Name_____Date_____Per._____

ACTIVITY: Calculating the Mass of Vegium – Applying Isotopes & Atomic Mass

Objectives:
1) Determine the average weight of each isotope of Vegium.
2) Determine the percent abundance of each isotope of Vegium.
3) Determine the average atomic mass of Vegium.

Background information: Vegium is an element consisting of three different isotopes – pintonium, navium, and lentilium. As with real isotopes you will need to calculate the percent abundance of each isotope and the individual mass of an isotope.

Procedure and Calculations:
After completing each step place the measurements and calculations in the matching row / box of the data table.

1) Obtain a sample of vegium, separate the pintonium, navium, and lentilium, and then mass each group.
2) Count the pintonium, navium, and lentilium.
3) Calculate the total number of isotopes by adding each bean count.
4) Calculate the mass of one isotope by dividing its total mass by the number of isotopes.
5) Calculate the average mass of the Vegium by adding the three individual masses and dividing by three.
6) Determine the percent abundance of each isotope by dividing the number of each isotope with the total number of isotopes and then multiplying by 100.
7) Calculate the sum of the percentages by adding each percentage together.
8) Determine the relative mass of each isotope by multiplying the (mass of one isotope) by the (percent abundance) and then dividing by (100).
9) Calculate the weighted average of the element vegium by adding each isotopes relative mass.

Data Table:

	Pintonium	Navium	Lentilium	Total
1) Mass of all the isotopes				********** **********
2) Number of each isotope				3)
4) Mass of one isotope				5)
6) Percent Abundance				7)
8) Relative Mass of each isotope				9)

Space 5 is a "regular average" **Space 9 is a "weighted average"**

(over)

Questions for Analysis:

1) List which values in the table were measured.

2) List which values in the table were calculated.

3) Compare the total values in box #5 and box #9. Why is calculating atomic masses using weighted averages better than just calculating averages?

4) Explain any differences between the weighted atomic mass of your vegium sample and that of other groups in the class.

5) Would you expect to get closer to the actual average atomic mass of vegium by using a LARGER or SMALLER sample size? **Explain your answer.**

6) Element X has two naturally occurring isotopes. The isotope with a mass of 10.012 amu (^{10}X) has a relative abundance of 19.91%. The isotope with a mass of 11.009 amu (^{11}X) has a relative abundance of 80.09%. Calculate the atomic mass of element X.

7) Lithium has two isotopes, lithium-6 (atomic mass = 6.015 amu, relative abundance = 7.5%) and lithium-7 (atomic mass = 7.016 amu, relative abundance = 92.5%). Calculate the atomic mass of lithium.

8) Chlorine has two isotopes, chlorine-35 (atomic mass = 34.969 amu, relative abundance = 75.77%) and chlorine-37 (atomic mass = 36.966 amu, relative abundance = 24.23%). Calculate the atomic mass of chlorine.