**Scientific Method and Writing a Lab Report**

**Which is the Most Effective Heartburn Remedy?**

**Question/Problem: Using the scientific method power point information you are to design an experiment based on the scientific method and communicate your results in the form of a lab report. Should test at least 4 heartburn remedies and one must be a home remedy you bring with you.**

**Observation/Research: video and questions as well as online research as to what is heartburn and what causes it**

**Hypothesis:**

**Independent Variable** (could include units of measurement):

**Dependent Variable** (specify units of measurement):

**Constants** (all other factors not selected as independent variable):

**Hypothesis** (use “If ..., then...., because” format):

**Experimental Design Guidelines**

**Materials List**

HCl solution (0.05 M)

Tums
Rolaids
Pepto Bismol

Milk of Magnesia Other Home Remedies

**Available Equipment**

Mortar and Pestle

 pH probes

Graduated cylinders

 Thermometers

Test tubes Beakers

**Procedure**

Brainstorm with your partner a detailed procedure for determining the relationship between your independent variable and the dependent variable.

* Write your procedure in bullet point steps.
* Make sure you include the specific lab equipment you will use in the procedure
* steps and the specific units.
Include steps that indicate a change in your independent variable, and how it will be measured. Indicate specific units if applicable.
* Include multiple trials for every measurement you make in the procedure.
* Create a data table after the procedure to record both quantitative data (make sure it indicates the units), and written qualitative observations (should also be

accompanied by pictures) of the reactions.

* Make sure there are no calculation steps in your procedure. Only record

measurements you can see without doing any math in your head. Check with the

teacher after this step and finish for HW if needed.

**Data Collection**

* Perform the experiment and collect data.

**Data Analysis and Results**

The data should be presented in a clear, concise manner (data table, graph, and visual representation) and properly labeled.

* This may require calculations.
* If you have a qualitative independent variable, use a bar graph.
* If your independent variable is quantitative, use a line graph (best fit line).
* Photos or diagrams of the experiment.

**Conclusion**

Write a conclusion. A conclusion contains a general overview of the lab purpose, a summary of your results, and an explanation of how your results either confirm or disconfirm your hypothesis. This section should include any changes you made in your procedure with an explanation for why, and also include your sources of error. There are potential sources of error for EVERY laboratory. Think of at least **two** possible sources of error and make a note of them here. Make sure they are specific to the lab and its procedure. Do not just say “calculation” or “measuring” errors. How exactly may it have been difficult to measure?

**- 1 point for reference to purpose of the lab and the research question**

**- 5 points for the evaluation of the hypothesis using specific observations and data points
- 5 points for drawing conclusions from the lab that relate to the scientific theories or concepts based upon evidence from the experiment**

**- 2 points for the two sources of error
- 2 points for addressing how you might improve the experiment if you were to do it again in the future**

**Grading Rubric**

Lab Report needs to be typed and added to your website for grading.

Reference course website on [how to write a lab report](file://localhost/Users/holbrookj/Desktop/Pre-AP%20Chemistry/Lab%20Report.docx)

(2 pts.) Research Question and Title

(10 pts) Abstract

(15 pts) Introduction

(5 pts.) Hypothesis

 Includes:

Independent variable (include units of measurement, if applicable)

Dependent variable (include units of measurement)

Constants

Hypothesis (“if..., then...., because” format)

(15 pts.) Materials and Procedure

(15 pts.) Results/data:

-Data Tables (properly labeled, with appropriate title)

-Graphs (properly labeled, with appropriate title)

-Calculations (if applicable)

-Visual representation (photo or diagram of experiment)

(15 pts.) Conclusion/discussion Includes:

-1 point for reference to purpose of the lab and the research question

-5 points for the evaluation of the hypothesis using specific observations

and data points

5 points for drawing conclusions from the lab that relate to the scientific

 theories or concepts based upon evidence from the experiment

2 points for the two sources of error

-2 points for addressing how you might improve the experiment if you

were to do it again in the future

(8 pts.) Overall Appearance and neatness/organization of report

(5 pts ) Bibliography