Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **“Runtium” Lab­­** Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Purpose

To model how the average atomic mass on the periodic table is calculated for an element. ****

In our activity, we are using Runts® candy to model the fictitious element “runtium”. You will receive a sample of the element; it has 5 isotopes (5 different coloured candies).

Prequestion

What is an isotope of an atom?

Method

1. Count to determine the abundance and % abundance of each “isotope” of runtium in your sample. % abundance = 100 x number/total. Record in table to 3 sig figs.
2. Determine the mass of each isotope. Record in table.
3. Calculate the average atomic mass by using the following formula:

*Average atomic mass = (mass of isotope 1 x decimal form of % abundance) + (mass of isotope 2 x decimal form of % abundance) + (mass of isotope 3 x decimal form of % abundance) + (mass of isotope 4 x decimal form of % abundance) + (mass of isotope 5 x decimal form of % abundance)*

1. Record your data and calculated average “atomic” mass in the digital spreadsheet provided in order to pool the class results.

Data Table Total # of candies in our sample: \_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Colour |  |  |  |  |  |
| Shape | Banana | Grape | Apple | Strawberry | Orange |
| Mass (g) |  |  |  |  |  |
| # |  |  |  |  |  |
| % abundance calculation |  |  |  |  |  |

Questions

1. Calculate the average atomic mass for “runtium”. Include units and the correct # of sig figs.
2. What is the class average for the “runtium”? Why is your result different from the class average?
3. What subatomic particle is the same in all isotopes of one element?
4. A) What subatomic particle is different in all isotopes of one element?

B) By changing that one particle, what does that change for that isotope?

1. Calculate the average atomic mass for Magnesium. Show calculations, units and the correct # of sig figs.

|  |  |  |
| --- | --- | --- |
| Isotope | Mass | % Abundance |
| Magnesium-24 | 23.98504 | 78.99 |
| Magnesium-25 | 24.98583 | 10.00 |
| Magnesium-26 | 25.98259 | 11.01 |

1. Calculate the average atomic mass for Boron. Show calculations, units and the correct # of sig figs.

|  |  |  |
| --- | --- | --- |
| Isotope | Mass | % Abundance |
| Boron-10 | 10.0129369 | 19.9 |
| Boron-11 | 11.0093054 | 80.1 |

1. Strontium has 4 known isotopes: Sr-84, Sr-86, Sr-87, and Sr-88. Using the known average atomic mass of Strontium, predict which isotope has the highest percentage abundance.
2. Indium has 2 known isotopes: Indium-113 and Indium-115. Using the known average atomic mass of Strontium, predict which isotope has the highest percentage abundance.