

Results:

* Table I – Your classifications of ‘Estimation of Texture (‘Field Textures via your fingers) of the nine soils from Lab 1.
* Table II – (For the Pipette Method): Sieving data (weights) for the total weight of sample for a) sand, b) silt, c) clay and e) silt and clay, for all six samples. Be sure to follow the directions on your lab sheet for proper calculation of the silt and clay.

*For Example:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample | Starting Wt. (g) | Wt. of Sand (g) | Wt. of Silt & Clay (g) | Wt. of Silt (g) | Wt. of Clay (g) |
| Z | 40.05 | 10.00 | 27.50 | 20.00 | 7.50 |

* Table III - (For the Pipette Method): Sieving data (percents) for a) sand, b) silt, c) clay (adjusted for 1000 ml, and normalized by dividing each value by **your total recovered sample weight**) for all six samples.

*For Example:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample | Recovered Wt. (g) | Percent Sand | Percent Silt | Percent Clay |
| Z | 37.50 | 26.67 | 53.30 | 20.00 |

* Table IV – (For the Hydrometer Method): Sieving data (weights) for the total weight of sample for a) sand, b) silt, c) clay and e) silt and clay, for all six samples.

*For Example:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample | Starting Wt. (g) | Wt. of Sand (g) | Wt. of Silt & Clay (g) | Wt. of Silt (g) | Wt. of Clay (g) |
| Z | 40.05 | 10.00 | 26.50 | 19.00 | 7.50 |

* Table V - (For the Hydrometer Method): Sieving data (percents) for a) sand, b) silt, c) clay (normalized by dividing each value **by your total recovered sample weight**) for all six samples.

*For Example:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample | Recovered Wt. (g) | Percent Sand | Percent Silt | Percent Clay |
| Z | 36.50 | 27.40 | 52.05 | 20.55 |

* Table VI - Percent Difference of clay fraction for each soil comparing the pipette and hydrometer methods. Percent Difference = 100 \* (high value % – low value%)

(average of two %values)

*For Example:*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample | % clay (hydrometer) | % clay (pipette) | Percent Difference |
| Z | 20.00 | 20.55 | 2.71 |

* Table VII - (for pipette)

Percent loss of sample = 100 \* [**1**- *{ (recovered wt. sample)/( starting wt. of sample)}*]

*For Example:*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample | Starting Wt. (g) | Recovered Wt. (g) | Percent Loss |
| Z | 40.05 | 37.50 | 6.37 |

* Table VII - (for hydrometer)

Percent loss of sample = 100 \* [**1**- *{ (recovered wt. sample)/( starting wt. of sample)}*]

*For Example:*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample | Starting Wt. (g) | Recovered Wt. (g) | Percent Loss |
| Z | 40.05 | 36.50 | 8.86 |

* Figure 1 – Plot your values from Tables III and V on the soils ternary diagram (e.g., slide 37 of ‘Soils Up Close’ lecture, or similar diagram). Also, plot your value of ‘Field Texture’ estimates from Lab 1 on this diagram (choose the center location for these data). Be sure that I can make out ‘which is which’ for your different plots of the data.

Discussion:

* How do your Field Textural estimates from Lab 1 compare to the sieve data for each sample?
  + Specifically, what was your success rate (percent) in ‘a perfect match’, defined as assigning a given soil the same texture on the ternary diagram (your Figure 1) using both the Field and Sieve/Laboratory techniques?
  + Additionally, if we broadened our criteria to ‘a good match’ by counting both an exact match and/or an adjacent soil texture category (i.e., you were one sector off), how is your success rate?
* Do you think your ‘Estimation of Texture’ from week one is a good approximation for classifying our soils? Do you observe any broad trends in your data that show a good match between certain grain sizes (i.e., sand, silt, clay) between your finger testing and the sieving data? If so, why might that be?
* Ideally, you have less than 5% loss of your sample while running your analyses for both the pipette and hydrometer. Offer up plausible explanations of any discrepancies in your recovery based on your procedures in our laboratory.
* What are your observations in which technique (pipette or hydrometer) is the most reliable when assessing the fine fraction of a sample? Offer plausible explanations for your logic.
* Any other observations pertinent to the laboratory

Conclusions (Number or bullet the conclusions)

\*\*Part of your evaluation will be based on the ‘Professionalism’ of your report. A good rule of thumb—would you be satisfied paying $500 if you were receiving YOUR report as a customer, based on the quality and accuracy of the data, and presentation of the report? If not, make it better!