

Date: _____

Name: _____

PREDICTING CHEMICAL REACTIONS

Partner: _____

Blk: _____

OBJECTIVES:

1. To predict the outcome of several chemical reactions
2. To write balanced equations (with phases) to support your predictions
3. To identify the type of chemical reaction as either: synthesis, decomposition, single displacement, double displacement, neutralization or combustion
4. To identify exothermic vs endothermic reactions

MATERIALS NEEDED:

This is a stations lab so all materials will be set out at specific stations

PROCEDURE:

Part I: Prediction: Write out the predicted **balanced** chemical equations when the following substances are reacted together. Be sure to include **phases**.

I. Cobalt (II) chloride solution, CoCl_2 , and Sodium hydroxide solution, NaOH

II. Lighting a candle wick : $\text{C}_{25}\text{H}_{52}$

III. Magnesium metal, Mg (s), and a flame from a lit candle

****WARNING: DO NOT LOOK DIRECTLY AT THE FLAME THAT IS PRODUCED AS IT CAN DO MAJOR DAMAGE TO YOUR EYES!!****

IV. Hydrochloric acid solution, HCl , and solid Zinc, Zn (s)

V. Hydrogen peroxide solution, H_2O_2 , in the presence of solid Manganese (IV) oxide (which acts as a catalyst so is not included in the overall reaction)

VI. Barium hydroxide solution, $\text{Ba}(\text{OH})_2$, and Sulphuric acid solution, H_2SO_4

VII. Sodium bicarbonate solution, NaHCO_3 , and Calcium chloride solution,

VIII. Lead (II) nitrate solution, $\text{Pb}(\text{NO}_3)_2$, and Potassium iodide solution, KI

Part II : Testing the Predictions:

Combine the following reactants as instructed below. Record your observations such as colour, temperature, production of a gas, formation of a solid (cloudy=precipitate), etc. in the data table provided.

I. Mix 1 or 2 mL Cobalt (II) chloride solution, CoCl_2 , with 1 or 2 mL of Sodium Hydroxide solution, NaOH , in a test tube and record your observations.

II. Take a match and light the candle wick

III. Take a piece of Magnesium metal, Mg (s) and hold it with a pair of tweezers over a lit candle and record your observations

****WARNING: DO NOT LOOK DIRECTLY AT THE FLAME *****

IV. Place a chunk of solid Zinc into 5 – 10 mL of Hydrochloric acid, HCl , in a test tube and record your observations. (HYDROGEN POP TEST?)

V. Place a **small** scope of Manganese (IV) oxide into about 5 – 10 mL of Hydrogen peroxide solution, H_2O_2 , in a test tube and record your observations. (HYDROGEN POP TEST)

VI. Place 1 or 2 mL of Sulphuric acid, H_2SO_4 into a test tube and add (drop by drop) some Barium hydroxide solution, $Ba(OH)_2$, until a change is noted, record your observations.

VII. 1. Place one spoonful of Sodium bicarbonate (s) into a plastic sealable bag. 2. Place 1 spoonful of Calcium chloride (s) into the bag. Seal the bag, shake it and see if a chemical reaction takes place. 3. Measure 10 ml (or 2 teaspoons) of indicator solution. Carefully add it to the bag. Flatten the bag to remove the air and seal it. 4. Tilt the bag back-and-forth to wet all of the solid. Squeezing the bag may also help in wetting the solid. Be careful not to squeeze the bag too hard as it might break or open up.

VIII. Mix 1 or 2 mL of Lead (II) nitrate solution, $Pb(NO_3)_2$, with 1 or 2 mL of Potassium iodide solution, KI, in a test tube and record your observations.

DATA AND OBSERVATIONS:

Reaction	Colour of Reactant A	Colour of Reactant B	Colour of Combined Products	°C of A	°C of B	Temp of Products	Make or use heat?	Did a gas or a Solid Form?
I								
II								
III								
IV								
V		N/A			n/a			
VI								
VII								
VIII								

ANALYSIS:

Compare your experimental observations in Part II with your predicted balanced equations in Part I. Account for your laboratory observations for each chemical reaction by using your predicted balanced equation to help you determine what is being produced etc.

DISCUSSION:

1. Identify each chemical reaction in Part I as either: synthesis, decomposition, single displacement, double displacement, neutralization or combustion
2. Then classify the reactions as either exothermic or endothermic

SOURCES OF ERROR:

There are no sources of error as this is a qualitative lab, not a quantitative lab

SUMMARY:

Be sure to include a connection to every-day life.