How Lab Reports Are Graded

Experiments are the best way to learn about the world around us because they let us test our ideas in a controlled and logical manner. If your experimental results are going to be convincing, you need to make an organized argument that leads logically to your conclusion. The responses in your lab report must be logical and clear as well as correctly formatted to receive full credit.

Each response to a Synthesis Question will be graded on its Content & Correctness (80%) and Format (20%).

Correctness (80%)
To receive full credit for Correctness, your Synthesis Response must:

- Contain all the content (data, graphs, analysis, etc.) that is required by the Synthesis Question
- Justify any assumptions you make in your argument
- Develop your ideas in a logical sequence leading to your conclusion
- Include correct statements of relevant math and physics concepts
- Be clear, concise, and easy to follow for your reader

Format (20%)
You will be required to structure your Synthesis Responses in the form of a scientific lab report, with all the parts clearly defined and in the following logical order.

- Purpose
- Procedure
- Data Collection
- Data Analysis
- Conclusion
• **Purpose**
  A clear and precise statement at the beginning of the report identifying the exact purpose of the investigation, what the lab will demonstrate or solve. Also, identify independent variable, dependent variable, and controlled variable.

• **Procedure (including materials and apparatus)**
  This section should identify and name all experimental variables and briefly describe how the independent variables are controlled. Someone who was not present during the lab should be able to understand how the experiment was performed by reading your procedure. Let your reader know without a doubt WHAT was measured and HOW it was measured so that they will be in a position to judge the validity of your results and your interpretation. If necessary, include a well-labeled diagram of the apparatus used.

• **Data Collection**
  This section should consist of a presentation of the data you collected. It is important that the data be organized neatly and logically. There are certain ground rules that should be observed in presenting data:
  a. Data should be neatly recorded and effectively organized. Usually some type of table is needed.
  b. Each table should be numbered, and have an appropriate title. The title allows the reader to identify the data without detailed inspection.
  c. The row and columns of a table must indicate what has been recorded. The reader should be able to tell without hesitation what the data in a given column or row of the table represents.
  d. The units for physical measurements (kg, m, s, etc.) in a data table should be specified in column heading only.
  e. Record data in decimal fractions only (ex. Instead of the number 1 ½ write 1.5).
f. Rules regarding significant figures must be properly observed. This rule applies not only to the recording of measured data, but to the results of any calculations made with them.

g. A zero should always be placed before a decimal point when no other figure occupies that position. Seven tenths should be written “0.7” not “.7”.

h. Use the metric system of measurements exclusively.

• **Evaluation of Data**
This section should include all graphs, mathematical expression of the graph, analysis of graphs, and post laboratory calculations. State each formula, and if necessary, identify the symbols used in the formula. If repetitive calculations are to be performed, substitute only one set of data into each formula and then construct a table of values for all additional calculated values. Be certain that your final calculated values are expressed to the correct number of significant figures. Graphs should be numbered and have a descriptive title. The axes should be labeled and accompanied by a two-column data table of the data being graphed.

• **Conclusion**
This section should include a thorough analysis of the findings. State whether the purpose of the lab was achieved. It should also include an analysis of any discrepancy. If necessary, include a quantitative comparison of the values such as percentage error or percentage difference.
Examples of reasons for point deductions

**Correctness:**

- A vague or confusing title on a plot or table
- Incorrect physics or math
- Including a measurement of a quantity without mentioning how you measured that quantity
- Failing to control all relevant variables outside of dependent and independent
- Units are missing or incorrect
- Showing a mathematical result without including the equation and (if required) showing your work

**Format:**

- Starting or ending the report with a graph or diagram
- Not including a necessary section of your response
- Using an unreasonable number of significant figures
- Displaying data in a paragraph instead of a table
- Writing equations in sentences instead of in the equation editor
- Inserting a picture of the calculations done in a notebook instead of using equation editor
- Entering an unclear and blurry graph from LoggerPro
- Poorly labeled diagrams