Name_____

Section_____**Date**_____

The Bean Lab An Investigation into Moles

Pre laboratory Questions 1. What number is represented by each of these names? Consult a dictionary for any that you do

not recognize.

 a. score   b. gross   c. decade

d. century   e. ream (of paper)

2. How many objects are in each of the following?

a. 7 dozen eggs

b. 0.25 ream of paper

3. A box is weighed, then filled with 100 glass marbles and weighed again. The marbles are removed and replaced with 100 plastic spheres; the box and spheres are weighed a final time. Explain how you would calculate the mass ratio of one glass marble to one plastic sphere.

Observations and Data

1. Show a sample calculation for the mass of 50 beans (without the cup) in this space.

Enter the result for all five types of beans in the Data Table for Part 1, next page.

2. Calculate the relative masses of each type of bean and record them in the data table below.

The 50 beans with the lightest mass will have a relative mass of "1". The relative mass of the second most massive divided by the mass of the 50 lightest beans. Do this for each one.

3. Part 2 Data Table. - Fill out the data table with the beans the symbols and the relative masses. Use a scale and count the number of beans to get to that relative mass and record the data.

Calculations for Analysis and Conclusion. Choose one bean and fill out the following!

Bean_____

Relative mass (g)_____ = _____Pots= _____#beans

Analysis and Conclusions

1. We define a "pot" of beans as being the number of beans that has a mass in grams equal to the relative mass of that type of bean. The Data Table for Part 2 lists the beans by name and symbol, along with their relative masses and the number of beans in a "pot". Examine and compare the numbers of beans in a pot for the various types.

Allowing for the fact that only whole numbers of beans could be used, and for experimental errors, were the results pretty consistent from type to type? Discuss.

2. Calculate the average number of beans in a pot and express your answer with an uncertainty that reflects the range of variation. As an example, if one were averaging the numbers 26, 28, 29, 29, 28, the average would be reported as 28 + 2; this indicates that none of the numbers being averaged is more than 2 units above or below the average.

3. Calculate the following for each type of bean. Before you calculate, consider the following conversion factors!!!

Relative mass grams = 1 pot = _____ Beans

Show a sample calculation for one type of bean in each case. Please identify the bean.

a. the number of pots in 250 grams.

"Always be on the lookout for the presence of wonder." E.B. White2

www.chemedx.org - C. Husting (Modified from Zumdahl's "World of Chemistry" textbook)- 2/6/19

b. the number of beans in 250 grams.

c. the number of pots in 250 beans.

d. the number of beans in 3.17 pots.

e. the number of grams in 3.17 pots.

4. You will notice that, in some cases the result is the same no matter which bean is being used, while in other cases, each bean gives a different result. Explain why this must be so.

5. Compare and contrast a the following:

Relative mass (g) = 1 pot = Some number of beans

Atomic mass of an element (g) = 1 mole = 6.022×10^{23} atoms of that element