

Skills Practice Lab

# Drawing Atomic Models

## Introduction

Look at the many different things in your classroom or lab: desks, chairs, windows, laboratory equipment, students, shoes, and notebooks. If all of these things are made from atoms and all atoms are made of only a few kinds of particles, what accounts for the variety of things that you see?

Atoms of different elements have different numbers of protons in their nuclei. In atoms that have a neutral charge, the number of electrons around the nucleus equals the number of protons in the nucleus. As it turns out, the number of electrons in an atom is one of the most important things in determining the chemical properties of the atom.

Elements are arranged in the periodic table according to the number of protons in each atom, which also corresponds to the number of electrons in the atom. The periodic table is called "periodic" because as the number of protons increases, certain chemical properties appear over and over again—periodically. In this activity, you will draw models of atoms and will place the atoms in the proper place on a periodic table.

## OBJECTIVES

**Draw** models of atoms that show the numbers of protons and neutrons and electrons in proper energy levels.

**Locate** the proper position of atoms on a periodic table.

**Infer** the relationship of the number of energy levels and number of valence electrons in an atom to the group and period of the atom on a periodic table.

## MATERIALS

- paper
- pencil
- periodic table of the elements

## Procedure

### DRAWING MODELS OF ATOMS

1. Figure 1 shows a model of an atom. This type of model is sometimes called a *Bohr model* because it was first used by the physicist Niels Bohr. The model shows a nucleus in the center that has three protons ( $p^+$ ) and four neutrons ( $n$ ). Surrounding the nucleus are three electrons ( $e^-$ ). Notice that the number of electrons equals the number of protons in the nucleus.

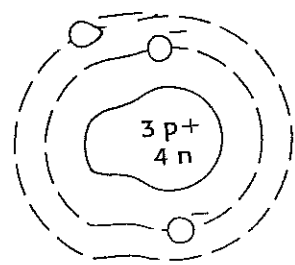


Figure 1

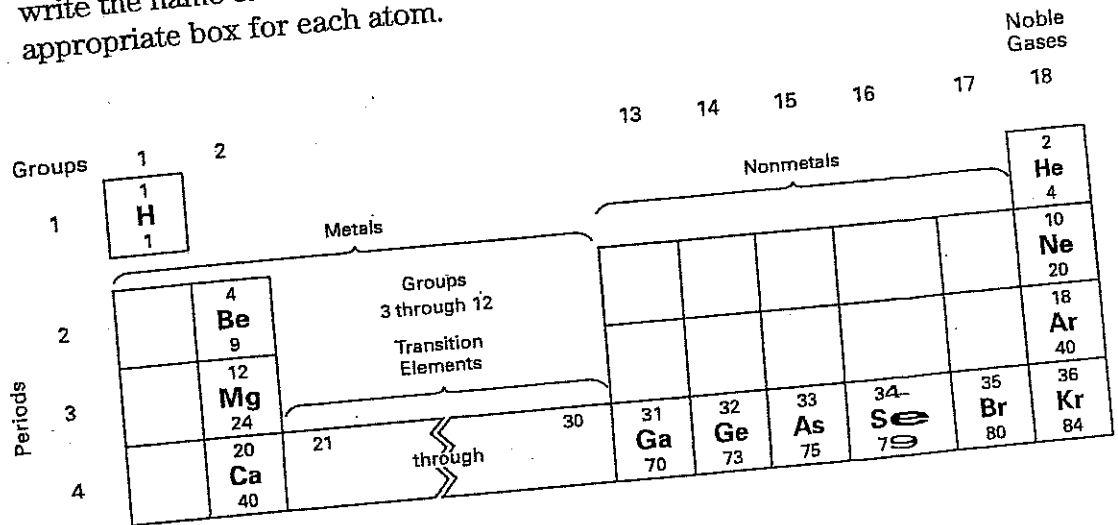
**Drawing Atomic Models *continued***

**DATA TABLE 2**

Atom	Total # of electrons	# of energy levels	# of electrons in highest energy level
Atom A			
Atom B			
Atom C			
Atom D			

**PLACING ELEMENTS IN THE PERIODIC TABLE**

8. Figure 2 shows part of a simple periodic table that is partially filled in. Locate the proper places for Atoms A, B, C, and D on the table. On the table, write the name of the atom (A, B, C, or D) and the atomic number in the appropriate box for each atom.



**FIGURE 2**

**Analysis**

1. **Recognizing patterns** What value in the data tables do Atoms A, B, and C have in common? How is this similarity reflected in their positions in the periodic table?

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