

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. Proton = the positive charged subatomic particle found in the nucleus of the atom
  - i. Neutron = the neutral (no charge) subatomic particle found in the nucleus of the atom
  - j. Molecular compound = composed of two non-metals sharing electrons in a covalent bond

k. Ionic compound = composed of a metal and a non-metal transferring electrons

l. Polyatomic ion = ion composed of many atoms  
i.e.  $\text{PO}_4$ ,  $\text{SO}_4$

m. Chemical property = a property that describes the behavior of a substance

n. Physical property = a property that describes the appearance of a substance

o. Electron = a negatively charged subatomic particle found in the orbits of an atom

p. Subatomic particles = consist of protons, neutrons and electrons

q. Pure substance = a substance that only contains one thing

r. particle theory of matter = there are several parts to the theory describing matter and how it behaves.

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    | <b>8</b> | ii. | Carbon      | <b>4</b> |
| iii. | Nitrogen  | <b>5</b> | iv. | Phosphorous | <b>5</b> |
| v.   | Neon      | <b>8</b> | vi. | Lithium     | <b>1</b> |
| vii. | Magnesium | <b>2</b> |     |             |          |

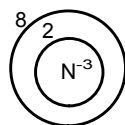
3. What two subatomic particles are found in the nucleus and what are their charges? **Protons and neutrons are found in the nucleus. Protons are positive, neutrons are neutral (no charge)**

4. How many electrons are found around the nucleus of the following atoms?

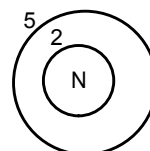
- a. Oxygen **orbit 1 = 2 orbit 2 = 6**  
b. Copper **orbit 1 = 2 orbit 2 = 8 orbit 3 = 8 orbit 4 = 11**  
c. Barium **orbit 1 = 2 orbit 2 = 8 orbit 3 = 8 etc**

5 Draw Bohr diagrams of the following atoms:

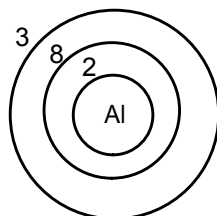
a. Nitride



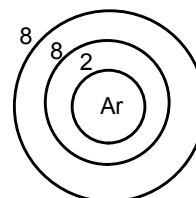
b. nitrogen



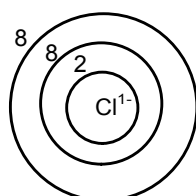
c. aluminum



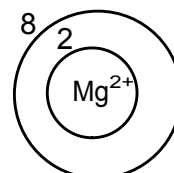
d. argon



e. chloride



f. magnesium<sup>2+</sup>



6. 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)**

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

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

9. What are the three states that non-metals can be found in?

**Solid, liquid or gas**

10. 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 example of a physical characteristic. Also the water is only changing states from liquid to solid there is no new substance formed.)**

11. 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.**