REVIEW - UNIT 1 SCH 3U

The Periodic Table

A Russian chemist, Mendeleev, was the first scientist to publish a table similar to the periodic table of today. In the modern periodic table the horizontal rows represent periods of elements and the vertical columns are grouped into families of elements.

The reactive metals such as potassium and sodium are found in the alkali family. These elements are grouped together because they have (a number) 1 electron(s) in the outer shell and they tend to (gain or lose) lose this (these) in a chemical reaction.

The next group, Group IIA, is called the alkaline earth metal family. This group is (more or less) less reactive than the previous group because it has (a number) 2 electron(s) in the outer shell and the atomic radius (increased or decreases) decreases as the atomic number increases within a period.

Another group of elements, which has 7 electrons in the outer shell, is called the halogen family. Within this group, the chemical reactivity (increases or decreases) decreases as the atomic number increases.

The least reactive group has either (a number) 2 or 8 electrons in its outer shell. Because this group does not usually take part in a chemical reaction, it is referred to as the noble or inert gases.

The middle elements in the periodic table, between groups II and III, are responsible for the extra length of the long periods and are called the transition metals.

The zigzag line, which begins between boron and aluminum, separates the non-metals to the right and the metals to the left. Elements near this zigzag line are called metalloids because they exhibit properties of both groups.

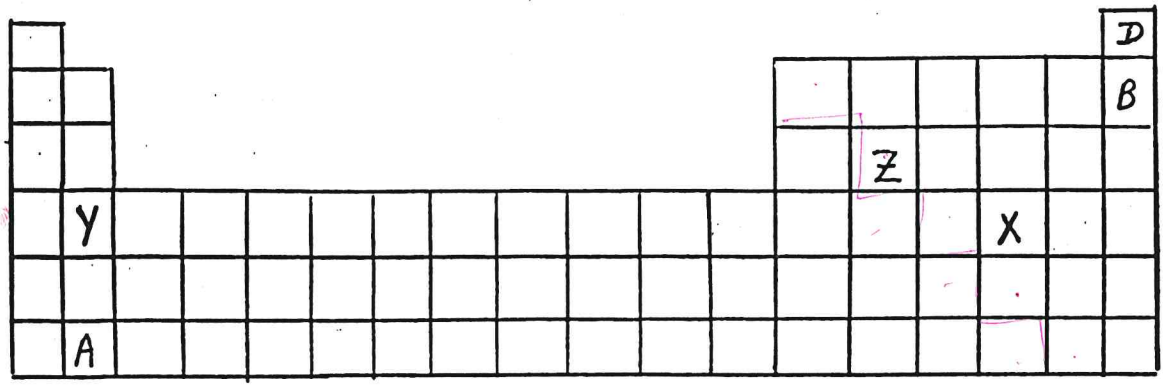
Chemical families have been distinguished by their outer electrons or valence electrons.

Since these 'outer' electrons are so important they can be represented by a special symbol called the Lewis dot symbol.

Within the periodic table itself, there are certain trends from left to right and top to bottom. The minimum voltage required to remove one electron from the atom or the ionization energy (increases or decreases) ↑ as on moves from left to right within a period and (increases or decreases) ↓ as one moves from top to the bottom within the family. The variation in the energy required to remove electrons is a direct result of the attraction the electron has for the nucleus or what may be called the atom's electron affinity. This attraction tends to (increase or decrease) increase with increasing atomic number within a period and tends to (Increase or decrease) decrease with increasing atomic number within a family.

The periodic table hence has proven to be effective way to organize the elements according to their chemical or physical properties.

SCH 3A1 PERIODICITY QUIZ NAME: _____



1. Draw Lewis diagrams for the following:

   Element A $\cdot\dot{A}\cdot$ Element B $:\ddot{B}:$ Element Z $\cdot\dot{Z}\cdot$ Element X $\cdot\ddot{X}:$

2. Name two elements that are in the same period. Y & X

   Name two elements that are in the same group. Y & A or D & B

3. Which of the six labelled elements is the most metallic? A

4. Which of the labelled elements is a metalloid? Z

5. Which of the labelled elements is a noble gas? D or B

6. How does the Ionization Energy vary across a period and why?

   I.E increases from left to right.

   # of protons is increasing & holds the outer es more tightly

7. How does the Ionization Energy vary down a group and why?

   I.E decrease as you move down

   outer electrons are farther away from the +ve nucleus & more easily pulled away

8. Compare the ionization energies of Y and X. X > Y

   Compare the ionization energies of Y and A. Y > A

9. How does atomic radius vary across a period and why?

   Atomic radius ↓ as you move across a period because increasing number of protons pulls electrons closer to the nucleus

10. Compare the atomic radii of Y and X. Y > X

    Compare the atomic radii of Y and A. A > Y

11. The Periodic Table is organized on the basis of the atoms' increasing atomic Number or protons or electrons. ← Periodic Law

P.T. we use today is based on the version suggested by

Periodic Trends - Try These

Trends – Try These

Highest Ionization Energy

F Cl I At

Ionization Energy:

Lowest Electron Affinity

K Fe Zn Br

Electron Affinity:

Highest Reactivity

Rb Sr Ag Sn

Lowest Reactivity

Al S Cl Ar

Atomic Radius:

Lowest Ionization Energy

Li Be B O

Largest Atomic Radius

K Cr Fe Cu

Smallest Atomic Size

F Cl Br I