Lab 1 Results: Calibration of Burettes

- Expected fabrication errors for burettes should not exceed 0.2 mL
- Expected errors in reading the burette should not exceed 0.1 mL
- If your deviations are significantly larger than 0.25 mL your analytical skills definitively need improvement

Graph: Average Burette Correction in Lab 1 (in mL)

- Expected value < 0.2 mL; Range reported = 0.02-4.00 mL; Median = 0.10 mL

Bar chart showing distribution of average burette corrections with categories from 0.00-0.05 mL to >0.5 mL.

Legend:
- Good results
- Unsatisfactory results
Lab 2 Results: Strong Acid Determination

\[
\frac{[\text{Strong}]}{\text{measured}} / \frac{[\text{Strong}]}{\text{true}} \text{ in Lab 2}
\]

Expected ratio = 1.00; range reported = 0.001 to 78; median = 1.11

Correct

Unsatisfactory results

Unsatisfactory results
Lab 2 Results: Weak Acid Determination

$$\frac{[\text{Weak}]_{\text{measured}}}{[\text{Weak}]_{\text{true}}}$$ in Lab 2

Expected ratio = 1.00; range reported = 0.0002 to 118; median = 0.97

Correct

Unsatisfactory results

Unsatisfactory results
Lab 3 Results: Carbonate Titration

$\text{wt}\% \text{K}_2\text{CO}_3_{\text{measured}} / \text{wt}\% \text{K}_2\text{CO}_3_{\text{true}}$ in Lab 3

Expected ratio $= 1.00$; range reported $= 0.032$ to $2.95$; median $= 1.03$

- Correct
- Unsatisfactory results
- Unsatisfactory results
Lab 4 Results: Total Ca$^{2+}$ and Mg$^{2+}$ in Water

- Bias in the method: measured values are systematically larger than expected.
- The bias is likely caused by incorrect drying of hydrates of MgCl$_2$ and CaCl$_2$
Lab 4 Results: Ca$^{2+}$ in Water

- Bias in the method: measured values are systematically larger than expected
- The bias is likely caused by incorrect drying of hydrates of MgCl$_2$ and CaCl$_2$
Lab 5 Results: Weight % of Fe in the Unknown

- Bias in the method: measured values are somewhat smaller than expected
- The bias is likely caused by incorrect drying of FeSO$_4$(H$_2$O)$_7$
Lab 1-5 Ratings (A = 4; B = 3; C = 2; D = 1; F = 0)

- Lab 1 was by far the least popular...
- By a popular vote, glassware calibration will be replaced by error discussion in 2009
Lab 2-5 Ratings: Which One Would You Remove?

- Carbonate lab was the least popular titration lab
- It will be considerably modified or even replaced with something else next year