Chemical Formulae

1. Write the correct chemical formula for the following substances:
   a. Water **H_2O**
   b. Carbon dioxide **CO_2**
   c. Oxygen gas **O_2**
   d. Hydrogen gas **H_2**
   e. Hydrochloric acid **HCl**

2. Determine how many atoms of each element are present in the following formulae and name each compound. The first has been done for you:
   a. NaCl *(sodium chloride)* contains *1 atom of sodium and 1 atom of chlorine*
   b. MgO (**magnesium oxide**) contains **1 atom of magnesium and 1 atom of oxygen**
   c. SO_2 (**sulfur dioxide**) contains **1 atom of sulfur and 2 atoms of oxygen**
   d. Na_2S (**sodium sulfide**) contains **2 atoms of sodium and 1 atom of sulfur**
   e. Fe_2O_3 (**iron oxide**) contains **2 atoms of iron and 3 atoms of oxygen**
   f. $AgNO_3$ (**silver nitrate**) contains **1 atom of silver, 1 atom of nitrogen and 3 atoms of oxygen**

3. Determine how many atoms of each element are present in the following compounds:
   a. Sulfuric acid (H_2SO_4) contains **2 atoms of hydrogen, 1 atom of sulfur and 4 atoms of oxygen**
   b. Barium hydroxide ($Ba(OH)_2$) contains **1 atom of barium, 2 atoms of oxygen and 2 atoms of hydrogen**
   c. Glucose ($C_6H_{12}O_6$) contains **6 atoms of carbon, 12 atoms of hydrogen and 6 atoms of oxygen**
   d. Ethanol (C_2H_5OH) contains **2 atoms of carbon, 6 atoms of hydrogen and 1 atom of oxygen**
   e. Nitric acid (HNO_3) contains **1 atom of hydrogen, 1 atom of nitrogen and 3 atoms of oxygen**
   f. Potassium hydroxide (KOH) contains **1 atom of potassium, 1 atom of oxygen and 1 atom of hydrogen**

4. The formula for methane is **CH_4**.

    a. Is methane an element or a compound? Explain your answer.

A compound. It contains two different types of atom chemically bonded together.

    b. Look at the formula. What is the **ratio** of carbon atoms to hydrogen atoms?

There are 4 hydrogen atoms for every carbon atom.

    c. Describe the **molecule** in words.

A molecule of methane contains a carbon atom chemically bonded to 4 hydrogen atoms.

5. Describe the following equation in words (NH_3 is ammonia).

$$N_2 + 3\ H_2 \rightarrow 2\ NH_3$$

A molecule of nitrogen reacts with 3 molecules of hydrogen to form 2 molecules of ammonia.

6. Describe the following equation in words.

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

2 molecules of hydrogen react with 1 molecule of oxygen to form two molecules of water.

Stretch: Circle all the compounds from Q2 and Q3 that would form molecules.

All compounds that are made up of only non-metals:
Q2: sulfur dioxide
Q3: glucose, ethanol, sulfuric acid and nitric acid