4 second places

Chemistry Lab Report Rubric

Problem Statement/Hypothesis

_____/3____ Answer the question "why will this experiment be conducted"

_____/3____ Answer the question "what will be the outcome of this experiment"

_____/3____ Written in complete sentences, paragraph form, third person past tense. Title is clear concise and scientifically appropriate.

Experimental Design

_____/3____Three, separately labeled subsections: materials, procedures, diagrams

_____/3____Chemicals are labeled with concentrations with molecular formula and IUPAC name. Materials are listed including size, precision and quantity of each item needed (x) identified with units.

_____/3____ A detailed numbered step-by-step approach.

_____/3___ Consideration is given to the sequence of events

_____/3___ Numbers are written out when they are less ten and not associated with a unit or if they begin a sentence.

_____/3____ Detailed, labeled diagram (or photograph) of experimental setup and appropriate tables and graphs

_____/3____Data tables labeled with units and significant figures. Properly anchored. Formulas properly formatted and anchored.

Conclusion

_____/4__ Summarizes general conclusions drawn from your experiment with appropriate statistics, Written in the third person.

____/5____ Tell reader the meaning of your findings **supported with scientific facts/experimental evidence and data.**

_____/4____ Explain why the results occurred scientifically

_____/3____ Do you agree/disagree results and why use data, science and statistics to support your argument.

_____/4___ What are the weaknesses in your design of this experiment. (i.e. sources of error OTHER THAN HUMAN ERROR USE SCIENCE!)

_____**/ 50 pts Total**

Measurements and Statistical Analysis of Experimental Data
AKA: The Popcorn Lab

Introduction

This experiment introduces you to the process of observation and inference to the use of analytical balances and gravimetric analysis of experimental data, and moreover it is an enjoyable one to perform.

The focus of the experiment is a very common experience—the popping of corn [a]. You and your partner will select a sample of popcorn kernels. A kernel is individually weighed, popped, and reweighed to determine the mass lost during the process. Careful observations are made of the corn popping, and deductions made about the cause. The average mass of unpopped kernels and the standard deviation are calculated, and these values are used to estimate the number of kernels in a bulk sample. Finally the mass loss, expressed as a percentage of the initial mass, is calculated for each kernel, then averaged and the standard deviation computed.

Science Background

Popcorn, a cereal grain like wheat or oats, is about 75% carbohydrate (starch) with smaller amounts of protein, fat, minerals, and water. The water plays a critical role in the popping process. When heated, the water moisture inside the kernel turns into a gas, which takes up much more space than liquid water. The hard outer covering called the hull of the kernel acts like a seal, causing a build up of pressure inside the kernel. When the pressure gets high enough, the kernel explodes and the starch rapidly expands to create the fluffy "flower" or popcorn. To ensure maximum popping expansion, the corn is carefully cured (dried) until it reaches a certain percentage of water, which you will determine in this lab.

Problem Statement:

Statistical Analysis

Hypothesis :

Experiment

Materials and equipments

Popcorn kernels, hot plate, analytical balance, 250-mL Erlenmeyer flask, cork, spot plate, test tube tongs.

Pre-lab

To develop popping technique and to minimize scorching of the corn, obtain about 4 kernels.

1. Turn on hot plate and place flask on top.
2. Add the kernel and resume heating with agitation using the test tube tongs until the kernel flowers.
3. Remove the flask from the heat and carefully return the flower on the hot plate. Repeat the process. Once perfected begin experimentation.

Data Measured:

Procedure

4. Randomly select 15-20 kernels. You will need to replace incompletely-popped or burnt kernels.
5. Weigh each and record the mass of each kernel on the data Table 1.
6. Pop the corn kernel as explained above
7. Weigh the popped, cooled (to room temperature) kernel and record its mass on Data Table 1.
8. Incompletely exploded or badly scorched kernels can be excluded from subsequent calculations. A total of 20 data points is needed.

Post-Lab questions

Sample Title:

1. What do you suppose is the nature of the mass lost? What evidence can you offer to support your answer?

2. What can you infer about how (why) corn pops when heated? This must be discussed on an atomic level.

3. Is it to be expected that the relative magnitude of the initial mass will always exceed that of the percentage mass lost? Why?

4. Is it valid to delete scorched or incompletely popped kernels from the calculations? Why?

DATA OBSERVATION SHEET

Table 1
Observations

Trial	Observation
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

****Write a sample anchor below ****

Table 2
Results

Kernel	Mass Before, g	Mass After, g	Mass Loss, g *(mass before – mass after)*	% Mass Loss *(mass loss/mass before)x100*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
SUM (Σ)				
Mean ($\bar{x}$)				

****Write a sample anchor below ****