**Writing a Formal Lab Report**

In English and humanities classes, papers are written according to MLA style, which is more flowery, subjective, and uses a voice and tone targeted to the “right” audience. In the scientific community, objectivity, economy of expression, and clarity are prized above all else, so we use APA style instead. APA style is very clinical and formal – **3rd person, no pronouns, no contractions, formal grammar and conventions, and generally passive rather than active voice.** The following words are examples of pronouns: I, we, our, my, they, the students, the lab group, etc.

Laboratory reports can be as long as they need to be and should be organized into sections with clear section headers (see below).

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**PRE-LAB (Lab Notebook)**

***Before every lab***, you will write your pre-lab in your laboratory (composition) notebook. You must write in pen. **NO** erasable pen, pencil, or white-out. If you make a mistake, cross it out neatly with a **single line** so that it can still be read. The following should be included in your pre-lab:

**Title**: the name of the lab experiment (e.g. Chromatography Lab)

**Dates**: the range of dates in which the experiment was completed (e.g. 09-07-10 to 09-10-10)

**Partners**: name your partners (not yourself) by first AND last name

**Objective**: a brief statement as to what should be accomplished/learned by doing the lab, and what method will be used.

**Materials**: a bulleted list in column format of the number/amount and type of glassware, chemicals, and other equipment needed (stopwatches/timers, probes, devices, etc.); lab notebooks, goggles, aprons, pens, etc. are assumed to be necessary for all experiments and do not need to be included.

**Pre-Lab Questions and Answers:** Some labs have pre-lab questions that must be answered before starting the lab. Write the question first and then the answer after.

**Safety:** Some labs require specific safety materials (goggles, apron, clean up procedure…etc).

**Procedure**: a numbered list of very detailed steps, in chronological order, that clearly describe what you did in the lab. Start each direction with a verb. There should be no data, observations, or calculations here. If you have to ask a question about the procedure in the lab, add a clarification to that step of your procedure in the final report.

**DURING THE LAB (Lab Notebook)**

***During every lab***, you will take your **Data and Observations**. Thisincludes **ALL** measurements and observations that were collected while doing the experiment, plus any changes to the procedure that you made. Write down *EVERYTHING* you observe, using neat tables. All units should be included (g, mL, cm, etc.) and you should include a section for handwritten notes on what you observed – you’d be surprised how quickly you forget what shade of blue your solution was or what the grains of your powder looked like. There should be no calculations or graphs in this section unless you need them to complete the procedure.

**TYPED LAB REPORT (Canvas)**

***Following every lab***, you will type a lab report, which includes:

**Data Table:** You must create a typed data table. Everything recorded in the data table of your laboratory notebook must be included in your typed data table.

**Apparatus**: Include a simple, neat, fully labeled diagram(s) of any equipment set-up required in the lab. You may draw or use photographs from YOUR ACTUAL SET-UP of the apparatus used in this experiment.

**Analysis/Results**: a logically-organized collection of all calculations (with work shown) and graphs relating to your data, and the answers to any questions required for the lab report. Questions should be numbered and typed in a different font than your answer. Answers must be written in complete sentences unless stated otherwise. Graphs should follow all best practices.

**Discussion/Conclusion**: 3-4 paragraphs interpreting your data and analysis by answering the following questions in detail (1 per paragraph). Adhering to APA style is most important here.

* Discuss whether you met your objective(s) by citing 1-2 specific pieces of data (or numbers or features on graphs in your analysis) that directly address the most important objective(s). Discuss how well you met your objective by comparing those data points to any available literature values (cite your sources or show calculations) and evaluating their accuracy, precision, etc.
* List and discuss 2-3 specific sources of error that could explain why your data did not match the literature values/why you did not achieve the objective. For each source of error, explain how it would affect the data points you recorded, and how that would affect your achievement of the objective. It must affect both!
* How would you improve the procedure to eliminate or reduce your experimental error? You must address each source of error listed above. If there are extra trials or independent variables that could extend the application of the lab, this is also a good time propose them and explain how they would be useful/what you would expect to learn from them.