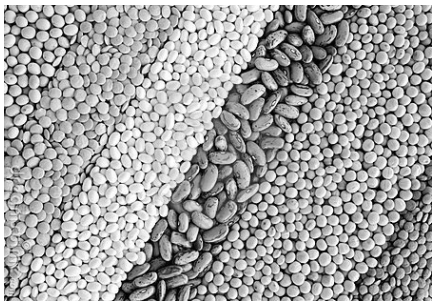
Name_____Date_____Per._____

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

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



Background information: Beanium 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 Beanium, separate the pintonium, navium, and lentilium, and then mass each group. Record the values in the data table.
2) Count the **number of each isotope** by counting the pintonium, navium, and lentilium.
3) Calculate the **total number of isotopes:**

total number of isotopes= (# of Pintonium) + (# of Navium) + (# of Lentilium)

4) Calculate the **mass of one isotope**:

$$\text{mass of 1 isotope of Pintonium} = \frac{(\text{mass of all Pintonium isotopes})}{(\text{\# of Pintonium isotopes})}$$

Repeat for Navium & Lentillium.

5) Calculate the **average mass of the Beanium**:

$$\text{Ave mass of Beanium} = \frac{(\text{mass of 1 isotope of Pintonium} + \text{mass of 1 isotope of Navium} + \text{mass of 1 isotope of Lentillium})}{3}$$

6) Determine the **percent abundance** of each isotope:

$$\%\text{ abundance of Pintonium} = \frac{(\text{number of Pintonium})}{(\text{total number of isotopes})} \times 100$$

Repeat for Navium & Lentillium.

7) Calculate the **sum total of the percentages:**

Sum total % = (% abundance of Pintonium) + (% abundance of Navium) + (% abundance of Lentilium)

8) Determine the **relative mass of each isotope**:

$$\text{Relative mass Pintonium} = \frac{(\text{mass of 1 Pintonium}) \times (\%\text{ abundance of Pintonium})}{100}$$

Repeat for Navium & Lentillium.

9) Calculate the **weighted average of the element Beanium**:

Weighted Ave of Beanium = (relative mass of Pintonium + relative mass of Navium + relative mass of Lentillium)

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)

POST-LAB 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. The **nucleus** of an atom has what type of charge?
[A] no charge [B] slightly negative charge [C] positive charge [D] large negative charge

_____5. A normal atom is neither positively nor negatively charged. It has a charge of zero. Thus, if a certain atom has 14 **electrons**, it must also have 14
[A] AMU for its mass number [B] protons and neutrons [C] protons [D]neutrons

_____6. How many **neutrons** are present in an atom of fluorine, which has a mass number of 19 and an atomic number of 9?
[A] 19 [B] 10 [C] 9 [D] 28

_____7. An atom with 34 neutrons and 16 protons has a **mass number** of
[A] 18 [B] 50 [C] 16 [D] 68

_____8. For the atom above with 34 neutrons and 16 **protons**, how many electrons does it have?
[A] 18 [B] 52 [C] 50 [D] 68 [E] 16

_____9. An element has 21 **neutrons** and a mass number of 40. What is the name of this element?
[A] Zirconium, Zr [B] Scandium, Sc [C] Potassium, K [D] Calcium, Ca

_____10. Of the three cesium isotopes mentioned below, which atom has the greatest number of *neutrons*?
[A] ^{132}Cs [B] ^{134}Cs [C] ^{137}Cs [D] all the same