

## **HOW TO WRITE A SCIENTIFIC LABORATORY REPORT** **IN APA FORMAT**

**NEVER USE THE APA TEMPLATE IN MS WORD!** If you do and once you save the document, you will not be able to go back and make certain corrections. For example, if you did not indent paragraphs and then try to correct it, the template will only right justify the document. You will not be able to move tables or graphs. In addition, you will not be able to use hanging indentation. Start with a Word Blank document and you'll have no problems editing.

*The purpose of a lab report (or scientific paper) is to provide background information and other research performed on the topic. In addition, it gives information about the experiment, how it was conducted, what results were found and any conclusions made based on those results. It also provides information so that someone else (another researcher or even a layperson) can replicate (repeat) your experiment and get similar or the same results!*

***If you read and follow this handout completely and honestly, you should get a good grade on your lab report.***

Scientific lab reports are always written in APA Writing Style format (American Psychological Association). This document will guide you through the APA format and will illustrate the APA citation style. *The last two pages of this handout are step-by-step directions on how to create a table and graph using **MS Excel 2013/2016**.*

### **GENERAL FORMAT OF AN APA PAPER**

Scientific laboratory reports or any other APA style paper written at a collegiate level have a standard format. It is best to first check with your instructor to verify the format. Some instructors may want something a little different. The following are standard for APA papers:

- 1 inch margins on **all** sides
- **12-point font** and the font style should be either Calibri, Arial, or Times Roman
- Some type of **Header** (Running Head:)
- Numbered pages **except** the Title Page
- **Paragraphs** indented 5 spaces
- **DOUBLE-SPACED** throughout the paper including Title Page and Reference Page.

Scientific laboratory reports have a separate Title Page and a separate Reference page. Some instructors want an Abstract as well but check with your instructor first.

Unlike other types of papers or reports, scientific reports have **HEADINGS** within the body of the paper. These headings are:

- **Introduction**
- **Methods & Materials**
- **Results**
- **Discussion**

### TITLE PAGE

The first page of the lab report is the **TITLE page**. **Do NOT number the Title page unless instructed to do so.**

The title of the lab report should **NOT** be too general but should reflect more specifically about the experiment. For example: "Fingerprinting" is too general for the title but instead, use something like: "Fingerprinting as an Effective Forensic Tool in Solving Murders." The title should be informative; it should not be "cute."

Some lab instructors may want what's called a "Running Head" but some do not. ***Check with your instructor first.*** When adding the page number in the header area (Insert Tab – Header/Footer or right click the mouse at the top of the page then click on Edit Header) of the report, also include the Running Head. Insert the page number **first** then make sure the cursor is in front of the number then type the Running Head. The Running Head should appear as **Running Head: SHORT TITLE OF PAPER IN ALL CAPS** (but not in bold). After typing the running head, press the tab button until the running head is flush left and the page number is flush right in the header area. Close the Header/Footer editing tab.

**NOTE:** The title is in **Title case** (first letter of each word is capitalized except non-essential words.)!

The Title page information should be absolute **centered** on the page.

The Title page should **NOT** be numbered! (unless instructed)

### NO PAGE NUMBER ON THE TITLE PAGE

To eliminate the page number on the title page:

- Place mouse arrow at top of page and right click
- Click on Edit Header
- Click insert page number (top of page, plain #3) then type Running Head: and tab so that running head on left and page number on right
- While in the Edit Header Tools, in Options check **Different First Page**
- Go back to Page Number and click the small black arrow.
- Select Format Page Number
- Click on Start At: then put zero (0) in white box.

- The Running Head will disappear on the Title page so type it again.
- The next page of your document should have both the running head and page # 1.
- Close the Edit Header/Footer Tool bar

Usually start the title 10 line spaces down from the top margin. If required a Running Head, it should be in the upper left corner of the Header area (above the top margin of the page). The Title page **must** be **doubled-spaced** and include the following information:

Title

Your Name (author)

Names of those in the experimental group (do not put "Group Members" next to names)

Name of Institution/Instructor

Class name and section

Date

**Title Page** – can you honestly check off the following?

**Did you?:**

- State the Title and Center on the page?
- State your name?
- State the names of other group members that participated in the experiment with you?
- State the Institution **and** the Instructors' name?
- State the Date?
- NOT number the page?
- Give a title that summarized the main idea of the experiment?

Fingerprinting as an Effective Forensic Tool in Solving Murders

Joe College

Jane College, Harry Potter, Norman Rockwell and Barry Allen

Georgia State University Perimeter College

Dr. Jane Science

Biology 1401 330

January 15, 2015

**\*\*\*\* Example Title page. Title case and absolute centered on page. The Title summarizes the main idea of the experiment.**

Fingerprinting as an Effective Forensic Tool in Solving Murders  
(restate Title from Title page)

**Introduction** (Heading should be flush left and double-spaced below Title). The header “Introduction” should **NOT** be bolded, capitalized, in quotations or underlined.

The Introduction does just that: **INTRODUCES** the topic or concept on which an experiment was performed. It is in the Introduction where you explain the ideas or concepts and **NOT** the experiment.

The paper must be written in **THIRD person**. Do **NOT** use I, me, we, them, they, he, she or us.

Explain why the topic is important and if needed, a short history. How does the topic relate to other previous work that is similar to your experiment? What other research has been done on this topic?

**ALL** resources (references) **MUST** be properly **CITED** in the **Introduction**. For example: According to Lee (1997), the forensic use of fingerprinting has assisted in the prosecution of thousands of perpetrators of crime. Or, “The first use of fingerprinting in a crime investigation was in 1889 by Sherlock Holmes (Aldin, 2001).”

Credit must be given to other author’s words, ideas and thoughts whether directly quoting (using quote marks) or paraphrasing. It is considered **PLAGIARISM** if credit is not given.

Do **NOT** continuously quote material (one quote after another throughout the Introduction) from your references because you are unsure how to paraphrase.

In the Introduction, **NEVER**:

- Discuss results
- Write in first person
- Include information just to fill in space.
- State how data were collected (data are plural!)
- Use numerous quotes instead of paraphrasing. **But**, avoid paraphrasing that isn’t written in your own words!
- Plagiarize literature reviews or anything else in the paper (use quotations if directly quoting otherwise paraphrase or use your own words)
- Use direct information from the lab manual or lecture book
- Start the Introduction with “In this experiment...” or “We experimented on....”
- Include unnecessary information. “A Sharpie was used...”
- Be wordy!
- Triple space between paragraphs or next Heading
- Start the Hypothesis with “I hypothesize... or “My group hypothesizes...” or anything else that is first person.”

The last paragraph in the Introduction is for stating the **Purpose** and **Hypothesis**.

The Purpose is stating why the experiment was performed. Do **NOT** make statements such as: “The purpose of this experiment is to learn more about solutions.” Or, “The experiment will help me learn more about fingerprinting.” Or better yet, “It’s part of my grade.” The purpose should be logical and scientific. Basically, what was the lesson learned!

It is also in the Introduction where your **HYPOTHESIS (ES)** is stated. A hypothesis is a scientific guess of the outcome of the experiment. **NEVER** start the Hypothesis with “I (or We or Our group) hypothesize ....” It should still be stated in **Third** person. For example: “It is hypothesized that comparing fingerprints from the crime scene with those....” The hypothesis is usually in the form of “**If ... then.**”

**The hypothesis is always created PRIOR to doing the experiment.** What outcome or outcomes do you expect from doing the experiment?

The Hypothesis **MUST** be relevant to the experiment that **will be performed**. You can only create a hypothesis about the experiment. The hypothesis should be formulated **BEFORE** you do the experiment. If you wait until after writing the paper to state a hypothesis, you will find that you may have to waste a lot of time re-writing the paper to fit the hypothesis.

## Introduction

### DID YOU?

- Write in third person
- Give appropriate background about the topic or concept related to the experiment and not the experiment itself
- Properly In-Text Cite references
- Use quotations when directly stating from reference
- Did not quote everything but used paraphrasing or own words
- Restate the title at the top of the first page before starting the Introduction
- Place the Introduction Heading flush left
- State Purpose of experiment
- State Hypothesis
- Number page
- Plagiarize (**DON'T DO IT**)
- Spell words correctly and used proper grammar (MS Word has a Spell Check and Grammar check – Use it!)
- Use proper spacing, standard font size (12 pt.) and type face.

## Methods and Materials

This section is used to describe **HOW** the experiment was performed. There should be enough information so that another researcher or layperson can repeat the experiment and get the same or similar results. This section is written in sentence (**narrative**)

format **DESCRIBING** the materials and/or equipment used and **EXPLAINING** the steps taken to collect data.

You should **NEVER** just **LIST** materials used and steps taken. These should always be explained in a narrative, sentence format.

**DO NOT LIST!!! Do not plagiarize information from the lab manual or experiment handout!**

The M&M section should always be written in **PAST TENSE** since you have already completed the experiment. Remember that you are **describing what you did** or how you set up the equipment so that data were collected and what materials were used. However, you must include enough detail that another person could set up the experiment the same way you did!

Do not include unnecessary information such as: "A blue sharpie pen was used to label..." Or "Three marks were made on test tube #1..." Use statements such as: "Three mls of water and 3mls of methylene blue were added to each of three test tubes marked 1-3."

Variables of the experiment should also be described in the M&M section. Both **Dependent** and **Independent** variables are explained. What were the Dependent variables and the Independent variables? One or more variables were manipulated (independent) while other variables (dependent) have changed based on what was done to the independent variable(s).

Do **NOT** make any statements about the data collected. This will be in the Results section.

## Methods and Materials

### DID YOU?

- Write in Past Tense
- NOT list materials or steps taken to collect data
- Not state the same that is in the lab manual (use your words only)
- Describe in sentence format any materials and equipment used
- Describe the steps taken to collect data
- Describe variables (dependent and independent)
- Take care not to describe the results or make opinionated statements about the results (save that for Discussion!)
- Make it so another researcher or layperson can repeat your experiment

## Results

This section is for **PRESENTING** the data that were collected in the experiment. DATA ARE PLURAL! Your presentation of the data should allow readers to draw some type of conclusion about your experiment.

You **MUST** include Tables and Figures (graphs) in this section about the data you collected. All tables and figures should be described in **NARRATIVE** format.

You **MUST** describe the data in a narrative form and not just insert a table or graph or some type of listing. Follow the sentence descriptive form as with any section of the lab report except you will also insert a table(s) and figure(s) displaying the mathematical data.

You should **NEVER DISCUSS** what the data **MEAN** in this section.

Other readers should be able to easily read and understand what was measured from the table and figure.

**TABLES AND FIGURES MUST BE NUMBERED and have an informative title.** The number and title are placed **ABOVE** the Table or Figure and **double-spaced**. The information inside the table is **not** double-spaced.

For Example:

Table 1.

Weight changes (gms) for nuts placed in various percent NaCl solutions versus time in minutes

Time	0% NaCl	10% NaCl	20% NaCl	40% NaCl
0	1.2	1.9	2.9	3
15	2.4	3.1	4.3	4
30	3.6	4.5	6.9	5
45	7.1	7.5	8.8	6
60	10	12	11.1	7

Figures are also numbered and can include Graphs, Charts and Illustrations

Figures (Graphs, Charts and Illustrations) must have **Legends, Specific Titles, X & Y axes named, numbered and a short explanation of the figure.**

The titles on the X and Y axes should also include the type of measurement such as gms (grams), min (minutes), cms (centimeters), etc... The measurement types can be abbreviated.

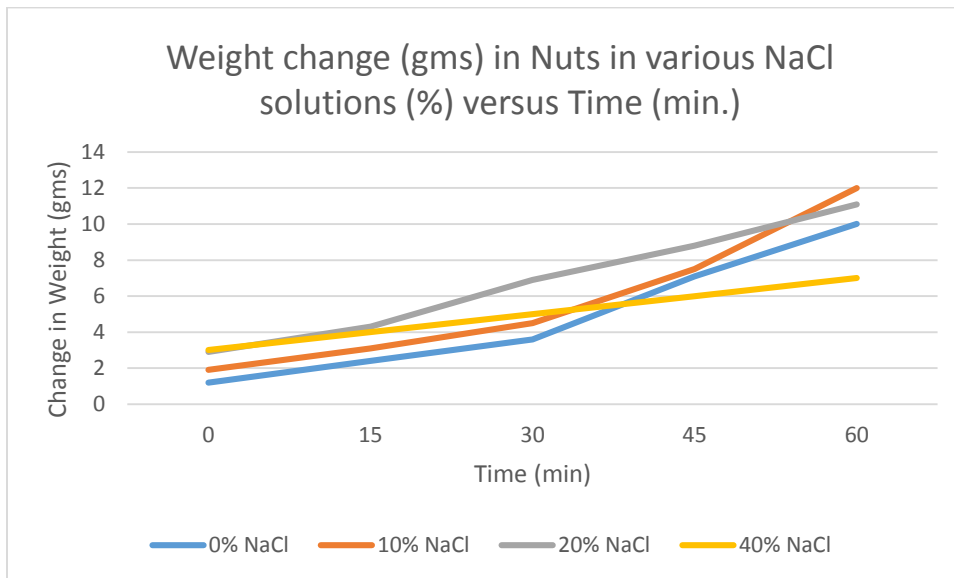


The figure number and title are placed **above** the figure and **double-spaced**.

For example:

Figure 1.

Weight (gm) changes of Nuts in NaCl solutions (%) versus time (min).



## Results

### DID YOU?

- Use narrative format to describe data
- Insert Table
- Insert Figures (Graphs, Charts and Illustrations)
- Label and number Table and Figure appropriately
- Give descriptive title to table and graph
- Include Legend for graph
- Use appropriate units of measurements (gm – grams; min – minutes; hr –hours; spell out or use correct abbreviations)
- NOT** discuss meaning of results but instead just described the data collected

## Discussion

In this section, you will **EXPLAIN** or **analyze** the **results**. The hypothesis(es) should be restated. Your conclusions should be well organized and thoughts not scattered about in different paragraphs. You can also in-text cite references again in the discussion to support your thoughts.

In this section, your results are **INTERPRETED!** Why are the results the way they are? Are the data similar to previous experiments? **INTERPRET!** Were your group results similar to other groups? Why or why not?

Include a short discussion as to whether the data **SUPPORTED** or did **NOT SUPPORT** your hypothesis. A hypothesis **cannot** be Right or Wrong! It cannot be correct or not correct or good or bad. A hypothesis can **ONLY** be supported or not supported by the data collected. Do not make statements in your discussion such as “The results showed that my hypothesis was right (or wrong).” *There is no right or wrong!*

If your hypothesis is not supported by the data, it does not necessarily mean that you did something wrong. You may have not done the experiment correctly but more than likely, there were other factors that may have altered the outcome such as contaminated solutions or instruments not properly calibrated or whatever you may think went wrong.

Assumptions about any possible **ERRORS** while collecting data should be discussed. Refer to the data to support your speculations about the experiment. Do not state that “something went wrong” or “I was not clear about the instructions.” Compare your group data to those of other groups to see if your data are similar to the other groups.

The last paragraph should state the major findings of the experiment/study.

## Discussion

### DID YOU?

- Restate Hypothesis and conclude if supported or not
- Interpret results
- Make speculations about the study
- State major findings in last paragraph
- If needed, cite references again
- State conclusions about the experiment
- State any errors in the experiment
- Organize conclusions

**Clinical Applications (ONLY for Anatomy & Physiology lab reports)**

In this section, you should briefly state any generalizations that you can draw from the experiment and its' relevance to the natural processes in the human body. Why is the topic important or what is the relevance of the topic in the medical field?

In-text citations are encouraged but check with your instructor first to see if required.

You do **NOT** restate information from the Introduction, Results or Discussion.

**References**

References are the scientific/scholarly articles from **VALID** and **RELIABLE** sources about similar studies.

**NEVER use WIKIPEDIA as a reference. It is NOT valid or reliable!!**

References for Scientific papers should be listed in APA (American Psychological Association Writing Journal) format.

Once again, you should **NEVER** use Wikipedia as a reference.

The best way to gather your references is to do a GALILEO search first. Other reliable web sites include WebMD.com, CDC.gov, nih.gov, or nih.gov/pubmed.

There are other reliable resources on the internet but be cautious.

**Reliable and valid resources include:**

- **An author(s)**
- **Publication date**
- **Affiliation with company or institution**
- **Some type of contact information**
- **Preferred peer reviewed.**

The Reference Heading should be **centered** at the top of the page. The heading should **NOT** be in bold, italicized or underlined. References are never bulleted or numbered.

**References should be listed on a separate page and in alphabetical order.**

Use the following format:

**Basic Format for List of references at the End of the Lab Report**

APA style dictates that authors are listed last name first followed by first name initials; publication year goes between parentheses, followed by a period. The title of the article

is in sentence-case, meaning only the first word and proper nouns in the title are capitalized. The periodical or journal title is italicized and in title case (first letter of each word is capitalized except non-essential words such as in, of, a, and, etc...), and is followed by the volume number which, with the title, is also italicized. If there is an issue number, it is in parentheses next to the volume number and is not italicized. Page numbers are in the format xx-xxx.

If the article was retrieved from the internet, include the URL. It should be written as Retrieved from then the web address.

Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. *Title of Periodical*,  
*volume number* (issue number not italicized), pages. Retrieved from  
<http://www.xxxx.xxxx>.

### **Articles from GALILEO Database**

If the article was retrieved from GALILEO, a URL is not needed. Articles from GALILEO should include the Database in which the article was found and listed after the page numbers.

Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. *Title of Periodical*,  
*volume number* (issue number not italicized), pages, Academic Search  
Complete.

Additional information on how to properly list references can be found on the LTC web site under Handouts then Reading/Writing Handouts, APA Reference Types.

<http://www.depts.gpc.edu/~gpc/ltc>

## **References**

### **DID YOU?**

- NOT** use Wikipedia as a reference
- List references in proper APA format
- Center Heading
- Use separate page
- Select articles from **valid** and **reliable** scientific journals (usually peer reviewed)
- NOT** just list a web address
- Provide all information for the reference (author, pub. date ...)

## Creating Tables and Figures (Charts) in Excel

If using a computer on campus such as in the computer labs or the LTC: From the desktop, double click on the Microsoft Office 2013 icon. Double click on the Excel program to open.

Follow these steps to create tables and charts in Excel then copy and paste into your lab report document in the Results section.

1. Open Exel
2. Click one time on Blank Worksheet to open a new worksheet for your data.
3. Enter your Data into the Cells. The first row and column should be used for your Headings such as Time, % solutions, weight etc... The second row is for data entry.
4. **SAVE!**
5. Once all data have been inserted into the table (**SAVE!**), place the mouse arrow on the first cell (usually A1) then click and hold the mouse button to highlight the entire Table.
6. From the tab bar at the top, click on Page Layout tab.
7. From the drop down window of the Page Layout tab, select Set Print Area.  
**SAVE!**
8. A small icon will appear at the lower right corner of the table. Click one time on the icon.
9. If the icon does not appear, place the mouse arrow somewhere over the Table then right click the mouse and select Quick Analysis.
10. Select Charts from the Quick Analysis then choose the Type of chart. Most lab instructors prefer a Line chart but check with your lab instructor first.
11. The chart will appear to the right of the table.
12. **SAVE!**
13. To the right of the chart will be several icons. Click on the icon that looks like a plus sign. A list of chart elements will appear.
14. Make sure Legend and Axis Titles have been checked along with the ones checked by default.
15. **SAVE!**
16. In the chart, click on the Chart Title and type in the name of the chart. It does not need a number in the actual chart area but it does need to be specific and not general.
17. Click on the Axis titles and give a name for each axis (i.e. Weigh, time...). **Make sure to include the measure such as time in minutes (min.) or weight in grams (gm)....**
18. **SAVE!**
19. It is best to put grid lines and borders on tables.
20. From the Home tab and to the right of the Underline icon, click on the small black arrow next to the border icon.

21. Select All Borders in the drop down window.
22. Once finished **SAVE!**
23. To place the table and chart into your Word document. Minimize your Word document.
24. In Excel, highlight the table then right mouse click then select COPY from the drop down window.
25. Got back you the Word document and mouse click where the Table will be inserted.
26. Select Paste from the Home tab menu.
27. Below the Table, number and label. See the Results area for an example of numbering and labeling a Table.
28. Repeat these steps for the Chart and see the Results area for an example of numbering and labeling a chart.
29. **SAVE!!!!!!!!!!**
30. **You may want to save the Table and Chart you created in Excel just in case things go wrong!**

## **Hanging Indentations for References**

Remember that References are on a separate page. The Reference title should be centered at the top margin.

1. Type the references
2. Make sure the references are alphabetized
3. Highlight all References
4. Under the Home tab, click on the spacing icon then select 2.0 for double spacing
5. While Highlighted and on the Home tab, click on the small black arrow next to Paragraph in the paragraph section.
6. A pop up window will appear
7. Under the Indentation section in the pop up window, go to Special and click on the black arrow.
8. Select Hanging.

## **Additional Help**

A shortened sample of a lab report can be found on the LTC home page under Decatur Workshops. The Workshops link is on the left side of the page with all other links.

If you are unfamiliar with MS Word or Excel, a handout on the basics of MS Word and Excel can be found under Decatur campus Workshops on the LTC home page.

Additional APA Writing Style information can be found at the [Purdue Online Writing Lab \(OWL\)](#).