The Lab Report

Checklist
The format of the report should include:

1. Title
2. Author Names (that’s you and any lab partners you worked with)
3. Introduction
4. Methods and Materials
5. Results
6. Discussion and Conclusion
7. References

Introduction
The introduction should give the reader sufficient background to understand the rest of the report. This section of the report should contain APA citations from references that are used to provide the necessary background information.

It should answer the following questions in this order:
- What knowledge already exists about this subject, and what concepts need to be addressed in order to understand the rest of the report?
- What is the specific purpose of the study?
- What is the hypothesis?

It might include general figures (include captions and references).

Methods and Materials
The procedure used in the experiment, along with the materials used should be reported in this section. This section should be written in the past tense.

Enough detail should be provided in order for the reader to understand what was done in the experiment. The reader should also be able to repeat the procedure based on what is written in this section.
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Results

This section presents the data obtained during the experiment. The data must be summarized into tables, figures, graphs, and charts. Usefully equations can also be given in this section.

All figures, tables, graphs, and charts must have descriptive titles and should be numbered separately.

All figures, tables, etc. should be self-explanatory. That is, the reader should be able to understand them without referring to the text. All columns and rows in tables and axes in figures should be labeled. Each table, figure, etc. have a caption that describes what data is being illustrated.

Discussion and Conclusion

This is the data interpretation section. Your description of the data should:

1. State the trends in the data **AND**

2. Discuss the meaning of the trends **AND**

3. Provide information on how these trends relate to your hypothesis **AND**

4. Suggest further work that could be done to either improve (for example, you might suggest a for future experiments that might help clarify questions that the reported data did not fully answer) or extend results

   - The interpretation of the data should relate the data to existing theory and knowledge.
   - It needs to explain the logic behind either accepting or rejecting the hypothesis.
   - This section could also include suggestions for the improvement of techniques or of experimental design.
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References

This section lists all resources used in the report and must follow APA format.

You should always be critical of the accuracy of the sources you use.

Using information from another source without a reference is plagiarism, which is in violation of the violation of the St. Francis Prep Honor Code.

Details on the specifics of citing references can be found at:

http://www.mhhe.com/biosci/genbio/maderinquiry/writing.html

Note: http://owl.english.purdue.edu/owl/resource/560/10/ describes how to reference different types of electronic information in the APA Format. For example:

Nonperiodical Web Document, Web Page, or Report

List as much of the following information as possible (you sometimes have to hunt around to find the information; don't be lazy. If there is a page like http://www.somesite.com/somepage.htm, and somepage.htm doesn't have the information you're looking for, move up the URL to http://www.somesite.com/):

Author, A. A., & Author, B. B. (Date of publication). Title of document. Retrieved month day, year (only if the text may potentially change over time), from http://Web address

NOTE: When an Internet document is more than one Web page, provide a URL that links to the home page or entry page for the document. Also, if there isn't a date available for the document use (n.d.) for no date.

Additional Information

- Lab reports should be typed using a word processing program.
- Text should use 1.5 spacing for paragraphs and single spacing for labels.
- Always use spell-check.
- Use proper grammar, complete sentences, correct punctuation and capitalization.
- The metric system should be used for measurements.
- Paragraphs should be divided correctly and should have starting and ending sentences that indicate the purpose of the paragraph. A report or a section of the report should not be one long paragraph.
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- The first person, I or we, should be avoided. The writing should be impersonal, in the third person.
- Never use slang or contractions.
- The use of tense should be consistent throughout a paragraph.
- Abbreviations can be used. If they are non-standard, they must be defined. For example PBJ should be defined as follows: A peanut butter and jelly (PBJ) sandwich consists of peanut butter and jelly. Something like grams (abbreviated as g) does not need to be defined.
- Be “word conscious”: don’t use 50 words to say something that you can say with 10. Provide the maximum value in a minimum space.
Investigations into the Perfect Peanut Butter and Jelly Sandwich: Determining the most Appealing Amount of Peanut Butter

Introduction

The peanut butter and jelly sandwich (PBJ) is often thought of as a stable of school lunches, because it does not contain any perishable ingredients. The advantage of the sandwich is that it does not require refrigeration in hot weather, making it suitable for lunch bags. The sandwich, also known as a peanut butter and jam sandwich in the UK, Canada and Australia, includes a layer of peanut butter and either jelly or jam on bread, commonly between two slices. The peanut butter and jelly sandwich is very popular with both adults and children in the US and Canada. A 2002 survey showed the average American will have eaten 1,500 of the sandwiches before graduating from high school.¹

Since PBJ sandwiches are enjoyed by a large number of Americans, the purpose of this experiment is to test how much peanut butter makes the perfect PBJ sandwich. Four people were asked to test sandwiches with the same bread, same jelly in the same amount, and varying amounts of the same kind of peanut butter. The hypothesis is that one (1) tablespoon of peanut butter will produce the best tasting sandwich.

Methods and Materials

One teaspoon of peanut butter (Jif Peanut Butter) was spread in an even coating over one slice of white bread (Wonder Classic White Bread). A second slice of white bread (Wonder Classic White Bread) was spread with 1 tablespoon of strawberry jelly (Smucker’s Brand). The two slices were put together (peanut butter touching jelly) and cut in four equally sized quarters as shown in Figure 1.²
Figure 1. Black lines indicate the cuts that were made in the peanut butter and jelly sandwich to divide the sandwich into evenly sized pieces.

This procedure was repeated using varying amounts of peanut butter: 2 teaspoons, 1 tablespoon, and 2 tablespoons. (NOTE: 1 teaspoon equals 4.7 g and 1 tablespoon equals 14.2 g)

Each test subject was given a quarter of each of the four sandwiches. Subjects were allowed to have a drink of their choice in between evaluating sandwiches. Sandwiches were rated on a 1-4 scale (1 being poor and 4 being excellent).

Results

Table 1 shows the results for how each person evaluated the PBJ sandwiches. As shown in table 1, an average score for each amount of peanut butter was determined by adding the score for each person and dividing by the total number of evaluators or ratings (equation 1)

Table 1. Results are given for the way that person A, B, C, and D rated sandwiches with the given amounts of peanut butter. The scale was 1-4 (1 being poor and 4 being excellent).

<table>
<thead>
<tr>
<th>Amount of Peanut Butter</th>
<th>Person A</th>
<th>Person B</th>
<th>Person C</th>
<th>Person D</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 teaspoon (4.7 g)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.25</td>
</tr>
<tr>
<td>2 teaspoons (9.5 g)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.75</td>
</tr>
<tr>
<td>1 tablespoon (14.2 g)</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3.25</td>
</tr>
<tr>
<td>2 tablespoons (28.5 g)</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Equation 1:

\[
\text{average} = \frac{\text{sum of rating}}{\text{total number of ratings}}
\]
Sample Lab Report

Discussion

Based on the results shown in Table 1, as observed in Figure 2 (a), the maximum quality of peanut butter sandwich was obtained when 1 tablespoon (14.2 g) of peanut butter was used on the sandwiches. This result is consistent with the hypothesis. More accurate results could have been obtained using a larger sample size of people trying the sandwiches.

![Graphs](image)

**Figure 2.** (a) The average quality of each sandwich is graphed verses the amount of peanut butter. (b) The quality of each sandwich as evaluated by Person C is graphed verses the amount of peanut butter.

It is interesting to note that Person C did not rank any sandwich above a score of 2. One possibility is that this person does not like peanut butter and jelly sandwiches in general. If this experiment were to be repeated, evaluators should be asked if they enjoy peanut butter sandwiches.

This experiment could be repeated in the same manner with varying amounts of jelly to determine the optimum amount of jelly in a PBJ sandwich. With preferred amount of jelly and peanut butter, one could also test different types of bread to determine the best type for a PBJ sandwich.

References

Sample Lab Report


Note: You should always be critical of the accuracy of the sources you use. This is a very rare source when information from Wikis (like Wikipedia, for example) and a non-scientific podcast is appropriate. Wikis are collaborative projects which cannot guarantee the verifiability or expertise of their entries.

Exercise:
The following text is copied directly from the Wikipedia article. Compare it with the Introduction in this sample lab report.

“The peanut butter and jelly sandwich, (PB&J), also known as a peanut butter and jam sandwich in the UK, Canada and Australia, is a sandwich that includes a layer of peanut butter and either jelly or jam on bread, commonly between two slices, but sometimes eaten open-faced, that is, with peanut butter and jam or jelly on each of two slices, eaten without putting the two slices together and without folding each slice of bread.[1] The sandwich has the advantage that it does not contain any perishable ingredients, so it does not require refrigeration in hot weather, making it suitable for lunch bags. The peanut butter and jelly sandwich is very popular with both adults and children in the US and Canada. A 2002 survey showed the average American will have eaten 1,500 of the sandwiches before graduating from high school.[2] Jars of pre-mixed peanut butter and jelly are commercially available for making these sandwiches.”