

Name: \_\_\_\_\_

### Chapter 4 Test Review

You may use a **GREEN** periodic table on the test... **NOT** your colorful/ labeled one!

1. List the number of valence electrons for each of the following elements:

- |         |         |
|---------|---------|
| a. 2 Be | f. 1 Rb |
| b. 4 Ge | g. 2 He |
| c. 6 O  | h. 8 Ar |
| d. 7 Cl | i. 1 Na |
| e. 7 Br | j. 2 Mg |

2. Write the group number, period number, atomic number, and atomic mass:

	Group	Period	Atomic #	Atomic Mass
Kr	18	4	36	84
Sr	2	5	38	88

3. State the **periodic law**:

the physical and chemical properties of elements are periodic functions of their atomic number

4. Which two elements are the most similar? **Explain why**:

a. Fe, Al, O, F, Br

F, Br because they are both halogens (same group) and both have 7 valence electrons = similar properties

b. Mg, Si, N, Ba, Kr

Ba, Mg because they are both alkaline earth metals (same group) and contain 2 valence electrons

5. Distinguish between the properties of the **alkali metals**, **alkaline earth metals**, **halogens**, and **noble gases**:

6. Distinguish between **metals**, **nonmetals**, and **metalloids** based upon their properties and location on the periodic table.

	Metals	Nonmetals
physical appearance	shiny	dull
conductivity	conductors	non conductors
malleability	malleable, ductile	brittle
reaction with acid	reacts with acid	doesn't react with acid
location on PT	left of "staircase"	right of "staircase"

*metalloids: a mixture of properties between both metals and nonmetals*

7. Classify the following as: Metal (**M**), Metalloid (**S** for semiconductor), Non-Metal (**N**)

- \_\_\_ a. Ge metalloid
- \_\_\_ b. Mn metal
- \_\_\_ c. Dull crystal that crushes easily and has a low melting point nonmetal
- \_\_\_ d. Ductile substance that reacts with acid metal
- \_\_\_ e. Silvery white element that is a conductor of electricity metal
- \_\_\_ f. Group 1 element metal
- \_\_\_ g. Group 18 element nonmetal

8. Be able to label the following areas on the periodic table:

\* Numbering system recommended by the International Union of Pure and Applied Chemistry (IUPAC)

\*\* Previous IUPAC numbering system

\*\*\* Numbering system recommended by the Chemical Abstracts Service

\*\*\*\* For the names of elements 104–112, see Table 27.

9. Describe/ define atomic radius, ionization energy, and electronegativity and know the general trends across the periods and down the groups:

**Electronegativity** – the ability of an atom to attract electrons towards itself  
increases across a period, decreases down a group

**Ionization energy** – the energy required to remove an electron from an atom  
increases across a period, decreases down a group

**Atomic radius** – the size of an atom (radius of the electron cloud)  
decreases across a period, increases down a group

10. Be able to rank elements according to increasing/decreasing atomic radius, ionization energy, and electronegativity:

a. **B, Be, C, Li, N**

*increasing* atomic radius:  $N < C < B < Be < Li$  (largest)

*increasing* ionization energy:  $Li < Be < B < C < N$  (largest)

*decreasing* electronegativity:  $N < C < B < Be < Li$  (smallest)

b. **Al, B, Ga, In, Tl**

*decreasing* atomic radius:  $Tl > In > Ga > Al > B$  (smallest)

*decreasing* ionization energy:  $B > Al > Ga > In > Tl$  (smallest)

*increasing* electronegativity:  $Tl > In > Ga > Al > B$  (largest)