Name: _____ Date: _____

Average Atomic Mass

Abstract:
Today we will be investigating the element pennium. Pennium has two isotopes of unknown mass. We will perform a small experiment to help us determine the average atomic mass of the element.

Part 1:
1. Count out 100 pennies, ignoring any that were minted in 1982.
2. Separate the pennies into two groups of 50.

Each partner:
3. Find the mass of each set of fifty pennies.
4. Count out the number of pennies minted prior to 1982 and record.
5. Count out the number that were minted after 1982 and record.

Data:
Set 1: 20 before 1982 pennies and 30 after 1982 pennies. Total mass = 136.88 g
Set 2: 15 before 1982 pennies and 35 after 1982 pennies. Total mass = 133.79 g

Calculations:
Part 1:
1. Create a system of equations from your data that will determine the mass of a pre-1982 penny and the mass of a post-1982 penny. Find solutions for your system of equations using any method you prefer.
2. Find the percentage of pre- and post-1982 pennies (from the 100 pennies together) and calculate a weighted average for the entire set of pennies.

Discussion:
Explain how you would use the weighted average to predict the number of pennies in an arbitrary pile of pennies given to you. Also discuss what factors could cause your prediction to be different.