### CHEMISTRY LAB BEANIUM – Isotope Analogy

**Learning goals:** Students will

* explore the concept of isotopes and average atomic mass using an analogy
* use their ideas in other situations

**Directions:**

Obtain a sample of beanium atoms from stock container. Sort the beanium atoms into three groups, each group representing a different isotope. In the observation section, sketch a picture of each beanium isotope to distinguish between each isotope. Fill out the Recording and Calculations section using appropriate units.

**Recording Data and Calculations:**

##### Initial observations:

#####

###### Number of type one Beaniums (isotope-1) \_\_\_\_\_

Number of type two Beaniums (isotope-2) \_\_\_\_\_

###### Number of type three Beaniums (isotope-3) \_\_\_\_\_

1. **Calculate the total number of beans**\_\_\_\_\_ Sample calculation here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. **Calculate the percentage of each type of isotope.**

###### Percentage of Beanium-1 \_\_\_\_\_ sample calculation here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Percentage of Beanium-2 \_\_\_\_\_

Percentage of Beanium-3 \_\_\_\_\_

1. **Calculate the average mass of each isotope.**

###### Total mass of type one Beans\_\_\_\_\_Average mass of Beanium-1 \_\_\_\_ Sample calculation here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

###### Total mass of type two Beans \_\_\_ Average mass of Beanium-2 \_\_\_\_\_

###### Total mass of type three Beans\_\_\_ Average mass of Beanium-3 \_\_\_\_\_

**Application of isotope type problems**

1. 140 students participated in a knowledge retrieval session. 25 scored 90 out of 100; 63 scored 80 out of 100; 31 scored 70 out of 100; 15 scored 60 out of 100; 6 scored 50 on the knowledge retrieval session. Determine the average score on this knowledge retrieval session. Show all work.
2. Magnesium consists of three isotopes with masses of 23.98 (78.6%), 24.98 (10.1%), and 25.98 (11.3%). Calculate the average atomic mass of Mg. Show all work.
3. Copper consists of two isotopes, one with a mass of 62.96 and 70.5% abundant. The other isotope has a mass of 64.96. Determine the atomic mass of Cu. Show all work.