Guidelines for Writing a Scientific Abstract

Abstracts:

The abstract appears at the beginning of a lab report or scientific paper, but it is generally the last portion to be written. It is a brief synopsis of the entire report, and is done as a courtesy to other scientists. The abstract allows your peers to quickly determine if your experiment and results are of interest to them, so that they may focus their research on relevant materials. This is the only portion of your report that many people will read, so your wording should be considered carefully. It is where you try to sell the importance of your research to your peers, as you want them to read the rest of your report and hear your ideas. In as concise a language as possible, state the rationale for the experiment, a brief statement about the analytical technique, a summary of your results (including important numbers), and a summary of your conclusions (including error analysis). In publications, the abstract often has a strict word limit, so try to include all this information in roughly 3 – 6 sentences. The abstract can be written in a mixture of past and present tenses for the work already completed and your current ideas, respectively.

Necessary components of an abstract:

Descriptive title:

The title should be more than the title given in the lab manual, and should accurately describe the essence of the experiment. It does not need to be a complete sentence. Some titles are a single phrase, and others have two parts separated by a colon.

Rationale and Analytical Technique:

These two components can often be included in a single sentence. The rationale is the objective or purpose of the experiment. The analytical technique is the name of the method or process (use scientific terminology). Do NOT include a step-by-step procedure.
Summary of Results:

Your most relevant qualitative (descriptive observations) and quantitative (numerical) data need to be included in your abstract. You do not need to include every piece of data that you recorded in your lab notebook, but you should definitely include the major numbers, including proper units and significant figures.

Summary of Conclusions and Error Analysis:

Any conclusions made based on the experiment should be included. You must also state what evidence supports your conclusion, and provide an error analysis. If you are comparing your data to an accepted value, you should include the accepted value so that your readers can make their own comparison, as well as the calculated percent error. Your error analysis should clearly explain how each error affected your final results. It is not enough to give a list of possible errors. State specific errors that occurred, follow their effects through the calculations, and state whether your calculated results are too high or low as a result. Also indicate which errors best explain the observed deviation between your results and the accepted value.

Example abstracts:

Read the following example abstracts and see if you can identify all of the necessary components in each abstract.

Calorimetry: Identification of an Unknown Metal Based on Specific Heat

The specific heat of an unknown metal was determined using calorimetry. The measured specific heat was 0.378 J/g°C. This value compares well with the specific heat of copper (0.385 J/g°C, 2% error), a conclusion which is further supported by the reddish brown color of the unknown metal. Heat losses during the transfer of the hot metal to the calorimeter and through the insulation of the calorimeter reduced the final temperature measured in the experiment. This decreases $\Delta T_{\text{water}}$ and increases $\Delta T_{\text{metal}}$, which appear in the numerator and denominator, respectively, when calculating the specific heat. This error lowers the experimental value of the specific heat, explaining the observed deviation from the accepted value.
Experimental Determination of the Boiling Point of Tap Water

The boiling point of coastal tap water was measured at 1.052 atm using a thermocouple thermometer. Upon heating, the temperature of the water became constant at 101.2°C and did not rise further. The measured boiling point is higher than the normal boiling point of pure water (100°C) due to impurities dissolved in the tap water and a higher than average atmospheric pressure, both of which increase the boiling point.

Note: In this example a % error was not calculated because you would not expect to obtain the normal boiling point under these conditions. In other words, the normal boiling point is not the accepted value. If several groups measured the same water, it would be appropriate to include an average value and a % difference instead of an accepted value and a % error.