

A. Tom in a Box
Concept Development

Problem:

1. What is the relationship between the number of protons, neutrons, and electrons in an atom?
2. What patterns can be seen between numbers of subatomic particles and the periodic table?

Materials:

twelve containers of beads identified as different elements
containers of beads identified as unknown elements
periodic table

Procedure:

Look closely at each of the containers identified with an element. There are patterns within each container associated with specific information given on the periodic table. Investigate these patterns. Find the mass of the individual parts and the whole. Place this information into a table.

Summing Up:

1. What similarities did you find between the protons and the neutrons in an atom? What differences were there?
2. What similarities did you find between protons and electrons? What differences were there?
3. What similarities did you discover between electrons and neutrons? What were the differences?
4. Which type of particle(s) contributes most to the mass of the atom?
5. What numbers on the periodic table are needed to tell you the number of protons in any atom? Which number on the periodic table corresponds to the number of electrons? the number of neutrons?
6. Now investigate the remaining containers. Identify each unknown container as a specific element. Justify your decision.
7. Which subatomic particle determines the element's identity? Justify your choice.