

WORKSHOP 4:
Writing and Balancing Equations

Name: _____

Section _____

Part 1: Write and balance the following word equations. Remember that hydrogen, oxygen, nitrogen, chlorine, and bromine are diatomic molecules.

1. Copper (I) sulfide and oxygen gas yield copper(I) oxide and sulfur dioxide
2. Zinc perchlorate, when heated, decomposes to zinc chloride and oxygen gas.
3. Solid iron reacts with oxygen gas to produce rust (a combination of iron oxides with a formula of Fe_3O_4).
4. Titanium metal and hydrochloric acid react to yield titanium (IV) chloride and hydrogen gas.
5. Lithium metal reacts with water to produce lithium hydroxide and hydrogen gas.
6. Carbon disulfide reacts with oxygen to form sulfur trioxide and carbon dioxide
7. Solid zinc and phosphoric acid react to form zinc phosphate and hydrogen gas.
8. Hydrazine (N_2H_4) and dinitrogen tetroxide gas react to produce nitrogen gas and water
9. Carbon monoxide and hydrogen gas react to form methane and water

10. Solid aluminum reacts with hydrobromic acid to produce aluminum bromide and hydrogen gas.

11. Nitrogen and hydrogen are gases that react to form ammonia gas.

12. Fluorine gas reacts with water to give hydrogen fluoride and oxygen gas

13. Lead (II) nitrate decomposes, when heated, to yield lead (II) oxide, nitrogen monoxide gas, and oxygen gas

14. Aluminum hydroxide, when heated, gives aluminum oxide and water

15. Phosphorus and bromine will react and form phosphorus tribromide.

16. Sodium hydrogen carbonate reacts with nitric acid to yield sodium nitrate and water and carbon dioxide.

17. Xenon gas and fluorine gas react over a platinum catalyst to form xenon hexafluoride.

18. Butane (C_4H_{10}) combusts with oxygen to produce carbon dioxide and water

Part 2: Complete and balance the following double displacement reactions. Use the chart on page 58 to predict insoluble products. One of these mixtures gives no reaction. (Predict which mixture will not produce a precipitate or gas or molecular compound)

1. Copper (II) nitrate solution reacts with a solution of ammonium sulfide.
2. Solid Magnesium hydroxide is added to hydrochloric acid.
3. Silver nitrate solution reacts with sulfuric acid.
4. Solutions of iron (III) chloride and ammonium nitrate are mixed.
5. Phosphoric acid reacts with a solution of calcium hydroxide.
6. Potassium carbonate solution reacts with a solution of cobalt (II) bromide.
7. Bismuth (III) chloride solution reacts with hydrosulfuric acid.
8. Potassium acetate solution reacts with hydrochloric acid.
9. Sodium sulfite solution reacts with hydrochloric acid to produce a weak acid and sodium chloride.
10. The weak acid produced in question 9 above, decomposes to a gas and water.

Single Replacement Reactions: Activity Series

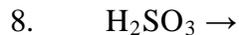
**Li > K > Ba > Sr > Ca > Na > Mg > Al > Mn > Zn > Fe > Cd > Co > Ni > Sn > Pb >
H > Cu > Ag > Hg > Au**

(Cu, Ag, Hg and Au do not replace H from acids)

The elements in the first line above all replace hydrogen from acids. The most active can replace H from water (Li – Na). Mg can slowly react with hot water. Al – Pb react with acids but not with water. Predict whether the following will react, and what the products will be if they do. If “no reaction” is predicted, write NR. Balance any reactions that do occur.



Decomposition Reactions



(optional) Combination reactions. Recall – hydration of metal oxides form what kinds of compounds? Hydration of non-metal oxides forms what kinds of compounds?

