

Analysis: In this section, the observed and measured data that was collected is *interpreted*. This may include calculations in which formulas and all work is shown with units. For example, this is where calculations of percent difference or error are made or where other statistical interpretations of the data are made. It generally includes a written analysis that speaks to the meaning and significance of the results by describing trends and patterns seen in the results.

Error Analysis: In this section unavoidable errors stemming from weaknesses in the design of the experiment are described. Errors are issues with the experiment that may undermine the validity of the results. Factors that are outside of the control of the experimenter are potential errors. The errors must be described as well as *how* the errors may affect the results.

True errors are not *mistakes* that the researchers made. Mistakes should be rectified whenever possible by redoing part of the experiment. If they cannot be rectified, then mistakes must be reported here because they may affect the validity of the results.

**Examples:**

Although we planted 100 tomato seeds from the same packet, it is possible that some of the seeds were not fertile and would not germinate under any conditions. In this case, we cannot prove conclusively that exposure to the pesticide is what prevented those seeds from growing.

The steel balls used to determine the acceleration due to gravity may have had minor imperfections from the manufacturing process and years of use. If so, then they may move differently or more slowly through the air as they fall, which would make our final value for gravity's acceleration less than accurate.

Because it is difficult to ensure that the entire volume of solution is poured out of a piece of glassware, the final mass of our reactant solution may be an underestimation.

Conclusion: The conclusion should first address whether the purpose/question was able to be carried out/answered and, if not, why not. Then it should address whether the hypothesis was supported or not. In either case, a brief summary should be provided that highlights only the key portions of the analysis and error analysis that justify the support or non-support of the hypothesis. Do not repeat data from your data section or repeat the entire analysis only the final outcomes.

The conclusion should be written so that it can stand alone. If someone merely reads the title, purpose, and conclusion of the write-up, they can understand why the study was done and what the results were, even without reading the other sections. In its simplest form, it is merely a restatement of the findings of the experiment as it is directly tied to the *purpose* of the lab.

A Conclusion is a statement about how the observations you made, fit together, and should summarize the ("bottom line") of the Analysis section. Your Conclusion should be legitimately derived from your observations and data analysis. Make sure that all important conclusions and final calculation solutions have been clearly and succinctly restated.

**Example:**

In conclusion, utilizing Freezing Point Depression Analysis, the formula weight of an unknown substance was determined to be 172.9 g/mol. When compared to the actual molar mass of 182.22 it was found to have a 5.11 % error.