Name $\qquad$ Period $\qquad$
LTHS: Chemistry

## Chemical Reactions Lab

Pre- Lab Questions:

1. Name the five types of chemical reactions.

2. What is a reactant in a chemical reaction?
3. What is a product in a chemical reaction?
4. Name four ways you can tell a chemical reaction has taken place.
5. What does the arrow $(\rightarrow)$ in a chemical reaction mean?
6. Give the four symbols for physical states of reactants and products, and tell what each symbol means.

Demo:
Word equation: Ethanol $\left(\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{OH}\right)$ reacts with oxygen in the air to produce carbon dioxide and water vapor.
a. How did you know a chemical reaction took place?
b. Formula of reactant(s)
c. Formula of product(s)
d. Type of chemical reaction
e. Write the equation for the reaction (including all physical states).
7. Get a strip of magnesium ribbon (about 2.5 cm long). Holding it with forceps, ignite the ribbon in a Bunsen burner flame. Do not look directly at the burning magnesium?
Looking directly at the burning magnesium could damage your eves. Hold the burning ribbon over glass plate to catch debris.

Word equation: Solid magnesium ribbon reacts with oxygen gas to produce solid magnesium oxide.
a. How did you know a chemical reaction took place?
b. Formula of reactants)
c. Formula of products)
d. Type of chemical reaction

## Synthesis

e. Write the equation for the reaction (including all physical states).

8. Place a small piece of zinc into a small test tube. Add enough dilute hydrochloric acid $(\mathrm{HCl})$ to just cover the piece of zinc.

Word Equation: Solid zinc reacts with aqueous hydrochloric acid to produce aqueous zinc (II) chloride and hydrogen gas.
a. How did you know a chemical reaction took place?
b. Formula of reactant (s)
c. Formula of products)
d. Type of chemical reaction

## Single Replacement

e. Write the equation for the reaction (including all physical states).
(5) $\mathrm{Zn}(\mathrm{s})+\mathrm{HCl}$ (aq) $\rightarrow \mathrm{ZnCl}_{2}($ aq $)+\mathrm{H}_{2}(\mathrm{~g})$
9. Place a small piece of magnesium ribbon (about 10 mm long) into a small test tube. Add enough copper (II) sulfate to just cover the ribbon. Compare to the sample prepared by the teacher.

Word Equation: Aqueous copper (II) sulfate reacts with solid magnesium to produce aqueous magnesium sulfate and solid copper.
a. How did you know a chemical reaction took place?
b. Formula of reactants)
c. Formula of products)
d. Type of chemical reaction
(i)

Single Replacement
e. Write the equation for the reaction (including all physical states).
(5)

$$
\mathrm{CuSO}_{4}(\mathrm{q})+\mathrm{Mg}(s)
$$

$$
\rightarrow \mathrm{MgSO}_{4}(\mathrm{cq})+\mathrm{Cu}(\mathrm{~s})
$$

10. Place 10 drops of barium chloride into a small test tube. Add 10 drops of sodium sulfate.

Word Equation: Aqueous barium chloride reacts with aqueous sodium sulfate to make solid barium sulfate and aqueous sodium chloride.
a. How did you know a chemical reaction took place?
b. Formula of reactant (s)
c. Formula of products)
d. Type of chemical reaction
 Double Replacement
e. Write the equation for the reaction (including all physical states).

$$
\mathrm{BaCl}_{2}(\mathrm{aq})+\mathrm{Na}_{2} \mathrm{SO}_{4}(\text { aq }) \rightarrow \mathrm{BaSO}_{4}(\mathrm{~s})+\mathrm{NaCl}(\mathrm{aq})
$$

11. Place 20 drops of hydrogen peroxide into a small test tube. Add a small amount of manganese (IV) oxide to the tube (just enough to cover the bottom of the test tube). HINT: manganese (IV) oxide is a catalyst. It is not a reactant or product, but it speeds up the reaction. A catalyst is indicated in a chemical reaction by writing the formula of the catalyst over the arrow.

Word Equation: Aqueous dihydrogen dioxide (hydrogen peroxide) decomposes to produce water and oxygen.
a. How did you know a chemical reaction took place?
b. Formula of reactants)
c. Formula of products)
d. Type of chemical reaction

Decomposition
e. Write the equation for the reaction (including all physical states).

$$
\mathrm{H}_{2} \mathrm{O}_{2}\left(\mathrm{aq}_{2}\right) \stackrel{\mathrm{MnO}_{2}(s)}{H_{2}} \mathrm{H}_{2}+\mathrm{O}_{2}(g)
$$

12. Light the Bunsen burner using a striker.

Word Equation: When carbon tetrahydride gas reacts with elemental oxygen, carbon dioxide gas and water vapor are produced.
a. How did you know a chemical reaction took place?
b. Formula of reactants)
c. Formula of products)
d. Type of chemical reaction combustion
e. Write the equation for the reaction (including all physical states).


