Solution Chemistry

2007 RET project by:

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Purpose

- **Students of all levels in high school chemistry acquire the necessary computational skills to determine solution composition**

- **Provide students an opportunity to experimentally analyze a solution's composition**

- **Students' precise method of solution analysis can be determined by the teacher or discovered by the students.**

Necessary Calculations:

- %(m/v)
- %(v/v)
- %(m/m)
- M
- $M_1V_1 = M_2V_2$

- grams solute/mL solution x 100
- mL solute/mL solution x 100
- grams solute/grams solution x 100
- moles solute/ liters solution
- Moles of solute at the start (1) are equal to the moles at the end (2) of a dilution.

Procedures:

1. Prepare 250. mL of a 5.00% aqueous solution of NaCl. Using evaporation, devise a procedure for assessing how precise you were in making this solution.

2. For an unknown solution of NaCl, utilize a 0.10 M $AgNO_3$ solution to stoichiometrically determine the concentration of NaCl. (Ensure all NaCl reacts with the $AgNO_3$.)

3. Assess % (m/m) salicylic acid in aspirin tablets employing spectrophotometry. Several procedures are available utilizing the reaction between acetylsalicylic acid and iron(III) nitrate.

4. Make a serial dilution of a solution of known concentration in order to compare and estimate the concentration of 10 mL of the unknown sample using the intensity of a the dilutions as the basis of the estimated concentration.

Conclusions:

- How close were your results to the actual solution composition?

- What made you choose your method of analysis?

- What are possible sources of error and how could you correct for them in the future?

- How should your grade be assessed? Explain your reasoning.

References:

Chang, <u>General Chemistry, The Essential Concepts</u>, McGraw-Hill (2006).

Randall, <u>Advanced Chemistry with Vernier</u>, Vernier/LoggerPro.

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