Name: Click on this text and replace it with your name. **Date:**

**Lab Group:** Replace this text with the names of everyone in your group (including yourself).

### Title: Replace this text with the title of your report

### Objective

Replace this text with your experimental objective (purpose).

### Experimental Design

#### Introduction

State the actions of the experiment and explain how you will make them happen.

The equations used and the quantities required (and how they will be determined) are shown in the following table.

#### Quantities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Desired Quantity** | **Equation** | **Description/Explanation**[*where equation is from*] | **Known Quantities** | **Measured Quantities** | **Calculated Quantities**[*still needed*] |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

#### Known Quantities:

* constants: Replace this text with a list of quantities that you can look up. Delete this item if there are none.
* unmeasured control variables: Replace this text with a list of quantities that are determined by the way you did the experiment and don’t need to be measured. Delete this item if there are none.

**Measured Quantities:**

* measured control variables: Replace this text with a list of quantities that are being kept constant, but whose values need to be measured (e.g., for use in a calculation). Indicate how they will be measured. Delete this item if there are none.
* manipulated (independent) variable(s): Replace this text with the quantities whose values can be measured before the action takes place. Indicate how each will be measured.
* responding (dependent) variable(s): Replace this text with a list of quantities whose values cannot be measured until during or after the action takes place. Indicate how each will be measured.

### Flow Chart

*A dot on the timeline indicates that an action and a measurement or observation need to happen at the same time.*

|  |  |  |
| --- | --- | --- |
| **Actions** | **Timeline** | **Observations/Measurements** |
|  | *start* |  |
|  | *finish* |  |

### Procedure

1. Replace this text with detailed step-by-step instructions.

### Data & Observations

Replace this text with 1-2 sentences describing the data in your data table. Data are shown below.

Replace this text with your actual data and/or observations. Use a table if you have multiple data points. Be sure to include the units and the uncertainty (±) for each measurement.

### Analysis

#### Discussion

***Claim(s)***:

Replace this text with a description of your claims in this report. (These should address the objective directly.)

***Evidence***:

Replace this text with a description (not explanation) of the specific data and calculations that support your claims.

***Reasoning***:

Replace this text with one or more paragraphs explaining how the evidence supports your claims.

#### Equations

Replace this text with a list of each calculated quantity and the equation that you used to calculate it. If you used a spreadsheet, add the text "calculations were performed using a spreadsheet".

#### Graph

Replace this text with 1-2 sentences introducing your graph. State which quantities are plotted on the x- and y-axes and the quantity that the slope represents. Mention any interesting results or outliers (with an explanation).

Replace this text with your graph. (If you did not need to plot a graph, delete this entire section.)

#### Uncertainty

Replace this text with a sentence describing how uncertainties were calculated (e.g., using relative error).

**Sources of Uncertainty**

* Replace this text with at least one source of uncertainty for each measured quantity. (Note that uncertainty does not mean mistakes. Assume you didn't make any mistakes.)

### Conclusions

Replace this text with your conclusions: 1-2 sentences listing the actions & measurements, 1-2 sentences describing the results (the claims in your discussion), and 1-2 sentences suggesting at least one possible improvement or follow-up experiment.