Writing a Scientific Paper

The scientific paper is the means by which scientists use to communicate research methods and results. The scientific paper must be written in correct English in a clear and concise manner and follow a specific standardized format. Scientific papers are written in the past tense using the 3rd person. The pronoun “I” is not used and the writing is devoid of literary flair, chatty, informal language, catchy phrases, metaphors, etc. The reason for this “dry” style is to convey information unambiguously and efficiently.

SECTIONS/HEADINGS:
The following sections are included as headings in your scientific paper (aka. formal laboratory report) for this course:

- TITLE (on title page)
- AUTHOR (on title page along with course name, number, professor and date)
- ABSTRACT
- INTRODUCTION
- MATERIALS
- METHODS
- RESULTS
- DISCUSSION
- LITERATURE CITED

Each section headings is centered on the page, 1 inch margins, 14 font, and printed in UPPER CASE letters. Leave two lines between each section. Each section follows one after the other without using separate pages for each. A description of each section follows.

TITLE

The title tells the reader about the investigation. It should be specific, but not too lengthy. It must be written to convey briefly and accurately the essence of the research. The following elements should be included in the title:

1. The name of the organism used. [Include the scientific name…genus and specie.]
2. The specific aspect or parameter of the organism studied. [survival, growth rate, respiration rate, etc.]
3. Any factors that may have been manipulated in the research. [temperature, pH, time, drugs, etc.]

AUTHOR

This obviously means the name of the student. In addition, those individuals with whom the work was done are identified. They are not, however, co-authors of the paper. Each student is responsible for writing an individual paper/report. The title, author, team members, name & number of the course, name of instructor and date are on a separate title page.

ABSTRACT

The abstract is a short summary of the entire laboratory project. Write the abstract as a comprehensive, objective summary of the scientific study. Include a brief description of what you did, how you did it, major results and conclusion. The abstract should be under 250 words. By reading abstracts scientists are able to determine whether or not it would be helpful to their research to read the rest of the scientific paper,
therefore it is important that the abstract contains all of the required elements mentioned, is short, concise and easy to read. Good abstracts are not easy to write. Some find it helpful to write the abstract after the rest of the sections of the paper are completed.

INTRODUCTION

In this section you introduce the topic by stating the nature of the study, the specific question or questions that are being asked, and gives the question some context from resources. This is where you state the purpose of the investigation and your hypothesis which predicts the results. Background information about the topic is provided from publications. Any published information mentioned must be appropriately referenced using the APA Style Manual. This is where you relate the study to other work on the topic and how the research will help expand the knowledge in this area of study is explained.

MATERIALS

List all reagents, apparatus, subjects and supplies needed to conduct this study. Your list needs to be specific enough for another individual to use to reproduce the exact same experiment or procedure.

METHODS

Write the protocol or experimental design step by step [listed and numbered, not in paragraph form.] Some scientific papers are written in paragraph form, but the step by step form is the easiest to follow. The method section must be written with simplicity, precision and detail. Remember that your procedure must be repeatable to be valid. It must contain sufficient detail to allow another individual to reproduce the exact same experiment using only your paper as a guide. Because the method section describes what was done in the study you are writing about, everything in should be stated in the past tense.

RESULTS

In this section the data [qualitative as well as quantitative] are presented. The presentation must be clear, concise and visually easy to scan. This is best accomplished by using tables and graphs. Be sure to label each graph (eg. Figure 1 and Figure 2) and each table (eg. Table 1 and Table 2). When you discuss your results you can then refer back to the specific graph or table. Be sure that all information displayed is identified and briefly described. Every table or graph is to include directly below it a brief narrative that summarizes the highlights of the table or graph. For qualitative data short descriptions will suffice. Do not include conclusions or judgments [these belong in the Discussion section]. The best rule for the Results section is to keep it short and to the point. A common mistake is to attach graphs and/or tables to the end of the paper; this is incorrect.

DISCUSSION

This is the section where you explain what the results mean and relate the results to your original hypothesis. Describe any relationships or correlations that can be found [or the absence of the same]. Do the results support or disprove the original hypothesis? Explain why or why not. Discuss the significance of the results as they relate to the background information found in the literature. Analyze the experimental procedure, identify any weaknesses in the data, or questions left unanswered, and then suggest changes.
Finally, state the conclusions and suggest further research that you think should be done on the topic. This is the one section where creativity is invited [held in check by logic and focused thought]. Be careful to restrict conclusions to results. Constantly ask, “Are the conclusions supported by the data?” Do not speculate, assume or extend the conclusions beyond the scope of the experimentation. New ideas and hypotheses may will be born of this study and they may be mentioned for future study, but remember that they are not part of the investigation. Stay focused. Finally, bring the paper to closure.

LITERATURE CITED

Here give credit to all published information used to write the paper. List all citations using APA format alphabetically by authors last name. The names are followed by the year of publication, title of the article in quotations, the name of the journal underlined, volume number of the journal, and pages of the article. A typical Literature Cited entry looks like this:

Refer to http://www.apastyle.org/aboutstyle.html for the APA Style Manual; you will also find how to site electronic references

ADDITIONAL COMMENTS

√ You may wish to visit the Writing Lab for help with this assignment (it will be of little help to ask for assistance right before the due date!)

√ Feel free to submit a rough draft for review, but it must be received no later than 7 days before the due date.

√ Be sure to save a copy of the paper prior to submitting it.

√ Refer to grading criteria to be sure all expectations for this assignment have been met or exceeded

√ The scientific paper will not be accepted if any portion of the content has been plagiarized. Refer to the MWCC Policy on Academic Honesty for what constitutes plagiarism.