Honors Biology Thesis Writing Guidelines

September 2022

Your thesis should be written in the form of a scientific paper and should contain these sections:

**Title/Author page**

**Abstract**

**Introduction**

**Materials and Methods**

**Results (Includes Figures and Tables)**

**Discussion**

**Acknowledgements**

**Literature Cited**

***Please submit as a PDF. The thesis is also sole-authored by the candidate. Though editing will be provided by mentors, submit as a sole-authored document.***

* Under some circumstances this structure may be altered. For example, it might be reasonable to combine the Results and Discussion if you worked on several unrelated projects, with a different Results & Discussion corresponding to each project.
* Refrain from using jargon. Each abbreviation should be spelled out at least once. If your thesis includes a lot of technical detail or acronyms (strains, genes or allele designations), a list of abbreviations should be included as a table.
* Figures and tables should be embedded in the document, ideally within the text, though you may instead attach figures and tables at the end of the document. Legends should be provided alongside or underneath figures and tables. Figures and tables should have a title; usually the title reflects the conclusion of the experiment. For those who choose to place figures and tables at the end of the document, make sure that they are referenced properly in the body of the paper.
* Typically, hyperlinks should not be used. If you would like to include data in the form of videos or audio, you may use hyperlinks, but these should be listed in a separate section at the end labeled “Supplementary Data”, placed before Literature Cited.
* For the text body, we request Arial 11 or 12 point font, one-inch margins and double-spacing.
* There are no requirements regarding length or word count.

The writing prompts below are meant to serve as a framework, and the questions posed below do not necessarily need an answer. Use your own judgement and work with your mentor on writing and editing. Use published scientific papers as a guide.

**Title/Author page**

Title

Your name

Mentor’s name

Location of lab

Date

**Abstract**

The abstract is the first part of a scientific paper that is read and should be one paragraph. In a few sentences, state the problem or question you are addressing, why this is an important question, your experimental approach, your results, conclusion and impact/significance. The abstract can be written last. The decision to continue reading a scientific paper will often be based on what is written in the abstract, so it is essentially an advertisement for your work. The abstract should be concise. Abstracts written too early in the paper-writing process are often too long.

**Introduction**

What? Why? Describe your specific topic, introduce the background and define key terms or concepts. Briefly describe the state of the field, knowns and unknowns, so that we might understand your motivation to work on the project. "Why?" is a difficult, but important question. What new material or insight are you offering? What important issues do your experiments address, define, or answer? If you are following up on previous observations made by the lab, describe those observations and describe the need to follow up. How will this new information allow the larger goals of the lab to progress?

It can be dangerous to spend too much time on the Introduction. Avoid writing three days of lecture material or a review paper. Give your audience the information they need in order to understand the particular problem you are working on and why it is important. The introduction should *not* be the longest section of your paper.

The introduction is also *not* the place to discuss your findings. Save that for the Discussion section. The Introduction can be fairly short (a few paragraphs), but it is important to provide sufficient background information so that the reader can understand the motivation of the work.

**Materials and Methods**

This is a good section to start writing first as it is rather straightforward. Keep a running list of reagents and materials; it can be edited and consolidated later. From this section, the reader should understand how the study was undertaken, what materials (reagents, machinery, programs) were used, and where the research was performed (for field studies, etc.). This section can be subdivided into subsections: Strains, primers, computer programs, equipment (microscopes, specialized equipment), etc. Detailed information regarding reagents you used or generated will be useful for the lab after you leave. For example, “anti-actin antibody” is less useful information than “rabbit polyclonal anti-actin antibody (Sigma AB2000 Lot # 201)”.

**Results**

In this section, you will present the results of your study, including figures and tables. The structure of this section should be your first focus, even before the experiments are performed. How will you present the data? In a chart or table? Graph? Images? Thinking about how to configure your data will help you remember important controls. If you do not have all the data you need, you can still start writing, but this section is commonly written after figures and tables are generated. Explain the steps required to obtain the data, the experimental approach, the controls used, what was measured, what was found, etc. You should provide enough information to convince the reader that your findings are sound and the experiments were well-controlled. A discussion of the data should be saved for the next section.

**Discussion**

Interpret the results. Did you find trends or patterns? Discuss your findings in the context of what is already known. Explain why you obtained unexpected results or why your results differ from published data. Explain why these results may be significant.

**Acknowledgements**

This section should be short. It is not a dedication section, but an acknowledgement of who contributed to the work of the thesis. If you include data that was generated in the lab before you arrived, or data from another lab, provide a reference for this information or simply state “Figure 1 is previous data from former lab members”. Who collected the samples for you? Who maintained the stocks for you? Who performed the sequence analysis for you? Also, acknowledge financial contributors such as UGRA.

**Literature Cited**

You should become accustomed to using a reference manager such as EndNote, Zotero or Paperpile. Cite all your sources. We recommend (Author,Date) format for in text citations. For the Literature Cited section, a more complete format is needed, with authors, article title, journal title, year, volume, issue and pagination. No specific format is required but you should follow a format used in other scientific papers. If (Author,Date) format is used for in text citations, the Literature Cited section should be alphabetical. If in text citations are numbered in order of appearance, the Literature Cited section will also be numbered.