

## Final Laboratory Report – Laboratory Project

**Each person** in the course is required to submit an **individual report** on the laboratory project.

I do realize that you will be discussing your results with the other members of your group. That is not only expected, but encouraged. The report, though, is to be your own individual document reflecting how you choose to describe the work you have undertaken over the semester. As such, I expect that each member of a particular group will submit a unique document that might have considerable differences in style and the manner in which data is presented and discussed.

Although I can also imagine reports from members of a group in which plots or tables of data are the same. The report is to be patterned after scientific journal articles published in *Analytical Chemistry*. It should be comprehensible to other students who have taken Separation Science at Bates. There is no length restriction; however, the report should be concise, yet complete. The report is to be a typed, double-spaced, size-12 font.

The report should contain the following sections:

### Title

**Abstract:** The abstract consists of a short paragraph containing a brief description of the focus of your experiment, a short statement describing in general terms the results obtained, and any major conclusions of your study. The abstract should only contain statements about what you did, how you did it, and the results obtained. It should be in the range of 100-200 words.

**Introduction:** The introduction should include a section justifying the work that has been done and explaining why the work was important to perform (why it is important to analyze for the particular species that you measured). The introduction also ought to describe in general terms (specific details will be provided in the Experimental Section) the methods that were used to perform the measurement. New techniques, instruments, or methods that would not be familiar to someone in the Separation Science course should be described. Relevant background literature that is important to the substance(s) you were analyzing or that helped you in designing particular aspects of your project are included in this section.

**Experimental:** This section should include a thorough description of all procedures that were followed in carrying out experiments and collecting samples and data. It should contain complete descriptions of equipment or apparatus including brand name and model numbers that were used, parameters that were set on instrumentation (e.g., flow rate, etc.), detailed procedures for preparing solutions, thorough descriptions of how samples were obtained, and procedures for workup and analysis of data. A common mistake that is made in this section is the omission of important details that another person would need to replicate the experiment. Another common error is for the writer to start reporting results or conclusions in this section, or to start explaining why a particular experimental protocol was used. These types of discussions belong in the Results and Discussions section. The Experimental section is essentially a cookbook (although it is not written as an itemized list of procedures, but written in a textual form) that describes to anyone else how to perform an identical experiment to what you have done. This is an important

section in a scientific paper because it is critical to anyone else who wants to repeat the work.

**Results and Discussion:** This section involves a presentation and discussion of the data. The presentation and discussion are integrated together. In other words, there is not a separation section that merely presents all of the data and then a following section that discusses its significance. The results of your work are to be communicated in an organized manner, and the significance of your results are to be discussed. The following items are usually included:

- Data: Relevant primary data should be included. This may best be done in the form of a table or figures with appropriate reference and discussion in the text.
- Tables: Tables should generally be integrated into the text. Tables are given titles and are numbered consecutively. Tables must be referred to and discussed in the text.
- Figures: Figures should generally be integrated into the text and are numbered consecutively. Each figure is described by a caption that appropriately describes the figure. Each figure must be referred to and discussed in the text. A common error for many first-time writers is to provide figure captions that tell too little about the figure.

Any conclusions that can be drawn from the data must be stated and supported by a discussion of the data. If the data appears flawed in some way, thereby preventing definitive conclusions from being drawn, this should be discussed. Data that you measured ought to be compared to prior results reported in the literature. A common error in these reports is for the writer to overstate the degree to which a conclusion is valid. This section should also include discussions of your experimental protocols; why you chose to perform the experiment the way you did and what you would retain and change if you were to continue the work.

This section should also contain a description of any future work that would be done should you continue this project. What would be done to obtain better data with a higher degree of accuracy and reliability? What experiments would you have performed if you had the time? Is there equipment that would have helped in the execution of your project?

**References:** Any information that is used in the report but obtained from another source (text, journal article, etc.) should be referenced.