

BIOLOGY

Lab Reports

➤ Preparation

The most important step to writing a good lab report is to take time to understand the lab completely. You should be able to answer the following questions before sitting down to write:

- What was the objective of the lab? (What did you want to find out?)
- What natural processes, if any, did you observe? (e.g. osmosis)
- What tool(s) did you use to measure your results? (e.g. a scale, a thermometer)
- What was your hypothesis?

➤ Organization

Each section should be labeled and contain only one type of content. For example, the reader should not find results in the METHODS section.

Here are the essential sections:

INTRODUCTION
MATERIALS
METHODS
RESULTS
DISCUSSION

➤ Tense

- Any time you refer to the experiment (even in the INTRODUCTION and ABSTRACT) use the **past tense** (e.g. “The objective of the lab was...”).
- For any topic other than the experiment itself:
 - Use the present tense in the INTRODUCTION (e.g. “Cellular respiration is...”)
 - In the METHODS section, use the **past tense** (e.g. “The object’s mass was recorded.”)
 - Deliver the RESULTS in **past tense** (e.g. “The temperature increased.”)
 - Discuss the RESULTS in the **present tense** (e.g. “The change in temperature suggests...”)

➤ Voice

Use the **passive voice** throughout the report (e.g. “The solution was stirred”).

- In passive voice, the object is at the beginning of the sentence, emphasizing the object (e.g. *the solution, the beetle, or the jar*) and the action (e.g. *stir, observe, or seal*).
- Never use *I* or *we*.
- Use active voice only when referring to others’ work in the INTRODUCTION (e.g. “Newton carried out several experiments on gravity”).

➤ Content

The INTRODUCTION explains the process(es) being examined.

- Define key terms and provide relevant background information.
- Include the objective of the experiment, followed by your hypothesis or hypotheses, and a brief explanation of how each hypothesis was established.
- Cite all sources in CSE format. Refer to one of the following for instructions and examples:
 - Council of Science Editors. *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers*. 7th ed. Reston: Council of Science Eds., 2006.
 - A handbook or website that draws from the CSE Manual such as the official website for Diana Hacker’s handbooks:
http://www.dianahacker.com/resdoc/p04_c11_o.html.

MATERIALS AND METHODS

- The point of both of these sections is to describe the experiment in detail so that another scientist could repeat it.
- The MATERIALS section is a list of the major items used. You can assume that the reader is familiar with the basic supplies of the lab (e.g. beakers and test tubes).
- The METHODS section is an explanation, not a step by step recipe, of the procedure.
- These sections are written in *your own words* (i.e. not copied from the lab manual).
- To avoid plagiarism, it is a good idea to try to recreate these lists without looking at the lab first, and then, refer to the lab to see if you missed anything.
- Because you have already completed the lab by the time you write the report, the METHODS should be in **past tense**.

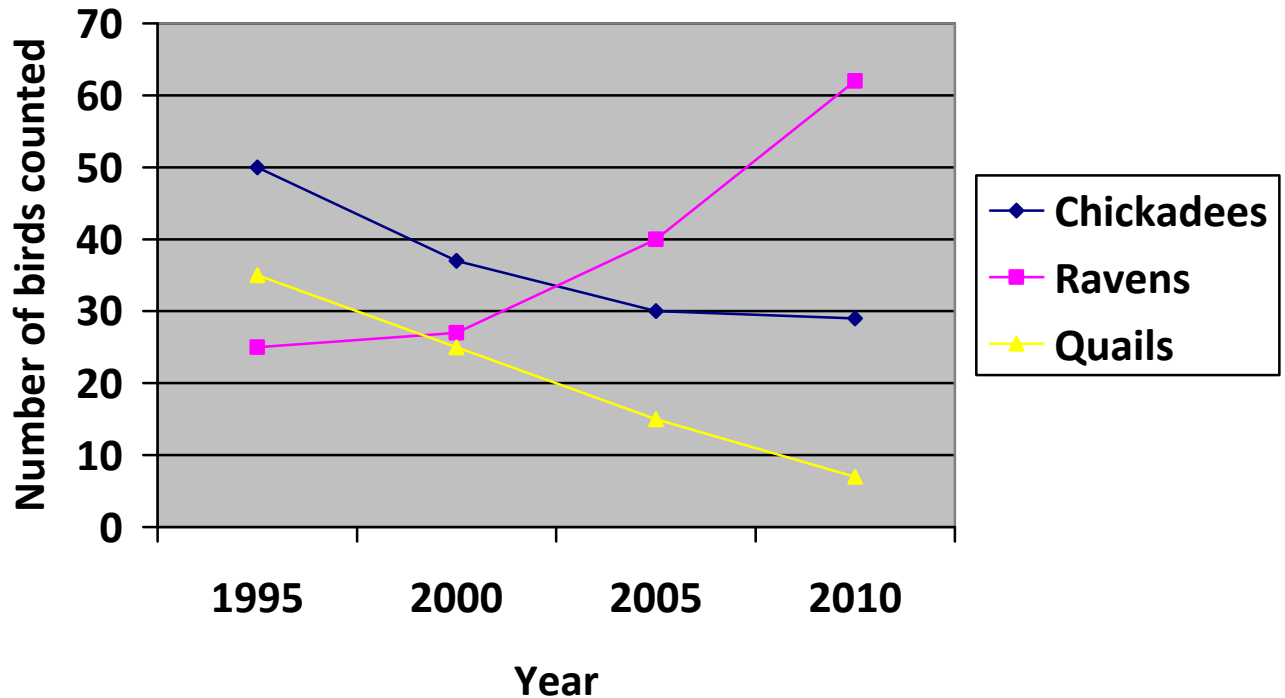
RESULTS are clearly presented in the most logical format (e.g. in a table, line graph, bar graph).

- Tables and graphs are labeled with a title (e.g. “Table 2: Change in Mass of Object A and Object B over Time”). All significant words in the title are capitalized.

- Graphs also include a specific label on each axis (e.g. “Time (minutes)” and “Mass of objects (grams)”) and a short description below (e.g. “The mass of Object A increased over time and the mass of Object B decreased over time”).
- Any data that cannot be easily presented in a table or graph is presented either in bullets or sentences under the subheading “Observations.”
- The RESULTS section must *not* include any interpretation! Save interpretation of the results for the DISCUSSION section.
- See sample graph.

➤ Sample Graph:

Figure 1: Change in Size of Three Local Bird Populations over Time



The graph above shows that the local population of chickadees increased between 1995 and 2010, whereas the populations of ravens and quails decreased over the same time period.

In the DISCUSSION section, answer the question, “Do the results support the hypothesis?”

- Provide specific evidence for the answer from the results.
- Suggest possible sources of error in the experiment and explain the potential consequences of each.
- No experiment results can “prove” anything. However, most results can “support” or “provide evidence against” your hypothesis. A result can also “suggest” or “indicate” that a process occurred.

The ABSTRACT is a brief overview of the whole report.

- It is one paragraph long and includes a few sentences for each of the following:
 - Pertinent background information
 - The purpose of the experiment
 - Hypothesis or hypotheses
 - Brief summary of the methods
 - Brief summary of results as relevant to the hypothesis or hypotheses
 - A concluding statement (i.e. What did the lab show?)
- Hint: Write the ABSTRACT *last*.

The TITLE PAGE includes:

- The title of the experiment
 - The title gives the reader a snapshot of the material covered in the lab report.
 - It must be both specific and concise, with major words capitalized (e.g. A Series of Experiments Exploring Habitat Preference among Lemurs).
 - If you have a subtitle, separate it from the main title by a semicolon and capitalize only the first word.
 - Words to describe the experiment in the title include: *comparison, investigation, evaluation, examination and assessment*.
- Your name
- Your course code (e.g. BIOL 117)
- The date the lab was performed