Name:_____ **Beanium Lab- Accel.** **Per:_____**

1. In this lab, we will use of beans to represent atoms.
   a. Use your notes to give a definition of isotopes:

   b. How are the beans in this bag like isotopes? (What is the same about them? What is different?)

2. In this activity, we will be finding a weighted average.
   a. If you have two atoms, one weighing 6 amu and one weighing 7 amu, what is the average mass of those two atoms?

   b. If you have LOTS of atoms, and about half weigh 6 amu and about half weigh 7 amu, what will the average mass be?

   c. Now, what if you have lots of atoms weighing 7 amu and only a few weighing 6 amu. What might their average mass be? (Make an estimate and explain how you guessed it.)

Get Initialed:_____

3. To find a weighted average, we need to know the average mass of each type of atom.
   a. Use the balance and a weigh boat to determine the mass of all of your red atoms (together). Count the number of all your red atoms and then divide this to get the mass of one red atom.

      Mass of red atoms = _____(mass of all red atoms) ÷ _____(# of all red atoms) = _____
      ← *Label your answer!*

   b. Repeat this method for the speckled atoms:
      Mass of speckled atoms = _____ ÷ _____ = _____ ← *Label your answer!*

   c. Repeat this method for the white with a black dot atoms:
      Mass of white with a black dot atoms = _____ ÷ _____ = _____ ← *Label your answer!*

4. Now, we need to find the percent abundance of each isotope present. (Use your math skills!)
   a. Calculate the percent of the bag that is the **red** isotope. Show your work!

   b. Calculate the percent of the bag that is the **speckled** isotope. Show your work!

   c. Calculate the percent of the bag that is the **white w/ black dot** isotope. Show your work!

   b. Add your three percentages together. Do they add up to 100%?

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5. Complete the table below using your calculation answers.

Mass of Isotope:	Percent Abundance (As a decimal)

Calculate the average atomic mass of beanium.

6. Compare your average mass to the mass of your three individual isotopes.
   a. Does the average fall in between the other masses? Should it? Why?

b. Is the average closer to the smaller mass or the larger mass? Why?

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Conclusion Questions

1. Magnesium has three isotopes, listed in the table below.

Isotope	Percent Abundance
Magnesium-24	79%
Magnesium-25	10%
Magnesium-26	11%

Calculate the average atomic mass of Magnesium. LABEL the atomic mass.

2. Compare and contrast the terms **atomic number** and **mass number**.

Compare: Contrast:

3. Compare and contrast these terms: **mass number** and **average atomic mass**

Compare: Contrast:

4. Why are mass numbers always whole numbers?

5. Why are average atomic masses NOT whole numbers?

6. Is it possible for <u>one atom</u> of chlorine to have a mass of 35.45 amu? Why or why not?

7. Copper has 2 isotopes. The percent abundance of copper-63 is 69.1% and that of copper-65 is 30.9%. Find the average atomic mass of copper.

8. Lithium has only 2 isotopes, lithium-6 and lithium-7.
   a. What is the average atomic mass of Lithium (from the periodic table)?

   b. Which isotope of Lithium is more common? Explain how you know this.

9. Gallium has 2 naturally occurring isotopes Gallium-69 and Gallium-71. The average atomic mass for Gallium is 69.723. What are the relative abundances for each isotope?