Name _____ Period _____
Partner _____ Date _____

Abundance of Isotopes Lab

Purpose
The purpose of this experiment is to investigate the mass properties and relative abundance of isotopes for the "bean bag" element (symbol Bg) and to calculate the atomic mass of this element.

Prelab Questions
1) Neutrons were discovered in 1932, more than 10 years after the existence of isotopes was confirmed. What property of electrons and protons led to their discovery? Suggest a possible reason why neutrons were the last of the three classic subatomic particles to be discovered.

2) Silicon occurs in nature in the form of three isotopes, Si-28, Si-29, and Si-30. Determine the number of protons, neutrons, and electrons in each isotope of silicon.

3) *"The atomic mass of chlorine represents the mass of the most common naturally occurring isotope of chlorine."* Decide whether this statement is true or false and explain why.

Procedure
1. Sort the atoms in the "bean bag" element sample (Bg) into three isotope groups (1, 2, and 3) according to the type of bean. (Assume that each type of bean represents a different isotope and that each bean represents a separate atom.) Place each isotope group into a separate pile.
2. Count and record the number of Bg atoms in each isotope group.
3. Measure the total mass of Bg atoms belonging to each isotope group. Record each mass to the nearest 0.01 g in the data table. *Note:* Zero (tare) the balance with an empty weighing dish on the balance pan, then add all of the Bg atoms of one type to the weighing dish and record the mass. Do this for each isotope group.

Data Tables

Bag #_____

	Bean Color	Number of Atoms	Total Mass of Atoms
1			
2			
3			
	Totals➔		

Results Table

	Bean Color	Average Mass of One Bean	Number of Individual Bean/ Total Number of all Beans	Percent Abundance
1				
2				
3				

Post Lab Questions

1) Determine the average mass of each Bg isotope to three significant figures. Enter the results in the Results Table.

2) Fill in the table above.

3) The atomic mass of the "bean bag" element (Bg) represents a *weighted average* of the mass of each isotope and its relative abundance. Calculate the average atomic mass of Bg.

4) How many Bg atoms in the original sample would be expected to have the same mass as the calculated atomic mass of the element? Explain.

5) The isotopes of magnesium (and their percent abundance) are Mg-24 (79.0%), Mg-25 (10.0%), and Mg-26 (11.0%). Calculate the atomic mass of magnesium. *Note:* To one decimal place, the mass of each isotope is equal to the mass number. Thus, the mass of an atom of Mg-24 is 24.0 amu.

6) Copper (atomic mass 63.5) occurs in nature in the form of two isotopes, Cu-63 and Cu-65. Use this information to calculate the percent abundance of each copper isotope.

7) Explain why the atomic mass of copper is not exactly equal to 64, midway between the mass numbers of copper-63 and copper-65.