

Chemistry & Chemistry Honors Lab Report Rubric & Sample

Section	Description	Total Points
Title	Concisely explains the purpose of the investigation (e.g., "The Effects of Fertilizer on Corn Growth")-	3
Abstract	Brief explanation of what you are investigating and what your findings were. This explains to the reader what is going on and why they would want to read the details. Maximum 100 words.	3
Introduction	Purpose of the investigation; how the investigation answers a specific question; curricular context A GOOD/TESTABLE Hypothesis(es) that lists dependent and independent groups ("if ... then" is okay)	15
Materials/ Procedures	- Materials/supplies listed - Procedures clearly stated	10
Results/ Data/ Analysis	- Data recorded in tables (tables titled, calculations completed) - Graphs (X-Y and histograms) present if applicable - Tables and graphs titled - Axes labeled correctly - Statistical analysis	30
Conclusions/ Discussion	- Results summarized - Errors identified - Results compared to hypothesis and primary question - Conclusions stated/results interpreted - Suggestions for improvement	20
Questions	What are questions for further investigation? What new questions arise from the results of the investigation?	10
References	- Cited within write-up - Accuracy of citation information	4
Grammar	- Grammar - Punctuation - Spelling	5
		Total: 100 pts.

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Score	Based upon a criterion that may adjust slightly per assignment due to the objectives.
80-100% possible points	Criterion satisfied fully with attention paid to details. All, to nearly all, information is present. Very few discrepancies exist.
51-79% possible points	An attempt was made to use the correct format, but minor discrepancies exist or incomplete.
50% possible points	An attempt was made to use the correct format, but incomplete and obvious discrepancies exist.
0% possible points	No attempt was made to satisfy this criterion.

Details

This will explain what you need your Lab Report to have to get full points as shown on the Rubric.

Title

The title needs to describe what the experiment was about and give some indication of what the procedure was. Remember that if people do an internet search, the title is the only thing they will see, so a more descriptive title is better.

Titles of lab reports are long-often almost a complete sentence (except for the verb). An example of a good title might be "The Effect of Temperature on the Pressure of Nitrogen Gas." Try to be as specific as you can; "The Magnetic Properties of a Vanadium-Iron Alloy" is better than "Properties of a Magnetic Alloy," or even worse, "Magnet Lab."

The title should not contain chemical symbols, formulas, or abbreviations. Note that a separate title page is not necessary. Your lab report is graded on content, not length, so there's no reason to kill extra trees.

Abstract

The abstract is a short (around 100 words or so) "executive summary" of your entire lab report. Its purpose is to communicate your entire lab report (procedure, results, and discussion) to somebody who doesn't have time to read it.

For a high school lab report, it will probably be one paragraph of 4-6 sentences. The first 1-

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2 sentences should describe the objective of the experiment and the procedure. The next 2-3 sentences should summarize the major results and conclusions, and the last sentence should describe any possible sources of error, the percent error (for a quantitative lab), and any other limitations or caveats on your conclusions.

Abstracts are often published separately from the rest of the report, so your abstract must be complete and make sense without any of the rest of your report. This means your abstract can't refer the reader to any other section of the report for tables, figures, or other information.

Introduction

This section describes the science behind your experiment, and should tell the reader why you performed it. The introduction should include background information about the chemical principles involved, and a summary of any prior related experiments. If your experiment includes a hypothesis, you would state it in the introduction.

For a high school lab report, the introduction should contain at least two paragraphs. The final sentence of the last paragraph should state the objective of your experiment, much like the final sentence of the introduction section of a term paper usually states the thesis of the paper.

The information in your introduction will almost certainly come from other sources (textbooks, class notes, handouts, etc.). You need to include citations that point to bibliography entries in your Works Cited section.

Materials and Procedures (Formally Materials & Methods)

This section (sometimes called "Experimental") describes your procedure, in enough detail that someone else with your level of experience could repeat the experiment. The section must be in paragraph form, and in the past tense. e.g., Sodium carbonate (10.0 ml of a 0.10 m solution) was placed in a 100 ml beaker and acetic acid (0.50 ml of a 1.0 m solution) was added.

You must include all of the relevant quantitative information, such as the names and concentrations of all chemicals used, temperatures, times, etc.) Your description must be specific. If the experiment involves a complicated set-up, you may include a drawing to show it. (Remember that figures need to be numbered and have titles, just like tables.) However, the drawing is not a substitute for the description. Be sure to include the manufacturer and model number of major laboratory equipment used (pH meters, spectrophotometers, etc.).

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The first time you mention a chemical, write out the name, followed by the chemical formula in parentheses (e.g., sodium chloride (NaCl)). After the first time, you can refer to the chemical by its formula.

You may assume that anyone who is reading your lab report will know basic chemistry. For example, don't bother to mention safety goggles, but you should mention any unusual hazards or precautions, including whether any of the chemicals are explosive, flammable, or toxic, or if there are any special procedures for disposing of wastes. Do this in a separate paragraph, starting with the word "Caution:". If your procedure is based on a written procedure from another source (such as a lab handout), remember to include a citation and a bibliography entry in the works cited section.

Results

In this section you present your data. You will probably want to use tables and/or figures to present the results. However, every figure or table must be numbered and the number must be mentioned within the text. All figures and tables also need titles, and need to be labeled with enough detail that someone who is not familiar with the experiment will know what they represent. (Remember to include units in your tables, and labels on both axes of your graphs.)

Keep in mind that tables are useful when the reader wants to know exact values, and graphs are useful for showing trends and for deriving values from a statistical fit of data. Tables and figures should be numbered sequentially (such as "Table 1" or "Figure 1"), and each one should have a descriptive title. If your data include any calculated values, you must include the formulas in this section.

Discussion

The Discussion section is where you interpret and compare your results. You should compare your results with published or theoretical values (including percent error) whenever possible, and list and analyze possible sources of error. (Remember that published values need a citation in your works cited section.) If your experiment includes a hypothesis, you need to evaluate how well your data support or refute the hypothesis.

Conclusions

As with an English term paper, this section should start with a sentence that restates and evaluates the objective that you stated in your introduction. Then, give a brief summary of the main results and conclusion(s) of the experiment (you'll probably use the same text here and in your abstract), as well as restating any major problems or sources of error. Finish with suggestions for improvements or future experiments.

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Works Cited

Any information that came from another source (including your textbook, class notes, handouts, etc.) must be listed here. References will be done using the MLA format.

Rules

Lab reports must:

- be typed or typeset on a computer, except for diagrams, which may be handwritten as long as they are neat and legible.
- include your name, and the name(s) of your lab partners (even though each of you must turn in separate lab reports).
- include your teacher's name and the class period.

Stylistic Points

No First- or Second-Person Pronouns

In formal writing, including lab reports, never use the first or second person. Instead of saying "I dissolved 8.5 g of sodium chloride in 100 ml of water," or worse yet, "You dissolve 8.5 g of sodium chloride in 100 ml of water," you should say, "Sodium chloride (8.5 g) was dissolved in 100 ml of water."

Passive Voice

You have probably been told to avoid the passive voice by your English teachers. (The previous sentence is an example of the passive voice; the active version would say, "Your English teachers have probably told you to avoid the passive voice.") However, scientists often use the passive voice, particularly when describing experimental protocols. This is done intentionally, to emphasize the fact that the report is about the experiment and its results. To your readers, the experiment is what matters; you are irrelevant! For example, most chemists would write, "The solution was heated to 100°C for 25 minutes," rather than "the investigators heated the solution to 100°C for 25 minutes."

Verb Tense

Lab reports are written in a combination of past and present tense, depending what you are writing about. If you are writing about things you did (actions that took place in the past), such as the details of your procedure and the results that you observed, use the past tense. However, use the present tense for trends and properties. For example, write "The solution was heated to 100°C for 25 minutes." because that was a specific action that was

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carried out at a specific time in the past. However, write "ammonia and hydrochloric acid react to produce ammonium chloride gas", because this happens every time these chemicals come into contact with each other.

Numbers at the Beginning of Sentences

Never start a sentence with a numeral. (The figure "2" is a numeral; the word "two" is not.) However, you need to report all numbers to the correct number of significant figures. This creates a problem: if you added exactly 1.00 g of salicylic acid to a beaker, you can't say "1.00 g salicylic acid was added..." because you can't start a sentence with a numeral. However, you also can't say "One gram of salicylic acid was added..." because you need three significant figures. You also can't say "I added 1.00 g of salicylic acid..." because you can't use the first person. The solution is to start with the substance, and put the exact amount in parentheses, e.g., "Salicylic acid (1.00 g) was added..."

Miscellany

Other than the above, you should follow the same rules of formal English grammar and usage that you have been taught in English class. Note particularly that the word "data" is plural, so you need a plural verb with it. You can't say "The data shows that..." This is as bad as saying "The people says that..." If you ever need to use the singular of data, it's "datum".