

## Lab Reports - Formal Write-Up Procedure

When performing experiments, it is important to keep detailed records of details such as procedures followed, materials used, observations or results, and conclusions so that these be shared with other experimenters. Investigations can only be validated after they have been repeated by others, publishing the results in journals, and are generally accepted by the scientific community. Publishing involves detailing the design, materials, procedure, evidence, analysis, and evaluation of the process.

Lab reports are prepared after the lab investigation has been completed. As such, it is imperative that you keep thorough and accurate records of all your activities as you carry out the experiment. Your lab report should reflect the type of scientific inquiry that you used in the investigation and should be based on the following headings (underlined), as appropriate.

### Title

Write the number and title of your investigation (usually given in text). If you create your own investigation, the title should reflect what the investigation is about. Include the date of the investigation, and a ***list of all lab partners*** (identify as yours by circling or underlining your name).

### Purpose/Problem

State the purpose of your investigation. Why are you performing this lab?

### Hypothesis/Prediction

Based on your reasoning or a previously studied concept, formulate an explanation of what you think should happen. This is an “educated guess” as to the outcome of your experiment. Be specific.

### Design

This is a brief overview (one to three sentences) of what was done. If independent, dependent, and/or control variables were involved, list and identify them here.

### Materials

This is a detailed list of all materials used. Include quantity and size, where appropriate. Be sure to include safety equipment and precautions needed. Draw diagrams for any complicated setup of apparatus.

### Procedure

Describe, in detailed, numbered, step-by-step format, the entire procedure followed in carrying out your investigation, in parts where appropriate. Each numbered statement is to contain only one step of the procedure. Include steps for clean-up and waste disposal, if necessary. This is written in ***past tense*** using the ***third person***.

### Observations

This includes all qualitative and quantitative observations made. Be as precise as possible when describing or recording quantitative observations (with units), including any unexpected observations. Present information in a form that is easily understood (tables, lists, etc. all with titles). ***Do not perform*** any data analysis or draw any inferences/conclusions in this section. ***\*\*Exception:*** Additional columns for data tables can be included if calculations are simple and/or straightforward. Show sample calculations in “**Analysis**” section and footnote.

### Analysis

Interpret your observations and present the evidence in the form of additional tables, graphs, illustrations, etc. including a title with each. Include and show any detailed calculations (*show at least three samples of repetitive calculations*), the results of which can be shown in a table (*see above, also*). Make statements about observed patterns or trends, and draw conclusions based only on the evidence gathered and presented in the investigation. Be sure to answer the question which initiated the investigation. If there are additional questions to be answered based on your results, these are answered in this section, numbered appropriately.

### Evaluation

This is a judgement about the quality of the evidence obtained and about the ***validity of the hypothesis/prediction*** made at the outset. Did your observations provide reliable, valid evidence to enable you to answer the question? Was the hypothesis supported or falsified by your observations and conclusions (i.e. should it be accepted or rejected)? List all possible ***sources of error*** here, indicating which are random and which are systematic. Provide any ***recommendations for improvements*** to the lab procedure/outline.