**Atomic Mass Lab Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**“Beanium”**

**Most elements in nature occur as a mixture of isotopes. The average atomic mass of an element can be determined from the atomic mass and the % abundance of each isotope. In this activity, you will model the isotopes of the imaginary element “Beanium.” The measurements you make will be used to calculate a weighted average mass that represents the average atomic mass of “Beanium.”**

**Materials Needed:**

**Balance**

**Calculator**

**Bag of beans**

**Procedure:**

1. **Open your bag of beans and organize them into groups based on their types**
2. **In the top squares of your table, write in the three types of beans found in your bag (color)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Bean Type:** |  |  |  |
| **# of beans:** |  |  |  |
| **Mass of 1 bean:** |  |  |  |

**Total Number of Beans in Your Bag: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Count the number of beans in each of your groups and record the number in your data table.**
2. **Also write down the total number of beans in your bag.**
3. **Using the balance, measure the mass of one bean from each group and record the mass in your data table.**
4. **With your table all filled out, put all the beans back in their bag and return beans and balance to the back table.**

**Answer Questions on Back**

**Analyze and Conclude**

1. **Find the % abundance of the beans by dividing the number of beans in each group by the total number of beans in the bag**

**Bean 1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bean 2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bean 3 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Find the mass contribution amount of each Beanium isotope by multiplying the mass by the % abundance.**

**Bean 1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bean 2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bean 3 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Add the mass contribution amounts together to find the atomic mass of Beanium.**

**Atomic Mass = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **What is the difference between the atomic mass and mass number of an element?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Boron has two isotopes: Boron-10 (abundance = 19.8%, mass = 10.013 amu) and Boron-11 (abundance = 80.2%, mass = 11.009 amu). Calculate the atomic mass of Boron.**
2. **Nitrogen has two naturally occurring isotopes, N-14 and N-15. Its atomic mass is 14.007. Which isotope is more abundant? Explain your answer.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**