

Organic Chemistry 212 Laboratory

How to Write a Laboratory Report

The main objective in producing a *written* laboratory report is to preserve and convey the steps taken during an experiment, the observations made, the results and the conclusions drawn; as effectively as possible. The report is a demonstration that the student learned what was expected. A well-written laboratory report must:

- a) ***Be reproducible*** within the acceptable limits of error: Accuracy and detail in recording are the keys to achieve reproducibility. On the other hand, sloppiness and dishonesty are factors that augment the reproducibility of an experiment.
- b) ***Be clearly communicated*** both in the procedure summary and in the expression of the thought process in the interpretation of results obtained: Relevant details should not be left out to just save time or paper space. The report needs to be well organized. Presentation is not everything but it is very important.
- c) ***Follow the format*** agreed upon by the scientific community, in order to facilitate comprehension and minimize ambiguity.

The Accepted Format for Written Scientific Reports:

A full laboratory report should be consisted of the following parts, in the sequence shown below:

- Pre-Laboratory procedure
- Observations
- Calculations: ***All*** of the calculations performed.
- Results: A simple statement of the main result(s) of the experiment. A table should include any numeric results
- Discussion of results: Analysis, explanation, and interpretation of the results. Analysis of error, explanation of chemical or physical processes of the experiment.
- Conclusions: Identification of unknowns along with a brief statement of reasoning, brief summary of results, comparison to known data as a indicator of purity, percent yield, etc. (this section should be fairly short and to the point.)
- References: A list of all the literature sources used for the experiment and the report.

Maintaining the Laboratory Notebook:

1. **Name:** Your laboratory notebook should be labeled with your name.
2. **Page Numbers:** Since all the pages are numbered, you should use the pages sequentially.
3. **Table of Contents:** Dedicate the first two pages of the notebook to the "Table of Contents". Draw the table first and update it every time you add more experiments to your notebook.
4. **Cleanliness:** The notebook has a semi-resistant cover. It is wise, however, to wipe it with a damp cloth, to keep it in a decent shape as long as possible.

Pre-laboratory Procedure:

A pre-laboratory protocol must be completed BEFORE the laboratory (sorry for mentioning the obvious!). It must have the following parts sequentially:

- *Date*: The starting date for the experiment.
- *Title*: The title of the experiment.
- *Purpose*: The main purpose of the experiment, stated in the form of a COMPLETE sentence.
- *Equation for the main reaction(s)*: If any.
- *Mechanism for the main reaction(s)*: If applicable. Usually with chemical synthesis experiments (where a product is obtained from reactants, the reaction mechanism is necessary).
- *Materials*: A data table of chemical substances which includes the structures, the relevant physical properties and the amounts used. This should also include the products and the structural and physical data – the amount used would not be included.
- *Safety information*: A data table of chemical substances which includes the relevant safety information, and the disposal notes for reactants, chemicals used in purification and products.
- *Apparatus*: Includes hardware and glassware pieces. This list of equipment could be a table. Since many of the techniques will be used again in the future it is best if a sketched diagram of the apparatus is included
- *Summary of the procedure*: This section will ultimately become your only reference source to the experimental steps. In order to make the procedure section easy to follow, the summary should be written on the left half of the notebook pages, and any observation for the steps should be recorded on the right half, across from its corresponding step.

More Pointers...

1. Each section of the laboratory report must be labeled, in order to make the reading of the report smoother.
2. The report must be written in third person (voice). (Do not use the phrase “I” or “the student” etc. Always write about the experiment i.e. “the water boiled”).
3. The report must be written in ink (no pencil). The prelab and post lab may be typed.
4. If any mistake is made, it should be crossed out (~~with a horizontal line through it~~) and initialed by the writer of the report.
5. ALL the lines (Including underlined titles, tables, strikethrough, etc...) must be drawn using a ruler (no free-hand drawing).
6. The report should not convey any personal emotion (positive or negative).
7. Handwriting should be legible
8. Language and diction should be formal and professional.
9. The report should not look like a rough draft.