

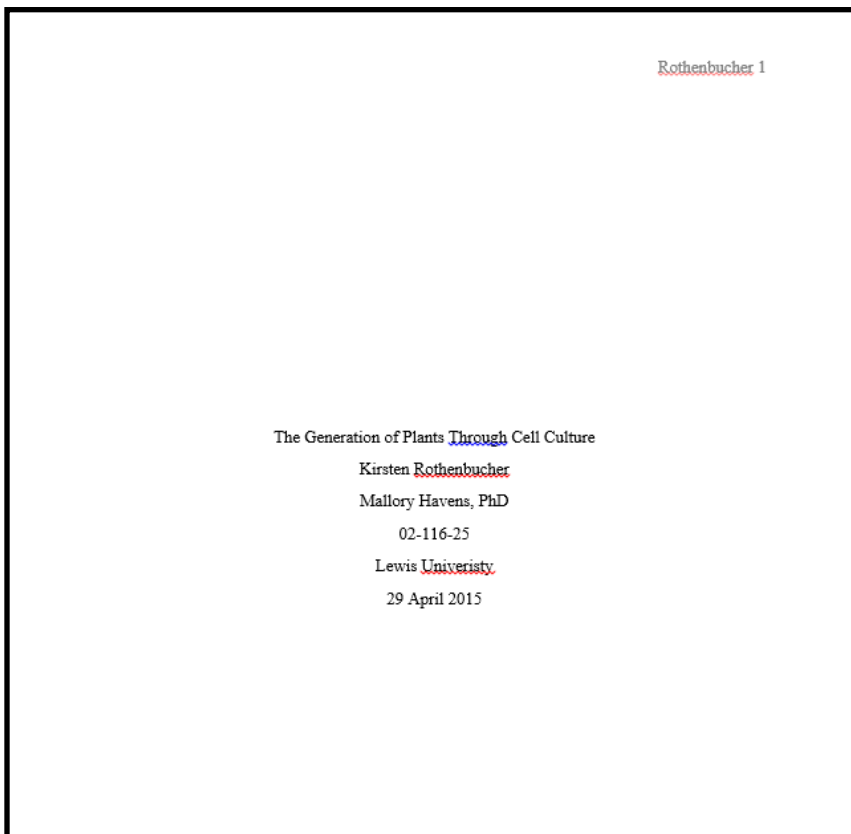


# Writing a Lab Report (Biology)

The process of writing a lab report can be daunting, especially when you're enrolled in multiple labs per week. Never fear, though! This resource will allow the task to become second nature! In the words of Julie Andrews, a very good place to start would be the beginning.

If you happen to be a STEM major, chances are, you will become familiar with writing a lab report. Lab reports are a way of documenting and discussing the data you collect throughout your experiment. Be aware that biology and chemistry lab reports will have slight differences, based on the disciplines' expectations. This particular resource will cover the general format of a biology lab report. **Please see our other lab report resource to learn about the format of a chemistry lab report.**

Your lab report should begin with a title page, unless otherwise instructed. The information should include the name of the study, name(s) of the authors, instructor, course number, institution at which the experiment was performed, and the date. It should be centered, and located halfway down the page, like this:





# Writing a Lab Report (Biology)

If you are writing in APA format, your abstract should appear on the second page. In a lab report, the purpose of the abstract is to attract your audience and provide a brief preview to summarize the content of the report. The abstract title is centered, and it is not bolded or underlined. The body of the abstract should not be indented. Within this section, your purpose is to grab the reader's attention. Include why the experiment is important, background information, how the experiment was conducted, the results of the experiment, and the conclusion. A key words section will follow the abstract, where the most commonly seen words/phrases throughout the study will be listed. The abstract should be on the second page, and nothing else should occupy that page.

*Note: Abstracts are not always applicable to scientific reports, depending on the format the instructor prefers you to use (MLA, APA, etc.). Be sure to ask your instructor about their preferences.*



EFFECTS OF AGE ON DETECTION OF EMOTION

2

## Abstract

Age differences were examined in affective processing, in the context of a visual search task. Young and older adults were faster to detect high arousal images compared with low arousal and neutral items. Younger adults were faster to detect positive high arousal targets compared with other categories. In contrast, older adults exhibited an overall detection advantage for emotional images compared with neutral images. Together, these findings suggest that older adults do not display valence-based effects on affective processing at relatively automatic stages.

*Keywords:* aging, attention, information processing, emotion, visual search

## Abstract Tips & Example

- Write your paper first—it will make completing the abstract far easier.
- The abstract is always on page two of the paper. It is not indented and the word “Abstract” should be centered.
- It should be between 150–250 words in length.
- The abstract should list information in the same order as your written work.
- Do not explain results or analyze information in the abstract.

To grab the attention of the scientific community, give an example how this experiment can be used in real-world applications!



# Writing a Lab Report (Biology)

Worldwide, many bacteria are showing resistance to antibiotics. This is becoming a major problem for health care professionals; for example, multiple strains of a potentially deadly bacteria, *Staphylococcus aureas*, are already resistant to all antibiotics except vancomycin. The reports of vancomycin resistant strains of *S. aureas*, which appeared from three different areas of the globe last year, sent shock waves through the medical community (Levy, 1998).

*Escherichia coli* (*E.coli*) is another bacteria that is beginning to show signs of antibiotic resistance. *E.coli* is a rod shaped bacteria which inhabits the human colon, living off organic material which would otherwise be eliminated with the faeces. *E. coli* and the other intestinal flora may make up 40% of the mass of faeces and as a result *E. coli* is used as an indicator species to detect contamination of lakes and streams by untreated sewage. Under normal conditions *E. coli* is harmless but some strains can cause blood poisoning, urinary tract infections, diarrhoea and kidney failure, illnesses that are more common in people who have weakened immune systems. In most cases these *E. coli* infections can be successfully treated with antibiotics such as ampicillin and chloramphenicol; however, some of the strains, such as those that cause urinary tract infections, have been shown to be resistant to certain antibiotics (Morrell, 1997, Levy, 1998). This experiment aimed to test the sensitivity of four *E. coli* strains (EC1, EC2, EC3, EC4), isolated from patients in a local hospital, to the antibiotics, streptomycin and chloramphenicol. It was hypothesised that separately both drugs would deter bacteria growth but that a combination of both drugs would be most effective.

Broad context  
(summary of  
previous research)

More specific context  
to this experiment  
(summary of  
previous research)

Significance of the  
research

Aims of the research

Hypothesis

## Introduction

The main body of your report begins with the introduction. No header is needed for this section because it is assumed that the first section is the introduction. The introduction should present the concept being investigated and provide background information.

- State your purpose for conducting the experiment. List and explain any parameters being measured in the experiment, and provide any mathematical formulas used to obtain data.
- Include any information that was given to you prior to the experiment (example: the specific heat of water).
- When including scientific names, make sure to italicize them (e.g., *Homo sapien*).
- Discuss any tables or figures that will be included in your report, making sure to identify the variables.
- Your hypothesis/predictions should also go in the introduction.
- This section should never be written in first person.
- When citing sources, be sure to include the author's last name and year of publication (Author, 2015).

*Note: This example uses APA 6. Please ask your instructor what format they prefer.*



# Writing a Lab Report (Biology)

**Methods** —→ boldface type, left-aligned

Be straight forward with the procedure – give enough information for an individual to be able to replicate the experiment. Make sure you specify the volumes and concentrations. Include any equipment used during your experiment. Do not forget to include units, temperature, time, etc. Make subheadings for detailed methods (italicized or underlined, left-aligned), and be sure to include a statement of purpose for each procedure. Exclude extraneous information that is assumed by the scientific community, such as labeling test tubes, clean-up procedures, or using aseptic technique.

This section should be written in **past tense**. Avoid transitions such as “first”, “next”, or “last”.

## EXAMPLE:

### Streak Plating

A mixed culture containing two unknown microorganisms in Nutrient Broth was isolated into pure culture by streak plating on Nutrient Agar. Aseptic technique was used to transfer the inoculum to the first quadrant on the agar plate. The loop was flamed and microbes from quadrant 1 were streaked into quadrant 2. The loop was flamed again and microbes from quadrant 2 were streaked into quadrant 3. The loop was flamed again and organism from quadrant 3 was streaked into quadrant 4. Plates were incubated at 37C for approximately 24 hours and observed for the presence of isolated colonies to determine colony morphology characteristics.

### Colony Morphology

Determination of colony morphology was completed using a handheld magnifier for observation of colony elevation, margins and consistency.



# Writing a Lab Report (Biology)

**Results** → boldface type, left-aligned

This is where any tables or figures should be inserted. Make sure each figure has a relevant and detailed title. The title should be bolded. Also, each figure should have a caption underneath it, and tables should include legends, if necessary. These figures should be located right before the text portion of the “Results” section. Here is an example of a table:

**Example:**

**Table 1. The effects of antibody 1 and 2 on patient samples.**

Sample	Antibody 1	Antibody 2
1	+	-
2	-	-

+ = reaction, - = no reaction

Underneath your tables/figures should be your written results. This should always begin with a statement of rationale (how was the experiment performed, and why was this method chosen?). Write a paragraph or two to describe your data; explain what each figure means, and identify any trends. Be sure to be continuously refer back to the figures/tables as you explain your data (According to Table 2, ... etc.). Notice how the actual tables/figures have specific, descriptive titles, but when referred to in the text, they are denoted as “Table 1” or “Figure 1”. This is for simplicity’s sake as your audience reads through your report. Do not make interpretations based on the data collected – that is for the conclusion/discussion. Here is an example of a written results section:

**Example:**

Table 1 shows the results of two patient samples treated with antibody 1 and 2 to detect the presence of antigen A. Sample 1 reacted with the first antibody whereas it did not react with the second antibody. These reactions were indicated by the presence of a color change in wells treated with the first antibody and no color change in wells treated with the second antibody. Sample 2 did not react with either antibody as indicated by no color change in any well.

Notice how there is no indication of whether these are positive or negative findings. That would be analysis and belongs in the Discussion. This section requires the header RESULTS



# Writing a Lab Report (Biology)

**Discussion** —→ boldface type, left-aligned

This section is where you discuss what the data means, and it is also the time to make interpretations based on your findings. You should begin your discussion by restating your purpose, as well as why the study is important.

- State whether or not the results support/refute your hypothesis/predictions and why.
- Make sure to continuously refer back to figures/tables.
- Include and cite outside sources to support your conclusions – **ask your instructor about source requirements.**
- It is a good idea to organize the paragraphs in the discussion by the conclusions you made. Each paragraph should include a conclusion, support, and its relevance to the study/outside scientific applications.

End with a general summary of your conclusions, along with how they relate to what is already known about the topic. The tense in this section varies between present, past, and future. Present is appropriate when discussing accepted scientific knowledge, and past should be used when discussing data/describing new findings. Future tense should be used to describe how this information can be useful in future scientific applications.

## Example:

This study was performed to test the effectiveness of two antibodies to detect the presence of antigen A in patient samples. Antibody 1 detected the antigen in Sample 1 but not sample 2. Antibody 2 detected no antigen in either sample (Table 1). These results confirm expectations as Sample 1 contained antigen A whereas Sample 2 did not. There was a specific reaction in the presence of antigen A for antibody 1 as indicated by a color change in the presence of the HRP substrate. Antibody 2 had no reaction in either sample. These results indicate that Antibody 1 is more effective in detecting the presence of antigen A. These findings support previous studies describing the effectiveness of Antibody 1 (Smith and Jones, 2011). These findings continue to provide insight into the production of highly specific antibodies against antigen A and could be useful in the development of a treatment to prevent cases of infection with antigen A.



# Writing a Lab Report (Biology)

## References

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These are some examples of citations in the bibliography section. Sources should be listed in alphabetical order. If a citation exceeds more than one line, include a hanging indent. This reference page is in APA 6 format – ask your instructor which format they prefer you to use.

**Further Assistance:** For more detailed help or if you have questions, visit the Writing Center located in the Lewis University Library, or call 815-836-5427.

Thank you to Professor Pifer, Dr. Kavouras, and the faculty of the Biology Department at Lewis University for providing the Writing Center with guidelines to a properly written biology lab report to supplement this resource!