

## Introduction 2

# Writing a Scientific Lab Report

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### Purpose

Well-written lab reports and scientific papers serve to persuade others to accept or reject hypotheses by presenting data and interpretations, detail data procedures and outcomes for future researchers, become part of the accepted body of scientific knowledge when published unless later disproved, and prove an archival record for reference and document a current situation for future comparison.

### Style

Lab reports should be prepared on separate paper and be either typed or handwritten. If handwritten, make sure that your writing is neat and readable, including all calculations, data, labels, units, and symbols.

Use third person and clear, concise descriptions and exact language. Using short but accurate sentences is much better than writing long, vague paragraphs. A lab report should be easy enough to follow that your peer could read and follow its procedure and explanations.

Use passive voice and past tense. Be consistent within the report (Note: "data" is plural while "datum" is singular).

Include all relevant units for all data in their correct abbreviations.

Write numbers as numerals when greater than ten (i.e., 156) or associated with measurements (i.e., 6 mm or 2 g).

Have a neutral person review and critique your report before submission.

### Format

The typical lab report includes: title, abstract, background, data and calculations, discussion and conclusions, and references and literature cited.

**Title:** Reflect the experiment with less than ten words in a straightforward manner. Use keywords researchers and search engines on the Internet or other databases would recognize. Your lab report title may be the same as the experiment title from the manual.

**Abstract:** Summarize in 1-2 sentences the purpose of the experiment, how the data was collected, and all results and conclusions.

**Background:** Define the subject of the report by answering, "Why was this study performed?" Provide background information and relevant studies already performed by answering, "What knowledge already exists about this subject?" Use and cite outside sources to add context. Outline the scientific purpose(s) and/or objective(s) by answering, "What are the specific hypotheses and the experimental design being used in this investigation?" This section should be about 2-3 paragraphs.

**Procedure:** List all materials used, how they were used, and when and where the work was done (especially when conducting field studies). Describe special pieces of equipment and the general theory of the analyses or assays used. Provide enough detail for the reader to understand the experiment without overwhelming them. When procedures from a lab manual or another report are followed exactly, cite the work and note that the details can be found there ("Refer to the procedure in Experiment 12 in the ChemV01AL manual").

**Data and Calculations:** Summarize data only; do not explain or discuss it. Organize data into clear and labeled tables, figures, or graphs. Title all tables, figures, and graphs and number them separately to refer to them in the text. Include sample calculations for each unique calculation required in the experiment.

**Discussion and Conclusions:** Refer to ("In Figure 1 it is seen that..." or "The relationship is inverse (Graph 2)"), interpret and explain the data; do NOT restate the procedure, calculations, or results. Instead, relate the conclusions to existing theory and knowledge while explaining the logic that allows you to accept or reject your original hypotheses. Speculate as necessary but identify it as such. Identify any possible errors or mistakes committed and include suggestions for improving your techniques or design or clarify areas of doubt for future research.

**References and Literature Cited:** Cite only references used in your paper. Alphabetize by the last name of the author and follow the ACS format.

**Website:** Author (if any). Title of Site. URL (accessed date), other identifying information.

Weisstein, E. W. Molecular Orbital Theory.  
<http://scienceworld.wolfram.com/chemistry/MolecularOrbitalTheory.html>  
(accessed 12/15/03), part of Eric Weisstein's World of Science.  
<http://scienceworld.wolfram.com/> (accessed 12/15/03)

**Journal:** Author. Title. *Journal Title*. **Year**, *Issue*, Pages

Freire, E.; Mayorga, O.L.; Straume, M.  
Isothermal Titration Calorimetry. *Anal. Chem.*, **1990**, *62*, 950A-959A