Introduction to the Periodic Table

I. Founders of the Periodic Table

A. Dmitri Mendeleev - published first periodic table; organized elements in vertical columns by similar properties; he arranged the columns so that the elements were in horizontal rows by - _____. (Grandfather of the Modern Periodic Table)

B. Henry Moseley - arranged elements in order of *increasing atomic number*. He arranged it so that elements with similar chemical properties were in the same vertical column. (Father of the Modern Periodic Table)

1. Periodic Law:

II. Organization of the Periodic Table

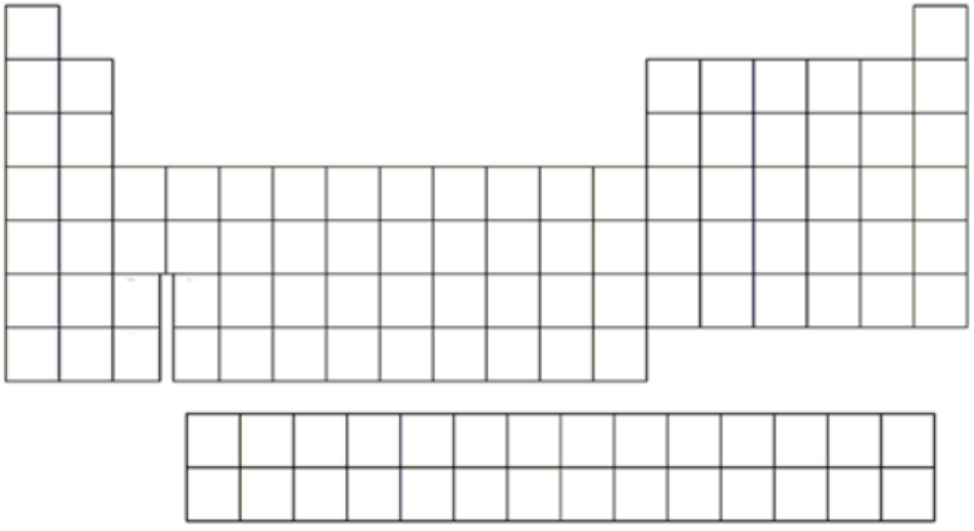
A. Metals vs. Nonmetals - divided by zigzag line

1. Metals - found to the left of the zigzag line; the majority of the periodic table
   Properties of metals:

2. Nonmetals - found to the right of the zigzag line
   Properties of nonmetals:

3. Metalloids - found between the metals and nonmetals; have properties of both; have two sides on zigzag line.

   Exceptions: Aluminum (Al) is a metal and Astatine (At) is a nonmetal.



☐ Metals ☐ Nonmetals ☐ Metalloids

B. Groups and Periods

1. Groups - vertical columns, also called families; **elements in the same group or family have similar chemical properties**
   a. number from left to right (1 -18)

2. Periods - horizontal rows
   a. All periods designated by a number (1 - 7) and represent energy levels.
   b. Note that periods 6 & 7 have some elements placed at the bottom of the periodic table (f block).

C. Names and Properties of Elements

1. Representative Elements Groups 1, 2, 13 - 18)- elements in the s and p blocks
   A. Alkali metals (group 1)
      i. Most reactive _____
      ii. Combine vigorously with _____
      iii. Not found freely in nature
      iv. React vigorously with water to
      v. _____ is NOT an alkali metal

   B. Alkaline earth metals (group 2)
      i. Slightly less reactive than alkali metals
      ii. Not found freely in nature
      iii. Harder, denser, and stronger than alkali metals

   C. Transition metals (Group 3-12)
      i. Can have multiple charges
      ii. Characteristics of metals
      iii. _____

   D. Halogens (group 17)
      i. Most reactive _____
      ii. "salt formers"

   E. Noble gases (group 18)
      i. Also called inert or rare gases
      ii. Very nonreactive due to outermost s and p sublevels being full

   F. Inner Transition Elements - at the bottom of the Periodic Table, no group designation
      a. Lanthanide series (elements 58 - 71)
      b. Actinide series (elements 90 – 103)
      c. Also known as _____

III. Special elements that you need to MEMORIZE!
   A. The following area called _____ elements because they ALWAYS exist in PAIRS in nature.
   B. H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2

Intro to the Periodic Table Homework

1. How did Dimitri Mendeleev organize the first periodic table?

2. How did Henry Moseley rearrange Mendeleev's periodic table?

3. In the modern periodic table, the vertical columns are called _____ or _____. The horizontal rows are called _____.

4. How do you know if an element is a ***metal*** based on the periodic table?

5. How do you know if an element is a ***non-metal*** based on the periodic table?

6. How do you know if an element is a ***metalloid*** based on the periodic table?

7. From this list (K, Ca, Cl, U, La, Sr, Kr), which elements are:

   Alkaline earth metals?

   Inner-transition metals?

   Noble gases?

8. From this list (H, Rb, Ag, As, I, Xe, Mg) which elements are:

   Metalloids?

   Alkali metals?

   Transition metals?