7.3 Students may be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Section 7.1, or other reason deemed appropriate by the student's instructor. To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class.

If needed, the student must provide additional documentation substantiating the reason for the absence, that is satisfactory to the instructor, within one week of the last date of the absence.

If the absence is excused, the instructor must either provide the student an opportunity to make up any quiz, exam or other graded activities or provide a satisfactory alternative to be completed within 30 calendar days from the last day of the absence.

7.4 The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence.

7.5 See Part III, Grievance Procedures: 45. Unexcused Absences, for information on appealing an instructor's decision.

7.6 If the student is absent for excused reasons for an unreasonable amount of time during the semester, the academic dean of the student's college may consider giving the student a grade of W during the semester enrolled or a NG (no grade) following posting of final grades.

7.7 Whenever a student is absent for unknown reasons for an extended period of time, the instructor should initiate a check on the welfare of the student by reporting through the head of the student's major department to the dean of the student's college.

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1 In accordance with Faculty Senate Resolution FS.14.101 (see Faculty Senate meeting minutes of Feb. 10, 1997), "faculty members are encouraged not to hold exams on the day of Muster. Any absence from classes beginning after 5 p.m. to attend Muster will be considered a university excused absence

CHEM 117 Laboratory Report Format

Spring 2022

All reports should include the following:

- Title page

- Abstract
- Experimental Procedure
- Results
- Discussion
- Conclusion & Referecnes
- Calculations & In-Lab Printouts (as needed)

Everything should be typed. This includes chemical formulas and calculations. Make sure to use the correct super- and subscripts.

Use the passive voice. For example:
Correct: "The temperature increased as the mass increased."
Incorrect: "The temperature increases as the mass decreases."

Do not use "I" or "we." For example:
Correct: "Using a stir plate, the chemicals were mixed."
Incorrect: "We used a stir plate to mix the chemicals."

Do not use contractions. For example:
Correct: "The precipitate could not be filtered."
Incorrect: "The precipitate couldn't be filtered."

Do not reference yourself. Do not mention "the students" or "during the lab period."

Abstract

The abstract is a shortened version of the paper and should contain all information necessary for the reader to determine the following:

- What the objectives of the study were;
- How the study was done; (briefly, not in detail… do not mention glassware, etc.)
- What results were obtained;
- What is the "real world" significance of the results?

By reading only the abstract, the reader should understand all of the above. Although it appears as the first section in a paper, it is best to write the abstract last. Abstracts should be only one paragraph, no more than a half-page long. To most effectively write an abstract, include the four points above in that order.

Experimental Procedure

This is where you detail the exact procedure of the experiment. This is not a step-by-step instructional guide. Summarize your procedure in passive voice and ensure that it is in a paragraph form not bullet points. Include the important details, you do not need to go into the details of specific techniques as it is assumed that your reader already has a background in chemistry.

Results

This should be several short paragraphs describing the results obtained from your experiment. You should use tables and/or figures to help guide your readers toward

the most important information you gathered. You will need to refer to each table or figure directly, for example, "Table 1 lists the rates of solubility for each substance," or "Solubility increased as the temperature of the solution increased (see Figure 1)." If you do use tables or figures, make sure that you do not present the same material in both the text and the tables/figures. Any tables or figures used should not show the collected data from the experiment, only the results determined. The results of any calculations performed should be shown in the Results section; either in the text, or in a table.

Describe any trends that emerge as you examine the data. For example, "Heating the solution increased the rate of solubility of polar solids by 45%, but had no effect on the rate of solubility in solutions containing non-polar solids."

Discussion

Discuss any observations you recorded during the experiment to share with the reader. List any errors or deviations that occurred during the experiment, and how they may affect the final results.

Always refer to your results in the past tense, because the events you recorded have already occurred. In the example above, note the use of "increased" and "had," rather than "increases" and "has." You do not know from your experiment that heating *always* increases the solubility of polar solids.

Conclusion

The conclusion should wrap up your report and mention how successfully your objective was satisfied. Reiterate your main results and propose improvements to the procedure that can help overcome the limitations of your work. This does not need to be long.

Calculations & In-Lab Printouts

Present one sample for each type of calculation you did throughout the experiment. Separate your calculations by parts of the experiment. Always include units throughout the calculations. Show all numbers used in the calculation, saving the significant figure rules for the final result. Always follow a numerical result with an identifier. For example:

Part A: Molarity of the solvent

Molarity = moles/L

$\text{Molarity}_{(NaOH)}$ = 0.50 mol NaOH / 2.0010 L

$\text{Molarity}_{(NaOH)}$ = 0.2498 M ≈ 0.25 M NaOH

The resultant number has no meaning without the units (M) or the identifier (NaOH).

Referecnes

In-text citations are a must! You cannot claim that "extraction is used in the XYZ industry" and have no reference to substantiate your claim. Your reader should be able to verify the validity of your statements. Also, your references cannot be copy-pasted links to websites. Use proper ACS referencing formatting. You can use this website for your citations: http://library.williams.edu/citing/styles/acs.php

<u>All work must be your own.</u> You and your lab partner may be sharing data, but should be writing down your own results and observations. You may work together in performing the calculations and determining the results. But your report must be your own work! Copying a report, either whole or in parts, is considered a violation of the Aggie Code of Honor and any findings will be reported to the Academic Affairs office.

Example Lab report

Experiment #1

"Determination of the Specific Heat of Copper"

Student's Name
CHEM 117-section number
Turn in date: Day-Month-Year
Lab Instructor: Instructor's name

Abstract

The purpose of this experiment was to determine the specific heat, *c* (J/g·°C), of copper metal. The mass and temperature of a copper coin was measured and recorded. The coin was placed into a measured mass of hot distilled water. The temperature change of the water was measured until the copper coin and the water reached thermal equilibrium, assuming no heat was lost to the surroundings. The procedure was performed twice to ensure accuracy. The experimentally determined specific heat of copper was found to be 0.44 J/g·°C. This result is significant since the specific heat of metal is vital in the development and manufacture of the heat exchangers that provide cooling to electronic components in computers.

Four parts to the abstract:

- **Objectives of the study**
  - **"The purpose of the experiment is…"**
- **How the experiment was performed**
  - **Brief summary explaining the procedure, and why you took those steps. If the experiment is in multiple parts, then "In Part A…"**
- **Results**
  - **Refer to the statement listed in the objectives. If the purpose was to find the average mass, make sure you show your determined average mass.**
- **Significance of results**

- **Real world significance; do not write "because it is important in chemistry." Think about why these results are important, and how they can affect everyday life.**

Experimental Procedure

Before the experiment was performed, several assumptions were made. First, the copper coin used was actually an alloy consisting of 95.4% copper and 4.6% zinc. The percentages were provided by the instructor. Since the percentage of zinc was small in comparison to the entire mass, it was decided that the zinc's affect on the experiment was negligible. Also, the thick Styrofoam container holding the water was assumed to have zero heat loss to atmosphere or absorption. The data from the two experimental trials are listed in Table 1.

- **The procedure in this section is detailed.**
- **Passive voice is used to describe the procedure**
- **It is written in a paragraph form, not bullet points.**

Results

The copper coins were cleaned with sandpaper and dipped in HCl prior to weighing. This was to remove any oxides that had accumulated on the surface of the copper coins. After the cleaning process, the copper coins became very shiny.

Table 1: Results from Trial 1 and Trial 2

	Trial 1	Trial 2
ΔT_{coin} (°C)	5.0	8.0
ΔT_{water} (°C)	45.6	26.2
c (J/g·°C)	0.40	0.48

A small amount of water in Trial 2 (~1mL) was spilled when adding the copper coin. The similarity in the results from Trial 1 and Trial 2 demonstrated accuracy across the two experiments. Deviations may have been due to heat loss to the walls of the water vessel and into the atmosphere.

The average specific heat of copper from the two trials was 0.44 (J/g·°C). According to literature, the actual specific heat of copper is 0.385 (J/g·°C). The deviation between the actual and experimentally found specific heat of copper was 6.67%.

Based on the experimentally discovered result of 0.44 (J/g·°C), copper has a smaller heat capacity than aluminum, 0.902 (J/g·°C). Therefore, since copper has a smaller heat capacity, if balls of aluminum and copper of the same mass were held a person's hands, the copper would reach thermal equilibrium with the person's hand faster than the aluminum.

- **The results section is not a summation of the procedure.**
- **Use tables to organize your results. Make sure they are properly titled, contain any units, and are referenced in the text of the results.**
- **State main findings in words.**

Discussion

- **Discuss any observations, deviations, errors, or ideas about the experiment.**
- **If the laboratory manual asks any questions, put your answers in paragraph format in this section. Be careful not to just write an answer without restating the question. Assume anyone who reads your report has never seen the lab manual.**

Conclusion

- **Restate the main obejective of the report**
- **Summarize the main results and future suggestions to overcome the limitations of the experiment.**

Calculations & In-lab Printouts

Trial 1:

$q = mc\Delta T$

Since the system is closed, the heat lost by the water must equal the heat gained by the copper.

$q_{water} = -q_{copper}$

$m_{water}c_{water}\Delta T_{water} = -m_{Cu}c_{Cu}\Delta T_{Cu}$

$$(10.0g\,H_2O)\frac{(4.184\,J_{water})}{g^\circ C}(59^\circ C - 54^\circ C) = (7.3g\,Cu)\frac{(c_{Cu}\,J)}{g^\circ C}(59^\circ C - 13.37^\circ C)$$

$c_{Cu} = 0.3961$ J/g°C ≈ 0.40 J/g°C

Average of Trial 1 and Trial 2 specific heat:

Average $c_{Cu} = (c_{Trial\ 1} + c_{Trial\ 2}) / 2$

Average $c_{Cu} = (0.396$ J/g°C + 0.482 J/g°C) / 2

Average $c_{Cu} = 0.439$ J/g°C ≈ 0.44 J/g°C of copper

- **Use an equation writer when inserting large equations. Smaller equations can be written using standard text**.
- **Show one example of every equation you used in the experiment**.
- **Always show the equation first, and then add in your numbers**.
- **Show your units at every step throughout the calculation**.
- **Always include an identifier of the chemical or item that your answer or unit is describing:**
    - **"10 grams$_{H20}$" or "10 grams of H_2O"**

- **If you need to round your final answer to meet the significant figure guidelines, use the "≈" symbol.**
- **Do not crowd your calculations. Separate the calculations with either a title or a one-line explanation.**

References

Format for an Article in a chemistry Journal:
Gbalint-Kurti, G. G. Wavepacket Theory of Photodissociation and Reactive Scattering. In Advances in Chemical Physics, Vol. 128; Rice, S. A., Ed.; Wiley, 2004; pp 257.

Format for an Article in a chemistry Journal:
Evans, D. A.; Fitch, D. M.; Smith, T. E.; Cee, V. J. J. Am. Chem. Soc. 2000, 122, 10033-10046.

- **All the information extracted from sources should be referenced**
- **References should be written in the format above and and should be numbered in the order of listing in your document**

Appendix A Course Syllabi

CHEM 117 General Chemistry for Engineering Students Laboratory
REQUIRED OR ELECTIVE: Required course

CATALOG DESCRIPTION: (0-3). Credit 1. Introduction to important concepts and principles of chemistry in the laboratory; emphasis on areas considered most relevant in an engineering context; practical applications of chemical principles in engineering and technology.

PREREQUISITES: CHEM 107 or registration therein.

TEXTBOOK AND OTHER REQUIRED MATERIAL: *General Chemistry: Principles and Modern Applications* Tenth edition, Petrucci, Herring, Madura & Bissonnette (MacMillion Publishing, 2011, ISBN: 978-0-13-206452-1). *Chemistry 117 Laboratory Manual 2012-2013,* Hayden McNeil. Student Lab Notebook.

COURSE LEARNING OUTCOMES: At the end of this course, students should be able to:

1. Perform laboratory experiments to measure a range of physical properties, such as temperature,
   Pressure, mass, volume, with precision and accuracy.
2. Use appropriate software to fit mathematical functions to experimental data and assess the quality
   of the fit.
3. Present experimental data in graphs and tables to facilitate easy interpretation.
4. Evaluate the quality of experimental data in both qualitative and quantitative terms, and