

Writing a Good Lab Report
(Taken from Warren Dolphin at Iowa State U.)

I. The format of the report should be:

1. Title
2. Introduction
3. Methods & Materials
4. Results
5. Discussion
6. References

II. What should each section of the report include?

1. Title

-The title should be less than 10 words and should reflect the factual content of the paper.

2. Introduction

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

- It should answer the following 3 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?

3. Methods & Materials

-Includes the procedure used in the experiment, along with the materials used.

-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 and be able to repeat the procedure exactly.

4. Results

-This section presents the data obtained during the experiment. The data must be summarized into tables, figures, graphs, and charts.

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

-All figures, tables, etc. should be self-explanatory, meaning that the reader should be able to understand them without referring to the text. All columns, rows, axes, etc. must be labeled.

5. Discussion

-This section should interpret the data.

-It should not simply state the trends in the data, but rather, should focus on the meaning of the trends.

-The interpretation of the data should relate the data to existing theory and knowledge (*relate back to the info you mentions in the Introduction!*).

-It needs to either accept/reject the hypothesis, but also explain the logic behind accepting or rejecting the hypothesis.

- This section could also include suggestions for the improvement of techniques or of experimental design.
- It might also include suggestions for future experiments that might help clarify questions that the reported data may have risen.

6. References

- This sections lists all resources used in the report. These sources will mainly be used to writw the introductions, but may also be used in the discussion.
- It must follow APA format.
 - Some helpful websites:

http://www.english.uiuc.edu/cws/wworkshop/writer_resources/citation_styles/apa/apa.htm

<http://www.liu.edu/cwis/cwp/library/workshop/citapa.htm>

<http://www.lesley.edu/library/guides/citation/apa.html>

APA Format to Follow:

Book :

Author, A. A. (Year of publication). *Title of work: Capital letter*
also for subtitle. Location: Publisher.

Magazine/Periodical :

Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article.
Title of Periodical, volume number(issue number), pages.

Website:

Author, A.A., & Author, B.B. (Date of publication). Title of article. *Title*
of Online Periodical, volume number (issue number if available).
 Retrieved from <http://www.someadress.com/full/url>

III. Other Helpful Hints

- Paragraphs should be divided correctly and should have starting and ending sentences that indicate the purpose of the paragraph.
- Students must use complete sentences.
- The first person (i.e *I* or *we*) should be avoided. The writing should be impersonal, in the third person.
- The use of slang or contractions should be avoided.
- The use of tense should be consistent throughout a paragraph.
- The metric system *must* be used for measurement.

Lab Report Evaluation Form

Criteria	Points
Title/Name	/5
Introduction: <ul style="list-style-type: none">- Background- Purpose- Hypothesis	/20
Methods and Materials: <ul style="list-style-type: none">- Procedure explained clearly- All materials included	/20
Results: <ul style="list-style-type: none">- Clear Observations- Data presented clearly/correctly- Proper Units and Labels	/20
Discussion: <ul style="list-style-type: none">- Clear explanation that refers to data- Accepts/Rejects Hypothesis- Clear Conclusion	/20
References: <ul style="list-style-type: none">- Proper Citation	/5
Overall neatness, grammar, formatting	
Total	/100

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26 November 2009

The Boiling Point of Water

Introduction:

Kinetic theory states that all molecules in matter are in constant motion (Kane and Sternheim, 1984). As these molecules absorb more energy they have a higher amount of random movement. As energy is absorbed in the form of heat the average kinetic energy (temperature) of the molecules will increase except during a phase change. The absorbed energy used in the phase change breaks the attractive forces between the molecules, thus transformation occurs in the orientation of the molecules. An example of a phase change would be the boiling point of water which is a change from a liquid to a gas. This can be observed by using a temperature versus time line graph when the slope becomes zero (plateau) The boiling point of water is expected to be 100.00 oC (Merck, 1976).

The purpose of this experiment is to determine the boiling point of water. The hypothesis is that If the pressure in the classroom is close to 1 atmosphere, then the boiling point of water should be approximately 100 degrees Celsius

Methods and Materials

The required materials were selected and taken to the workstation. A 500 ml beaker was filled with approximately 300 ml of distilled water. The beaker was gently placed on a hotplate. The thermometer was placed in the beaker and the initial temperature was recorded. The hotplate was switched on to the highest setting. The temperature was recorded every 2 minutes until 6 minutes after boiling began. The hotplate was turned off and the materials were allowed to cool for at least 10 minutes before the equipment was dismantled.

Results

Quantitative Results

Table 1 Graph displaying data obtained from the heating of water from 0 to 16 minutes

Time (minutes)	0	2	4	6	8	10	12	14	16
Temp (°C)	20.05	41.46	60.62	79.39	97.11	99.68	99.51	99.51	99.51

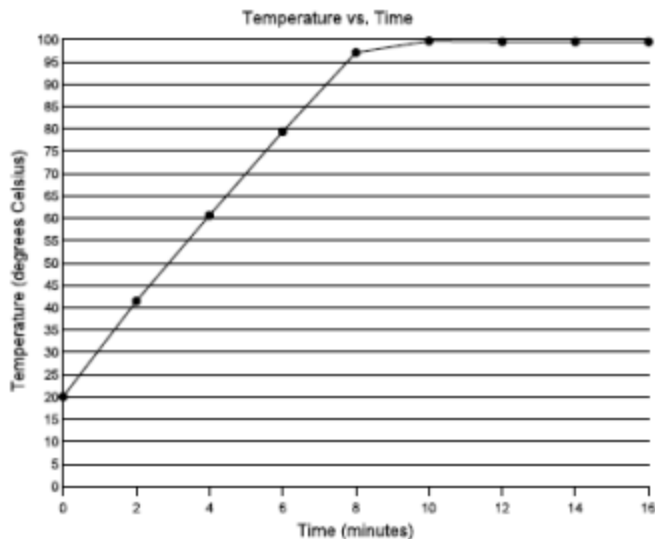


Figure 2. A line graph of temperature versus time of the data obtained in Table 1

Qualitative Results

Numerous small bubbles formed at the bottom of the beaker at 70.6 °C. The size and rate of bubble formation increased as the temperature increased. At 100.0 °C the rate and size of bubble formation remained constant. At that temperature, there was constant production of water vapor.

Discussion:

It was determined from the data plotted in the temperature versus time graph (Figure 2) that the boiling point of water is 99.51 °C. This concurs very closely with the stated hypothesis, therefore the experiment was deemed a success. The percent error was found to be 0.49%. Possible sources of error could have involved impurities in the water and human error in reading the thermometer. Possible sources of error may be impurities in the water which may be chemicals from dirty glassware. Improvements would include more accurate thermometers, clean equipment and proper reading of the thermometer.

References:

Kane, Joseph W. and Morton M. Sternheim. Physics.
New York: John Wiley & Sons, 1984 ed.

Merck, Josef. Merck Index of Chemical Constants. New
York: Benjamin/Cummings Publishing Company Inc. 1976.