Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_

**Skittle Isotope Determination Lab**



**Introduction:** In this lab, you will calculate the atomic mass of the rare (fictional) element, Calorium (symbol Ss), by calculating a weighted average of its naturally occurring isotopes. Calorium is found occurring in Skittles™. The Ss isotope is indicated by its color as listed in the data table below.

**Materials:** 1 cup of Skittles™ per student or pair of students, a calculator, white paper

**Safety and Waste Disposal:**

* Safety goggles are not required for this lab.
* Do not eat any of the isotopes until you are instructed to do so.
* Dispose all wastes as directed by your teacher.

**Procedure:**

1. Open your package of Skittles™. Separate them by color. Count how many of each color and enter your data in column 4 of the data table below.
2. Calculate the percent distribution of each isotope and record the values in column 5 (the sum of all the % values in column 5 should equal 100%):

 # of each isotope (column 4) x 100% = % distribution

 total number of Skittles™

1. Calculate the weighted mass so that each isotope contributes to the overall atomic mass of Calorium and record the values in column 6:

 % distribution x mass of isotope (column 3) = weighted mass

 100

1. Calculate the atomic mass of Calorium by adding up all of the weighted masses in column 6.
2. When you have finished calculating the atomic masses of Calorium, write your value on the whiteboard. Copy down the atomic masses that were calculated by the other groups in the chart on page 2 of this lab.

**Table 1: Skittles Isotopes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Skittle Color** | **Isotope Symbol** | **Mass (amu)****(3)** | **# In package****(4)** | **% Distribution****(5)** | **Weighted Mass****(6)** |
| Red | Ss-64 | 64 |  |  |  |
| Purple | Ss-65 | 65 |  |  |  |
| Green | Ss-66 | 66 |  |  |  |
| Yellow | Ss-67 | 67 |  |  |  |
| Orange | Ss-68 | 68 |  |  |  |
| **Total** |  | 100% |  |

**Record the other groups’ atomic masses:**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | 2. | 3. | 4. |
| 5. | 6. | 7. | 8. |
| 9. | 10. | 11. | 12. |
| 13. | 14. | 15. | 16. |

**Observations:** Based on the class data above write two explanations as to the difference in weighed averages.

1.

2.

**Questions:**

1. a. How does your atomic mass for Calorium compare to that of the other groups?

 b. Why would there be differences in what each students or pair calculated?

 c. Based on this activity, how should scientists decide on one particular number for atomic mass if it is possible to have many values?

2. a. Which isotope was the most abundant in your data? The class data?

 b. Which isotope had the mass that most closely resembled your weighted average? The class average?

**Approximately 75% of the chlorine atoms found in nature have a mass of 35. The other 25% have a mass of 37. What should we report as the atomic weight for chlorine?**

**What is the atomic weight of Bromine? Bromine has two isotopes: 79Br has an abundance of 50.43%, 81Br has an abundance of 49.47%.**