For each of the ionic and molecular compounds listed below, show how the compound dissociates or ionizes when placed in water. In the middle column, show the dissociation or ionization reaction and in the last column show the best representation of that compound in water. If the compound is insoluble, write insoluble in the middle column. When you are finished, circle all of the compounds that are acids and bases.

Compound	**Dissociation or Ionization Reaction**	**How Substance Exists in Water**
hypochlorous acid	$HClO(aq) + H_2O(l) \leftrightarrow H_3O^+(aq) + ClO^-(aq)$	$HClO(aq)$
sodium chloride		
hydroiodic acid		
silver chloride		
sodium carbonate		
zinc nitrate		
ammonia (NH_3)		
potassium hydroxide		
strontium acetate		
$HC_2H_2ClO_2$		
iron(III) sulfate		
perchloric acid		
mercury(I) sulfide		
HCN		
ammonium perchlorate		
sodium hydroxide		
potassium oxalate		
H_2SO_4		
aluminum perchlorate		
potassium dihydrogen phosphite		
$HC_2H_3O_2$		
CH_3COOH		

Convert each statement below into a balanced chemical equation. If the products are not given, you must predict what the products will be. Most of the reactions in which you have to predict the products are double displacement reactions, the others are combustion reactions. In your balanced chemical equation, make sure you include the physical states of the reactants and products.

1) Potassium metal reacts with fluorine gas to produce potassium fluoride.

2) Nitrogen gas reacts with hydrogen gas under high temperature to form ammonia gas.

3) Sulfur trioxide gas dissolves in water to form sulfuric acid.

4) Solid calcium carbonate is heated to form solid calcium oxide & carbon dioxide gas.

5) Water undergoes electrolysis to form oxygen gas & hydrogen gas.

6) Aluminum metal is placed in aqueous hydrocloric acid and forms aqueous aluminum chloride and hydrogen gas.

7) Copper metal is immersed in a silver chlorite solution, aqueous copper(II) chlorite and solid silver are formed.

8) Aqueous barium bromate is mixed with aqueous lithium phosphate.

9) Hydrochloric acid reacts with solid magnesium hydroxide.

10) Aqueous manganese(V) perchlorate is mixed with aqueous sodium sulfide.

11) Propane gas, C_3H_8, is burned (combusted).

12) Liquid MTBE, $C_5H_{12}O$, is burned(combusted).

Convert each of the statements below into a balanced chemical equation. After balancing each reaction, write the complete ionic equation and the net-ionic equation. Place a box around the net-ionic equation and list the spectator ions below this equation. You can predict the products of these reactions by noting that they are double displacement reactions.

1) An aqueous solution of lead(II) nitrate is mixed with an aqueous solution of potassium iodide.

2) Aqueous calcium chloride is mixed with aqueous ammonium phosphate.

3) Aqueous platinum(III) bromide reacts with aqueous sodium sulfide.

4) Aqueous hypochlorous acid is mixed with aqueous calcium hydroxide. Assume the product, calcium hypochlorite, is soluble in water.

5) Aqueous hydrobromic acid is mixed with aqueous sodium hydroxide.

6) Aqueous potassium chloride is combined with aqueous magnesium acetate.

7) Sulfuric acid reacts with potassium hydroxide in deionized water.

8) Aqueous sulfurous acid is mixed with aqueous potassium hydroxide.

9) Aqueous copper(II) sulfate is mixed with a solution of cesium phosphate.

The following reactions are oxidation-reduction reactions. You only need to predict the products and write the balanced equation.

10) A solid magnesium ribbon is burned in air to give the solid metal oxide.

11) The high temperature of engines cause the nitrogen & oxygen in air to react to form nitrogen monoxide (a reaction that plays a role in the formation of smog).

12) Solid copper(II) chloride reacts with hydrogen gas to produce gaseous hydrochloric acid and copper metal.

13) Solid carbon is heated with fluorine gas to give gaseous carbon tetrafluoride.

Molar Mass Worksheet

Molar Mass:

The molar mass is the term used for the mass in grams of one mole of any substance, except for atoms. Older terms for molar mass are molecular weight or formula weight. It could also be expressed as the mass in amu of one unit of that substance (i.e.: one molecule, one formula unit for ionic compounds, etc.).

Since the chemical formula of a compound tells the number of atoms (or moles of atoms) of each element, the molar mass is simply the sum of all atomic masses, as shown below:

To calculate the molar mass of CCl_3F (CFC–13)

1 mol C atoms = 1 (12.01 g) = 12.01 g
1 mol F atoms = 1 (19.00 g) = 19.00 g
3 mol Cl atoms = 3 (35.45 g) = + 106.35 g

137.36 g/mol or amu/molecule

Problems:

Calculate the molar mass of the following compounds:

1) TNT = $C_7H_5N_3O_6$:

2) Copper(II) oxide, CuO:

3) Hydrogen, H_2:

4) Sulfur dioxide, SO_2:

5) Potassium nitrate, KNO_3:

6) Ammonium hydroxide, NH_4OH:

7) Acetic acid, CH_3COOH:

8) Sodium sulfate, Na_2SO_4:

9) Potassium dichromate, $K_2Cr_2O_7$:

10) Copper(II) sulfate pentahydrate, $CuSO_4 \cdot 5\ H_2O$:

Worksheet: The Mole

1) What is the mass (in amu) of 2500. atoms of Carbon?

2) How many Zinc atoms are there in 5.00×10^{19} amu?

3) How many moles of He atoms are there in 221,000 He atoms?

4) How many atoms are there in 0.98 moles of iron?

5) How many moles of cesium are in 66.45 g Cs?

6) What is the mass in g of 6.52×10^{18} atoms of gold?

7) How many moles of CCl_3F are there given 435.2 g?

8) How many grams of TNT (TNT = $C_7H_5N_3O_6$) are there given 0.665 moles?

9) How many moles are in 57.2 g of octane (C_8H_{18}) ?

10) How many moles are in 0.44 g of nitric acid (HNO_3) ?