Early Models of the Atom **Name**_____

The Periodic Table and Ion Formation

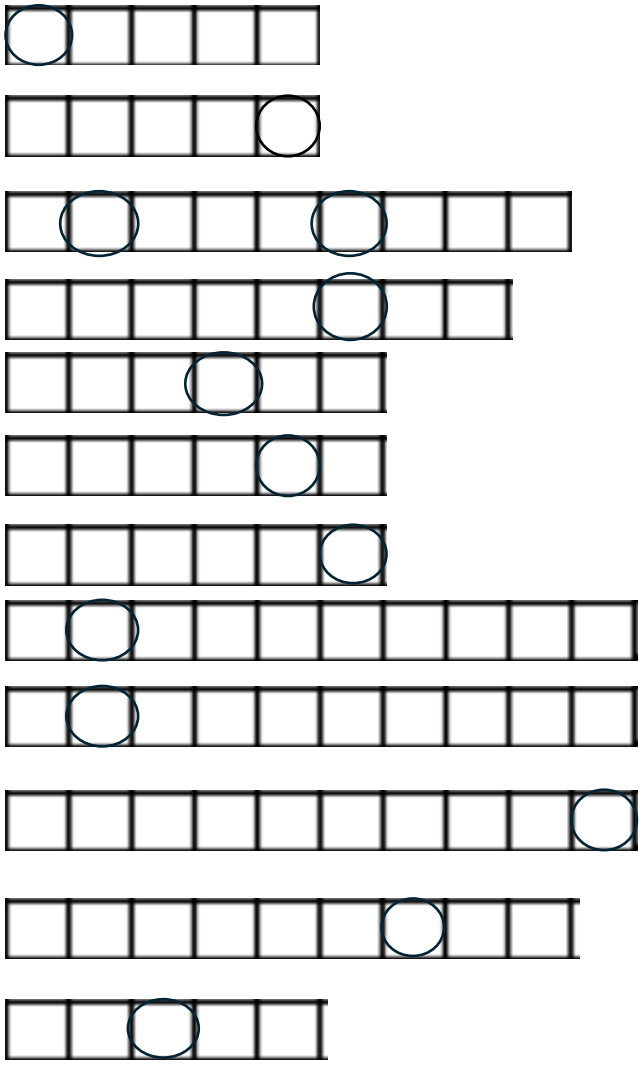
Review:

Lesson 3a in the **Chemistry Tutorial Section, Chapter 2 Matter** of **The Physics Classroom**: The Periodic Table of Elements AND

Lessons 2a-c and Lessons 3a-c in the **Chemistry Tutorial Section, Chapter 3**: **Elements, Atoms, and Ions** of **The Physics Classroom**: Lesson Table of Contents

Part 1: The Organization of the Periodic Table: Using the blocks provided next to each clue: write the letters of the word described.

1. A negative ion
2. A vertical column that contains elements with similar properties
3. These elements are dull, gases, brittle solids, and nonconductors
4. Elements in Group 17
5. A positive ion
6. These elements have luster, are mostly solid, ductile, malleable, conductors of heat/ electricity
7. The type of metal found in Group 1
8. The type of metals found in groups 3-12
9. These elements are a blend of properties of both metals and nonmetals
10. The type of ion that is multiple atoms packaged together as a single unit.
11. These elements have atomic numbers ranging from 89 to 103
12. The types of gases in Group 18



After completing all clues, unscramble the letters in the circled blocks to determine a chemist's most important tool. The answer:_____

Early Models of the Atom

Part 2: Ion Formation

1. Choose the answer that correctly completes each blank. Metals _____ electrons and become _____ ions and nonmetals _____ electrons and become _____ ions.
   a. gain b. lose c. positive d. negative

2. Complete these sentences:
   An atom of calcium (Ca) becomes a stable ion by _____ (gaining, losing) _____ (a number) electrons and assuming an electron configuration that resembles that of the element _____ (name or symbol).
   This ion contains _____protons and _____electrons.
   Is this a cation or an anion?_____

3. Complete these sentences:
   An atom of nitrogen (N) becomes a stable ion by _____ (gaining, losing) _____ (a number) electrons and assuming an electron configuration that resembles that of the element _____ (name or symbol).
   This ion contains _____protons and _____electrons.
   Is this a cation or an anion?_____

4. Write the equation for the formation of the ion formed when the element in period 6, group 1 becomes an ion.

   This ion contains _____protons and _____electrons.
   Is this a cation or an anion?_____

5. Write the equation for the formation of the ion formed when the element in period 4, group 16 becomes an ion.

   This ion contains _____protons and _____electrons.
   Is this a cation or an anion?_____

6. Write the equation for the formation of the chromium (III) ion.

   This ion contains _____protons and _____electrons.
   Is this a cation or an anion?_____

7. How many protons and electrons are in the following polyatomic ions? Write the formula and then the number of protons and electrons.
   a. This polyatomic ion gains three electrons when it forms with an atom of a period 2, group 14 element and three atoms of a period 2, group 16 element.

   b. This polyatomic ion loses one electron when it forms with four atoms of a period 1, group 1 element and one atom of a period 2, group 15 element.

   c. This polyatomic ion gains one electron when it forms with an atom of a period 3, group 17 element and four atoms of a period 2, group 16 element.