

Name:

Date:

A Quick Review of Elements and Compounds

1. Chemical elements cannot be broken down to other forms by chemical reactions. Each Element has a specific number of protons, neutrons and electrons.

a. Use the periodic table to fill in the following chart:

Element	Chemical Symbol	Number of Protons	Number of Neutrons	Number of Electrons
Hydrogen				
Carbon				
Oxygen				
Potassium				
Sodium				

b. Explain what information you need to figure out each of the following:

i. The atomic number of an element

ii. The mass number of an element

iii. The molecular weight (in Daltons) of one atom of an element

2. One mole of an element or compound contains 6.02×10^{23} atoms or molecules of that element or compound. One mole of an element or compound has a mass equal to its mass number (or molecular weight) in grams. For example, 1 mol of hydrogen gas (H_2) contains 6.02×10^{23} molecules and weighs 2 g.

a. What is the weight of 1 mole of pure sodium (Na)?

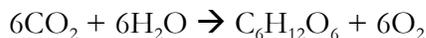
- b. How many molecules of Na are in 1 mole of Na?
- c. How can you determine how many grams are in a mole of any chemical element or compound?
3. One atom of Na can combine with one atom of Cl (chlorine) to produce one molecule of NaCl.
- a. What is the common name of NaCl?
- b. If Cl has 17 electrons, 17 protons and 18 neutrons, what is its mass number?
- c. What is the mass number of NaCl?
- d. How many grams of NaCl equal 1 mole of NaCl?
4. To make a 1 molar (1 M) solution of NaCl, you need to add 1 mol of NaCl to distilled water to make a final volume of 1 L (1,000 ml). A 1 M solution is said to have a molarity of 1. If you added 2 mole of NaCl to 1 L of distilled water, you would make a 2 M solution and its molarity would equal 2. The following questions refer to a 1 M solution of NaCl
- a. How many molecules of NaCl are in the 1 M NaCl solution?
- b. How many molecules of NaCl are there per ml of the solution?
5. Next, you divide this 1 M solution of NaCl into four separate flasks, putting 250 ml into each flask.
- a. How many grams of NaCl are in each flask?

b. How many molecules of NaCl are in each flask?

c. How many molecules of NaCl are there per ml of distilled water?

d. What is the molarity of NaCl in each of the four flasks?

6. The summary formula for photosynthesis is:

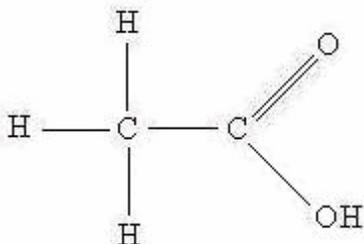


a. How many molecules of carbon dioxide and water would a plant have to use to produce three molecules of glucose?

b. How many moles of carbon dioxide and water would a plant have to use to produce 2 mole of glucose?

7. O_2 and NH_3 are both small covalent molecules found in cells. NH_3 is extremely soluble in the aqueous environment of the cell, while O_2 is relatively insoluble. What is the basis for this difference in solubility between the two molecules? In your answer, please draw the structures of the molecules as valence shell diagrams. Given these diagrams, what kind of interactions can each molecule have with water?

8. The molecule diagrammed below can also be represented by the formula CH_3COOH :



a. Explain how you can determine which of the bonds between elements in this molecule are polar or nonpolar covalent bonds, ionic bonds, hydrogen bonds and van der Waals interactions?