

Guide to Scientific Writing

In order for a scientific research to have any impact, it must be communicated with others. A scientific research paper is an effective way to tell others what data you have gathered, what those data mean, and why your study is important. Use this document to help you organize and write your report.

General Tips:

- The content of your paper should be hourglass shaped. Start broadly in your introduction and then narrow your focus to your specific research question and hypothesis at the end of the introduction. Your discussion should do the opposite – begin with the specific results of your research, and end with the overall importance and implications of your study.
- Use the past tense unless you are describing generalizations or conclusions.
- Be as clear and concise as possible.
- Check your spelling before handing in a final draft.
- Make sure to cite your sources both in the paper *and* in the literature cited section.
 - Within the paper cite sources with the author's last name and the year.
 - For **one or two authors**: "Eating carrots may improve eyesight (Smith and Jones 2005)."
 - For **three or more authors**: "Eating chocolate does not improve eyesight (Smith et al. 2007)."

Title: From the title, the work being reported should be clear without having to read the paper. "The effect of increased temperature on carbon storage in the boreal forest" not "Biology Lab Report."

Abstract: A brief overview of the entire paper. Use one to two sentences per section describing: the purpose of the experiment, general materials and methods, key results, and the overall conclusions of the study. This section is usually written last.

Introduction: Provide some background information on the topic (be sure to cite your sources). Describe why you conducted this experiment/study and why your study is important. State your research question(s) and your hypothesis.

Materials and Methods: Describe how the experiment or study was done: the study area, experimental design, materials used, and when you did the experiment. Include any important calculations or formulas used. Be specific enough that someone knowledgeable of the topic could duplicate your experiment. DO NOT write a list of steps in paragraph form, such as "I turned on the computer and then I opened Excel."

Results: Summarize the observations and results of the experiment. Display your data using tables, figures, or photos to highlight the important results (see below). If you include a figure or table, be sure to refer to in the text by describing the overall pattern and not each individual value ("Carbon storage in the forest increased over time (Figure 1)."). This section should *not* include interpretation of what the data might mean, that goes in the discussion section.

Discussion: Do not just restate your results, but interpret the trends and patterns that you see in your results. Describe how results are different or similar to what you hypothesized. Make sure you provide reasons for why you are interpreting the data this way using logical reasoning AND cited sources.

Conclusions: Restate the purpose for doing the research (e.g., "This study investigated ...") and briefly provide the overall conclusions of what the patterns and relationships in your data mean, and why they are important. A very short paragraph.

Acknowledgements: This section should give credit to people that helped with the experiment, provided the materials, or assisted in editing your paper. (e.g., “I thank Sunnyville High School for providing the materials used in this experiment.”)

Literature Cited: List, in alphabetical order, the sources you actually cited in your paper. See the *Creating an Annotated Bibliography* document for the correct citation formatting.

Figures and Tables: All tables and figures should be numbered chronologically. Avoid presenting the same information in a figure and a table.

Tables:

- Use gridlines and include column and/or row headings with units.
- Make sure to include a table caption (above the table).

Table 1. Average weight of chickens given different feed supplements.

Chicken Weight (g)	Type of Feed
246.43	Soybean
218.75	Sunflower
276.91	Meatmeal
328.92	Linseed

Figures:

- Use an appropriate type of graph
- Use an appropriate scale on the axes (that corresponds to the data points).
- Label your x- and y-axes (with units) and provide a legend if necessary.
- Use a white background on the graph
- Make sure to provide a figure caption

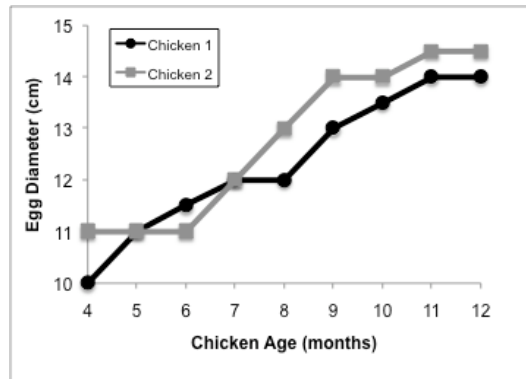


Figure 1. Egg diameter as a function of the age of the chicken.