

1. Define each of the following terms:
 - a. Alkaline earth metals = elements in group 2 of the periodic table
 - b. Chemistry = the study of the properties and changes in matter
 - c. Matter = anything that has mass and takes up space
 - d. Group = the columns in the periodic table
 - e. Period = the rows in the periodic table
 - f. Alkali metals = found in group 1 of the periodic table
 - g. Covalent bond = the bond that is created between two non-metals, electrons are shared
 - h. Molecular compound = composed of two non-metals sharing electrons in a covalent bond
 - i. Ionic compound = composed of a metal and a non-metal transferring electrons
 - j. Polyatomic ion = ion composed of many atoms
i.e. PO_4 , SO_4
 - k. Chemical property = a property that describes the behavior of a substance
 - l. Physical property = a property that describes the appearance of a substance

m. chemical change = a change in which a new substance is created i.e. cooking, baking, burning etc

n. physical change = a change in the state or form of the substance; no new substance is created i.e. melting, boiling, freezing etc

o. atom = the smallest part of an element

p. molecule = two or more atoms; can be of the same element or different i.e. H_2 , H_2O

q. compound = consists of two or more elements i.e. H_2O , $NaCl$

r. element = a pure substance that cannot be broken down i.e. Cl , Na , He etc

2 a. Where are valence electrons located? In the outermost orbit of atoms

b. How many valence electrons do each of the following have:

i. Oxygen 8 ii. Carbon 4 iii. Nitrogen 5

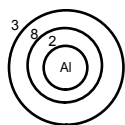
c. What is the most reactive group of elements on the periodic table? The most un-reactive? The most reactive group of elements are in group 1. The most unreactive group of elements are in group 18 (noble gases).

3. Draw Bohr diagrams of the following atoms:

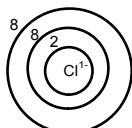
a. Nitride



c. aluminum



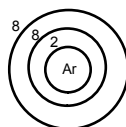
e. chloride



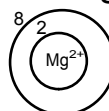
b. nitrogen



d. argon



f. magnesium²⁺



4. Identify the following elements based on their position on the periodic table:

- a. Period 4, group 5 **V (vanadium)**
- b. Period 5, group 1 **Rb (rubidium)**
- c. Period 2, group 17 **F (Fluorine)**

5. **Elements lose or gain electrons in order to be stable. Elements are stable when their valance (outer orbit) is full of electrons.**

6. a. **+2** c. **-3**
b. **+1** d. **-1**

7. For each of the following state whether it is a physical or chemical change.

- a. A popsicle melts on the pavement - **physical (it is only changing states from solid to liquid there is no new substance formed)**
 - b. Gasoline burns in the air - **chemical (gasoline burning is a combustion which is an example of a chemical change, also heat and light are produced and the change is difficult to reverse all characteristics of a chemical change.)**
 - c. Water freezes at 0°C - **Physical (melting point is an exmample of a physical characteristic. Also the water is only changing states from liquid to solid there is no new substance formed.)**
8. What is the difference between an ionic compound and a molecular compound in terms of:
- a. The bonds formed between them - **An ionic compound is formed because electrons are transferred from one element to another using ionic bonds. A molecular compound is formed when elements share electrons through a covalent bond.**
 - b. The elements involved - **Ionic Compounds involve metals and non-metals, whereas molecular compounds involve two non-metals.**