
Bead Mixture

Concept Development

Problem:

1. How can you determine the percent abundance of each isotope in a sample of an element?
2. How can you determine the atomic mass for an element from percent abundance?

Materials:

baggie containing atoms (beads)
balance

Procedure:

Isotopes are atoms of an element which are chemically the same but have different physical properties. Isotopes differ in their atomic masses. Since atoms are very small we will substitute a larger item, a bean, to represent the different isotopes of our element.

In this activity you will be using different types of beads. Each bead represents an isotope of the new element Beadium. Using the masses of your beads, find the average atomic mass of your element, Beadium. Be sure to show all of your calculations in answering each of the questions below.

Calculations:

1. Determine the total mass of each group of isotopes.
2. Determine the atomic mass of each isotope.
3. Determine the percent abundances for each isotope in the entire sample.
4. Determine the weighted average atomic mass of your sample.

Summing Up:

1. How many isotopes were present in your sample?
2. What was the weighted average atomic mass of your sample? Would it be the same if you counted all the beans and then divided by the total mass of all of the beans? Why or Why not?
3. Why were beads a good analogy for atoms when solving for weighted average atomic mass? Why were they not a good analogy?
4. How would an experimenter use weighted average atomic mass to identify an element?