

COUNTING BY WEIGHING

Goggles need not be worn during this activity – no chemicals will be used.

PRE-LAB DISCUSSION:

This lab will introduce the concept of counting by weighing. It may seem to be a waste of time to count by weighing when dealing with small numbers of units, and you would be correct. Counting by weighing is used in business and in chemistry when dealing with very large numbers of units -- often many orders of magnitude above anything you would consider counting by hand. In chemistry, we count atoms and molecules by weighing, since the minute size and immense numbers make counting by hand impossible. The United States Mint counts money by weighing, using well established averages to quickly "count by weight" millions of coins more accurately than any human or coin counting machine.

PURPOSE:

To practice methods and calculations for counting by weighing.

PROCEDURE:

1. Obtain a sample of pennies from your instructor.
2. Weigh ten of the pennies and record their total mass to three decimal places.
3. Weigh a new ten penny sample, recording its total mass to three decimal places.
4. One more time, weigh a ten penny sample, recording its mass to three decimal places.
5. Write the three totals on the board. We will use these to calculate a class average.

RESULTS

Observations and Data

Sample #1 _____ grams for ten pennies
Sample #1 _____ grams for ten pennies
Sample #3 _____ grams for ten pennies

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Sample 1							
Sample 2							
Sample 3							

Calculations

1. Calculate an average mass of ONE penny based on the results you obtained in your lab group. (Total mass of 30 pennies \div 30)
2. Calculate an average mass of ONE penny based on the results of all lab groups as recorded on the board. (Total mass of 210 pennies \div 210)
3. Using the results from Calculation #1, what would be the mass in **kilograms** of exactly one million pennies?
4. Using the results from Calculation #2, what would be the mass in **kilograms** of exactly one million pennies?