Name: _____ Date: _____

Small-Scale Lab
The Atomic Mass of _____ symbol:____

Background: Congratulations, you have discovered a new element that is so huge, it's the size of actual candies! But don't put any in your mouth yet, any one of the three isotopes could be radioactive! There will be time for eating your element, later.

The first order of business is to calculate the atomic mass of your element; then, if none of the nuclei are radioactive – you are free to eat them. Follow the directions below to determine your elements atomic mass. For now, we'll call the element candium, but you can name it after you complete your analysis!

Purpose: To analyze the isotopes of candium and to calculate its atomic mass.

Materials:

Sample of candium
Balance
Pencil/ paper
Procedure:

Step 1. Obtain a sample of candium. Separate the three isotopes (m&m's, Skittles, and Reese's Pieces) and measure the collective mass of each, estimating the $1/100^{th}$ place value (since the balance allows it). Record their total mass in Table 1.

Step 2. Count the number of each isotope, and record in Table 1.

Step 3. Complete the table by calculating the average of each isotope, the percent abundance, relative abundance and relative mass.

	m&m's	Skittles	Reese's pieces	Totals
Total mass (grams)				
Number				
Average mass (grams)				
Percent abundance				
Relative abundance				
Relative mass (grams)				

Analysis

Using the experimental data, record the answers to the following questions below your data table.

1. Calculate the average mass of each isotope by dividing its total mass by the number of particles of that isotope.

2. Calculate the percent abundance of each isotope by dividing its number of particles by the total number of particles and multiplying by 100.

3. Calculate the relative abundance of each isotope by dividing the percent abundance from Step 2, by 100.

4. Calculate the relative mass of each isotope by multiplying its relative abundance from Step 3 by its average mass.

5. Calculate the average mass of all candium particles by adding the relative masses. This average mass is the atomic mass of candium.

6. Explain the difference between percent abundance and relative abundance. What is the result when you total the individual percent abundances? The individual relative abundances?

7. The percent abundance of each kind of candy tells you how many of each kind of candy there are in every 100 particles. What does relative abundance tell you?

8. Compare the total values for rows 3 and 6 in the table. Explain why the totals differ and why the value in row 6 best represents atomic mass.

9. Explain any differences between the atomic mass of your candium sample and that of your neighbor. Explain why the difference would be smaller if larger samples were used.