

4. Explain how mass is conserved during a chemical reaction.
(include law of conservation of mass, open & closed systems, and coefficients in your answer) (p. 174-175)

5. Describe EACH of the THREE types of chemical reactions. (p. 180)

Review and Reinforce

*Text book
PGS 163-168*

Observing Chemical Change

Understanding Main Ideas

Complete the following table. Describe changes in properties that you might notice during each process and state whether the changes are chemical or physical.

Changes in Matter		
Event	Observable Changes	Type of Change
Baking a cake	1.	2.
Burning a log	3.	4.
Freezing water	5.	6.

Building Vocabulary

Fill in the blank to complete each statement.

- Any change that alters a substance without changing it into another substance is a(n) _____ change.
- _____ is anything that has mass and takes up space.
- A reaction that releases energy in the form of heat is called a(n) _____ reaction.
- A(n) _____ reaction is a reaction in which energy is absorbed.
- A chemical change is also referred to as a(n) _____.
- A(n) _____ is a solid formed from liquid reactants during a chemical reaction.

Lesson Quiz

Textbook
pgs. 163-168

Observing Chemical Change

Write the letter of the correct answer on the line at the left.

1. ___ Which of the following is true about chemical reactions?
A They are accompanied by changes in energy.
B They form new substances with new properties.
C both A and B
D neither A nor B
2. ___ In an endothermic reaction, energy is
A absorbed
B released
C converted to mass
D synthesized
3. ___ Which of the following is NOT a physical property?
A melting point
B state of matter
C density
D flammability
4. ___ Substances formed as a result of a chemical reaction are called
A catalysts
B precipitates
C products
D reactants

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

5. _____ In an exothermic reaction, products have more energy than reactants.
6. _____ Water boils at 100°C. This is an example of a chemical property.
7. _____ Substances that enter into a chemical reaction are called products.
8. _____ The ability to react with oxygen is an example of a chemical property.
9. _____ Another name for a chemical change is a chemical bond.
10. _____ In a physical change, some of the physical properties of the substance may be altered and the chemical composition remains the same.

*Textbook
pgs 170-178*

Review and Reinforce

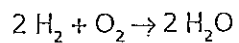
Describing Chemical Reactions

Understanding Main Ideas
Complete the table. Balance each equation. Then indicate whether the reaction is a synthesis, decomposition, or replacement reaction.

	Given Equation	Balanced Equation	Type of Reaction
1.	$\text{FeS} + \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2\text{S}$	a.	b.
2.	$\text{Na} + \text{F}_2 \rightarrow \text{NaF}$	a.	b.
3.	$\text{HgO} \rightarrow \text{Hg} + \text{O}_2$	a.	b.

Answer questions 4 and 5 on a separate sheet of paper.

4. Describe in words the reaction represented by the equation and include a description of the composition of each kind of molecule.



5. Use the law of conservation of mass to explain why the equation in question 4 is balanced.

Building Vocabulary
Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|-------------------------------|---------------------------------------------------------------------------------------------|
| 6. ___ chemical equation | a. substance present after a reaction |
| 7. ___ decomposition reaction | b. reaction in which substances combine to form a more complex compound |
| 8. ___ coefficient | c. principle that states that matter is not created or destroyed during a chemical reaction |
| 9. ___ product | d. reaction in which one element replaces another in a compound |
| 10. ___ reactant | e. substance present before a reaction |
| 11. ___ synthesis reaction | f. number telling how many molecules of a substance are involved in a chemical reaction |
| 12. ___ replacement reaction | g. reaction in which compounds are broken down into simpler substances |
| 13. ___ conservation of mass | h. uses symbols and formulas to show chemical reactions |

A

ctivity

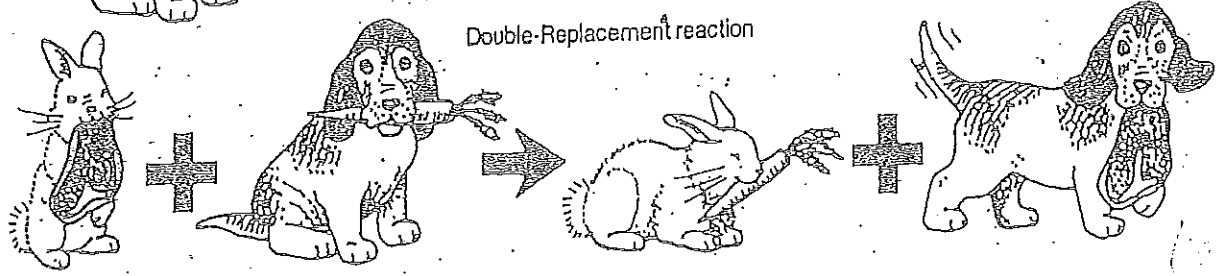
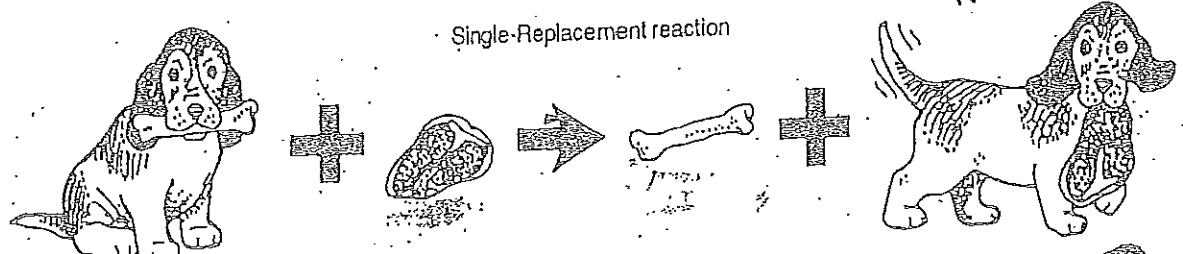
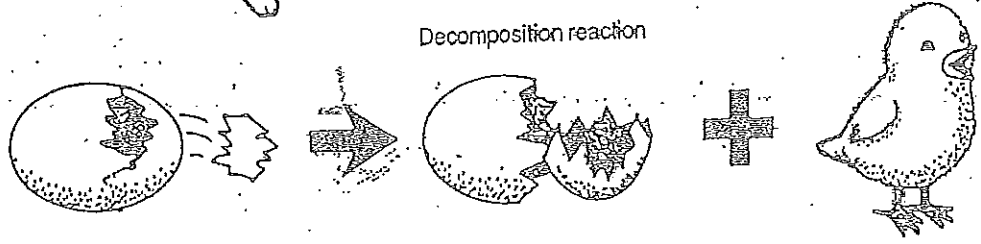
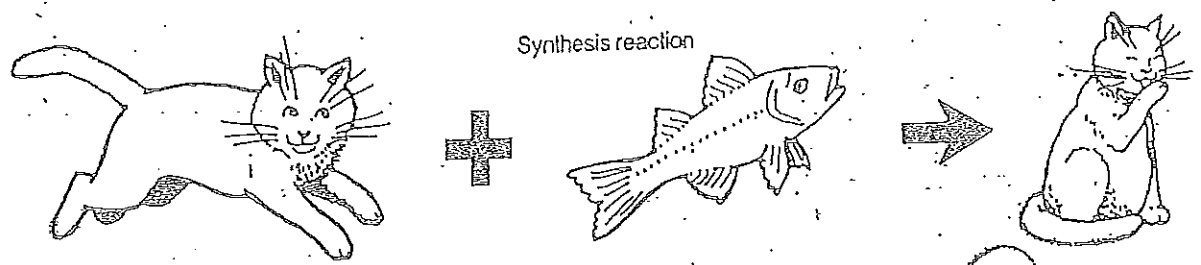
Chemical Reactions

Cartoon Chemistry

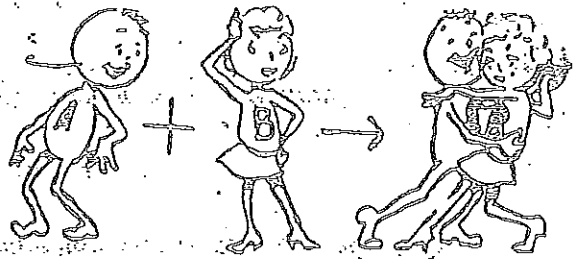
Remembering the four different types of chemical reactions can be quite confusing at first. This is especially true if you rely only on memorizing complex equations of symbols and formulas. If you enjoy drawing, however, you can use your creativity to help you understand the different reactions more easily. All you need is a sheet of paper or posterboard and something to draw with—you may choose to use colored pencils, crayons, pens, or markers.

What You Do

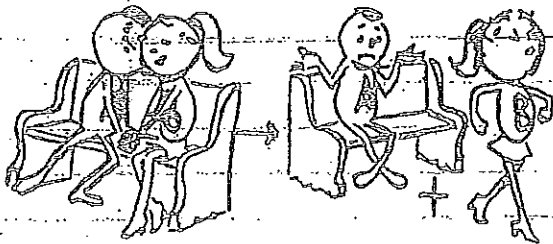
1. Analyze the sample cartoons below.



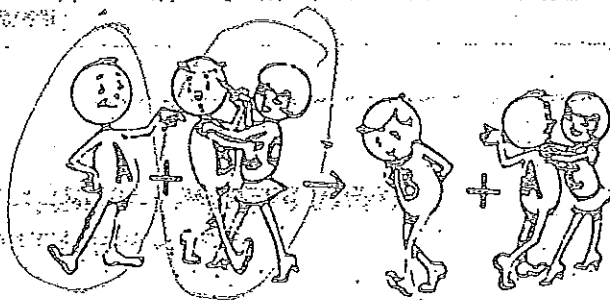
Synthesis (Composition, Combination)



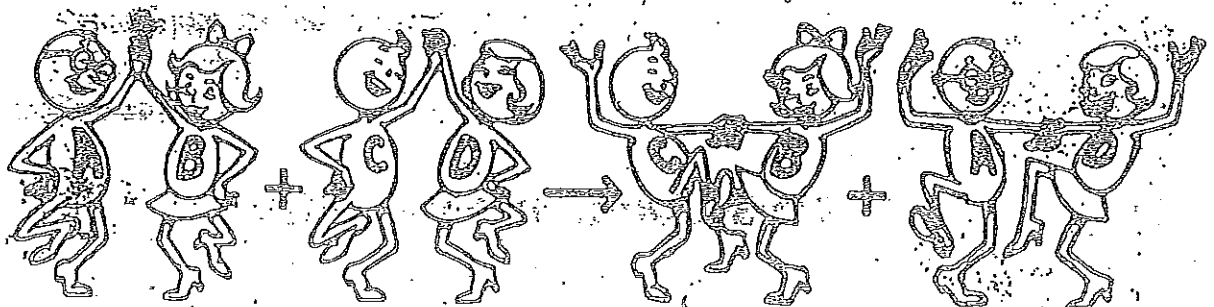
Decomposition



Single Replacement (Displacement)



Double Replacement



A Voyage through Equations

After working on this worksheet, you should be able to do the following:

- 1) Given an equation, you should be able to tell what kind of reaction it is.
- 2) Predict the products of a reaction when given the reactants.

Section 1: Identify the type of reaction

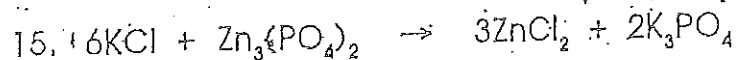
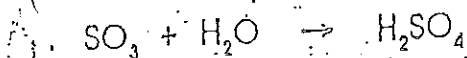
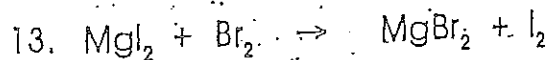
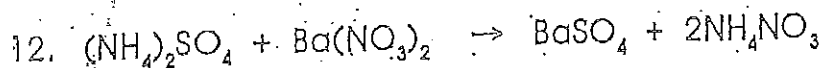
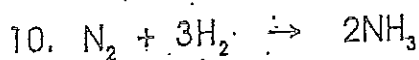
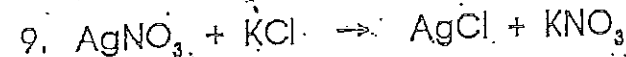
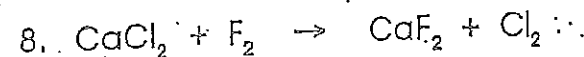
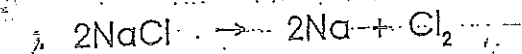
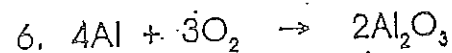
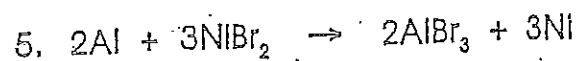
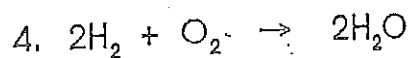
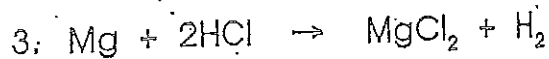
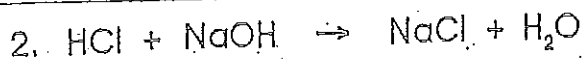
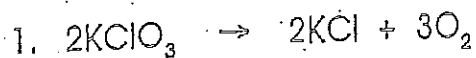
For the following reactions, indicate whether the following are examples of synthesis, decomposition, combustion, single displacement, double displacement, or acid-base reactions:

- 1) $\underline{\text{Na}}_3\underline{\text{P}}\underline{\text{O}}_4 + 3 \underline{\text{K}}\underline{\text{O}}\underline{\text{H}} \rightarrow 3 \underline{\text{N}}\underline{\text{a}}\underline{\text{O}}\underline{\text{H}} + \underline{\text{K}}_3\underline{\text{P}}\underline{\text{O}}_4$ _____
- 2) $\text{MgCl}_2 + \text{Li}_2\text{CO}_3 \rightarrow \text{MgCO}_3 + 2 \text{LiCl}$ _____
- 3) $\text{C}_6\text{H}_{12} + 9 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$ _____
- 4) $\text{Pb} + \text{FeSO}_4 \rightarrow \text{PbSO}_4 + \text{Fe}$ _____
- 5) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ _____
- 6) $\text{P}_4 + 3 \text{O}_2 \rightarrow 2 \text{P}_2\text{O}_3$ _____
- 7) $2 \text{RbNO}_3 + \text{BeF}_2 \rightarrow \text{Be}(\text{NO}_3)_2 + 2 \text{RbF}$ _____
- 8) $2 \text{AgNO}_3 + \text{Cu} \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$ _____
- 9) $\text{C}_3\text{H}_6\text{O} + 4 \text{O}_2 \rightarrow 3 \text{CO}_2 + 3 \text{H}_2\text{O}$ _____
- 10) $2 \text{C}_5\text{H}_5 + \text{Fe} \rightarrow \text{Fe}(\text{C}_5\text{H}_5)_2$ _____
- 11) $\text{SeCl}_6 + \text{O}_2 \rightarrow \text{SeO}_2 + 3\text{Cl}_2$ _____
- 12) $2 \text{MgI}_2 + \text{Mn}(\text{SO}_3)_2 \rightarrow 2 \text{MgSO}_3 + \text{MnI}_4$ _____
- 13) $\text{O}_3 \rightarrow \text{O} + \text{O}_2$ _____
- 14) $2 \text{NO}_2 \rightarrow 2 \text{O}_2 + \text{N}_2$ _____

CLASSIFYING CHEMICAL REACTIONS

Name _____

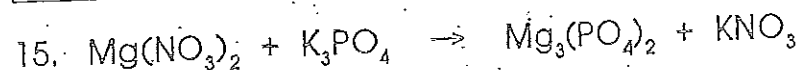
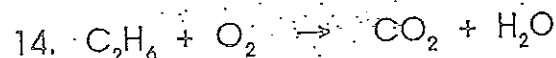
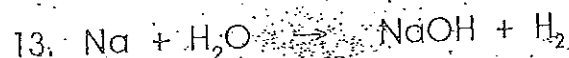
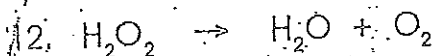
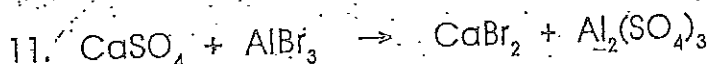
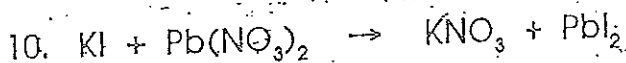
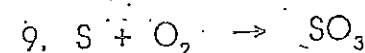
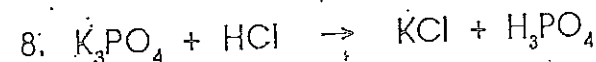
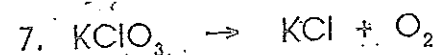
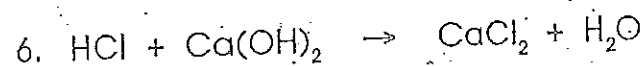
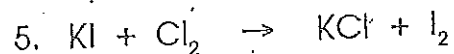
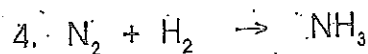
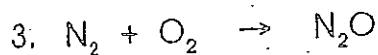
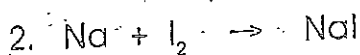
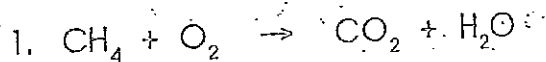
Classify the following reactions as synthesis, decomposition, single replacement or double replacement.



BALANCING EQUATIONS

Name _____

Balance the following chemical equations.

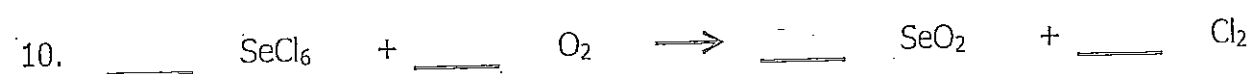
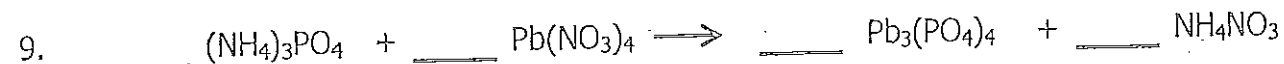
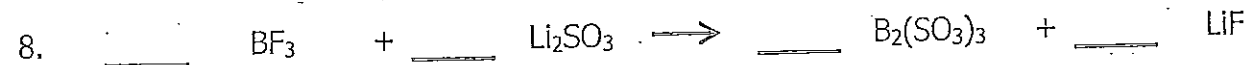
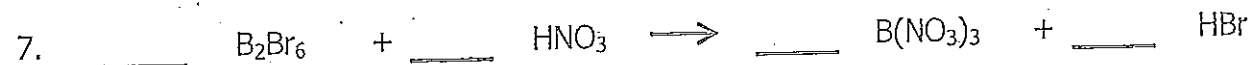
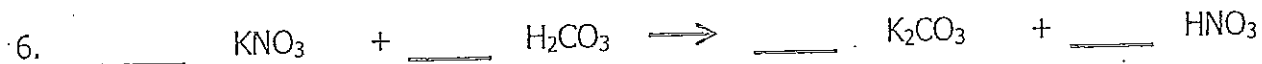
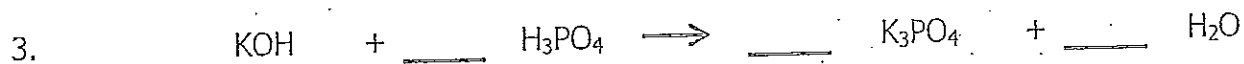
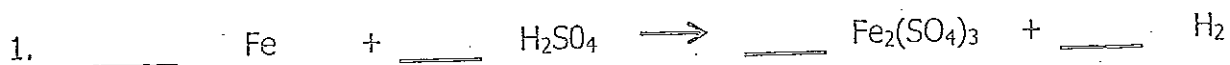


Name: _____

Date: _____

Balancing Equations

Balance the following chemical equations.

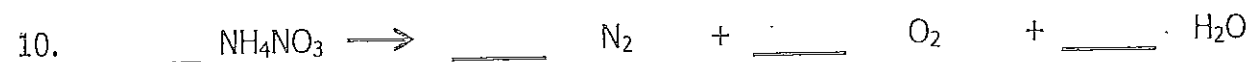
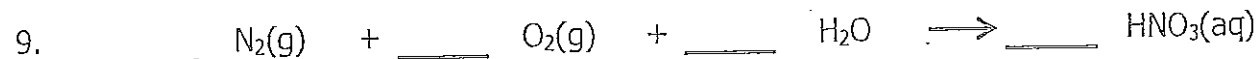
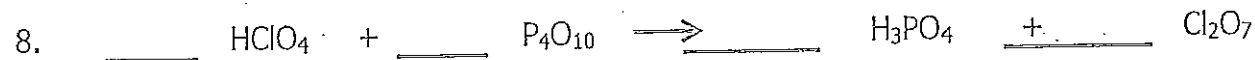
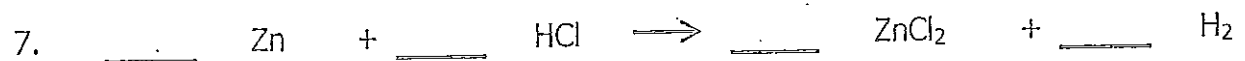
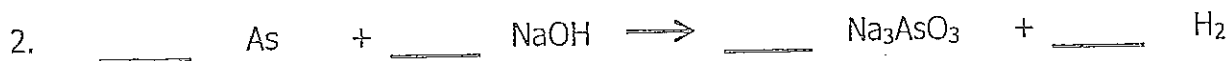


Name: _____

Date: _____

Balancing Equations

Balance the following chemical equations.



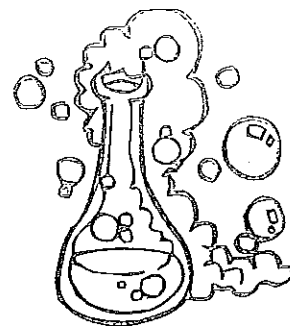
Section 2: Practicing equation balancing

Before you can write a balanced equation for a problem which asks you to predict the products of a reaction, you need to know how to balance an equation. Because some of you may not fully remember how to balance an equation, here are some practice problems:

- 1) $__ \text{C}_6\text{H}_6 + __ \text{O}_2 \rightarrow __ \text{H}_2\text{O} + __ \text{CO}_2$
- 2) $__ \text{NaI} + __ \text{Pb}(\text{SO}_4)_2 \rightarrow __ \text{PbI}_4 + __ \text{Na}_2\text{SO}_4$
- 3) $__ \text{NH}_3 + __ \text{O}_2 \rightarrow __ \text{NO} + __ \text{H}_2\text{O}$
- 4) $__ \text{Fe}(\text{OH})_3 \rightarrow __ \text{Fe}_2\text{O}_3 + __ \text{H}_2\text{O}$
- 5) $__ \text{HNO}_3 + __ \text{Mg}(\text{OH})_2 \rightarrow __ \text{H}_2\text{O} + __ \text{Mg}(\text{NO}_3)_2$
- 6) $__ \text{H}_3\text{PO}_4 + __ \text{NaBr} \rightarrow __ \text{HBr} + __ \text{Na}_3\text{PO}_4$
- 7) $__ \text{C} + __ \text{H}_2 \rightarrow __ \text{C}_3\text{H}_8$
- 8) $__ \text{CaO} + __ \text{MnI}_4 \rightarrow __ \text{MnO}_2 + __ \text{CaI}_2$
- 9) $__ \text{Fe}_2\text{O}_3 + __ \text{H}_2\text{O} \rightarrow __ \text{Fe}(\text{OH})_3$
- 10) $__ \text{C}_2\text{H}_2 + __ \text{H}_2 \rightarrow __ \text{C}_2\text{H}_6$
- 11) $__ \text{VF}_5 + __ \text{HI} \rightarrow __ \text{V}_2\text{I}_{10} + __ \text{HF}$
- 12) $__ \text{OsO}_4 + __ \text{PtCl}_4 \rightarrow __ \text{PtO}_2 + __ \text{OsCl}_8$
- 13) $__ \text{CF}_4 + __ \text{Br}_2 \rightarrow __ \text{CBr}_4 + __ \text{F}_2$
- 14) $__ \text{Hg}_2\text{I}_2 + __ \text{O}_2 \rightarrow __ \text{Hg}_2\text{O} + __ \text{I}_2$
- 15) $__ \text{Y}(\text{NO}_3)_2 + __ \text{GaPO}_4 \rightarrow __ \text{YPO}_4 + __ \text{Ga}(\text{NO}_3)_2$

Chemical Reaction Lab:

The Impatient Cork



Materials:

1 test tube

1 stopper

1 sheet or square of toilet paper

Approx. 1-2 cm of vinegar

Quarter size amount of baking soda

Procedure:

1. Place a quarter size amount of baking soda in the square of toilet paper.
2. Fold the toilet paper over so that the baking soda does not fall out. Then roll the toilet paper into an oval sized plug, small enough to fit into the test tube (do not insert into the test tube yet).
3. Place the designated amount of vinegar in the test tube.
4. Place the toilet paper roll filled with baking soda in the test tube.
5. Place the stopper into the test tube.
6. Hold your thumb over the stopper and shake the test tube a few times and remove your thumb promptly.
7. **DO NOT POINT THE TEST TUBE TOWARDS ANY CLASSMATES. DOING SO WILL RESULT IN AN UNFORTUNATE OUTCOME FOR YOU.**

*****Follow the lab report template to complete this assignment which is due the day after the lab procedure or per teacher discretion.

LABORATORY INVESTIGATION _____

PHYSICAL AND CHEMICAL CHANGES

Changes in size, shape, or state of a substance are called physical changes. The physical changes do not make the substance into a new substance. Changes in matter that produce new substances are called chemical changes. In this activity you will investigate some common physical and chemical changes.

MATERIALS

Test tubes, test tube holder, test tube rack, ring stand, wire gauze, glass beaker, iron nail, Bunsen burner, beaker tongs, ice, copper sulfate, spatula, watch glass, graduated cylinder, and wood splints.

PROCEDURE

1. Pour 5 ml of water into a clean test tube. Add $\frac{1}{2}$ spatula of copper sulfate to the test tube. Shake the test tube until the copper sulfate dissolves.

How does the water appear to have changed? _____

Do you think the copper sulfate is still present in the solution? _____

Did a physical or chemical change occur? _____

2. Now heat the copper sulfate solution until you see bubbles forming. Remove the solution from the flame and place an iron nail in it. Put the test tube aside, complete the rest of this lab, then check the nail to see what has happened.

3. Break a wood splint.

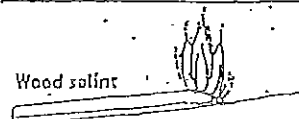
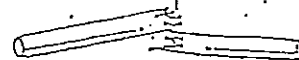
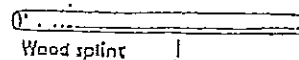
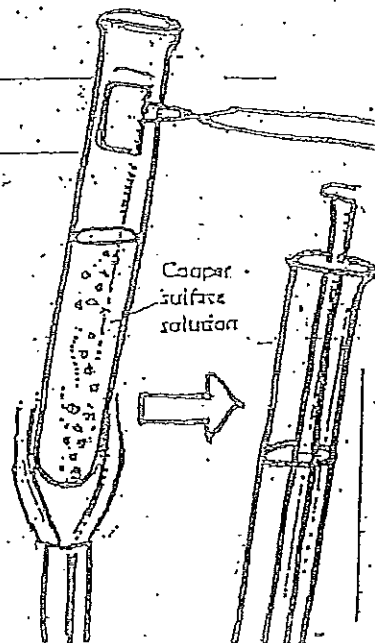
How are the pieces different from the splint? _____

4. Burn a wood splint and collect the ashes in a watch glass.

How are the ashes different from the wood? _____

5. Put an ice cube into a beaker. Heat the ice over the flame.

How does the ice change? _____



continued on the next page

6. Keep heating the beaker until the water begins to boil.
(Caution: Do not let the water boil out of the beaker.)
 Steam forms in the beaker.

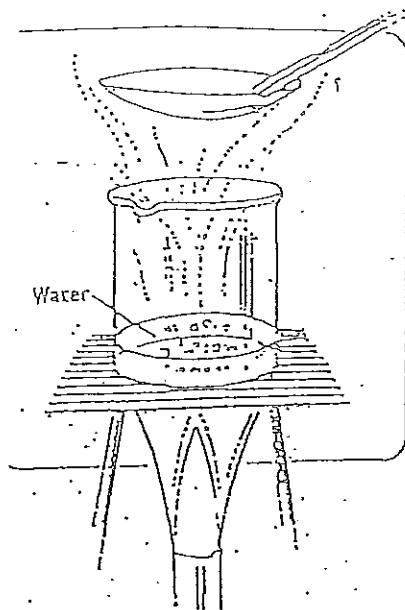
Where does the steam come from? _____

7. Hold a watch glass over the beaker.
Keep your hand away from the steam.

What substance forms on the watch glass? _____

Where did this substance come from? _____

Is this a new substance? _____



8. Now go back to the test tube with the nail in it that you put aside at the beginning of this activity. You will see that the nail appears to be coated with a new substance. If you examine the substance closely, you should be able to recognize it.

What substance has formed on the nail? _____

Where did this substance come from? _____

Did a chemical or physical change occur? _____

QUESTIONS

Use the observations you made to tell whether each change shown is a physical (P) or a chemical (C) change.

1. Breaking wood _____

2. Burning wood _____

3. Melting ice _____

4. Boiling water _____

5. Condensing water vapor _____

6. Dissolving copper sulfate _____

Write a definition for the following:

7. Chemical change _____

8. Physical change _____

Name _____ Hour _____

Exo/Endothermic LAB

Objective: To explore energy changes during two chemical reactions.

Materials for Each Group of 2

- Vinegar
- Baking Soda
- Baking Soda solution
- Calcium chloride
- glass flask
- Thermometer

Procedure:

1. Add 40 mL of the vinegar to a flask and place a thermometer in it.
2. Record the initial temperature
3. Add 8 g of baking soda
4. Record the temperature every 30 seconds
5. Rinse out flask completely
6. Add 30 ml of baking soda solution to flask and place a thermometer
7. Add 1 teaspoon of calcium chloride to the baking soda solution.
8. Record the temperature every 30 seconds

Chemicals	Initial Temp. in Celcius	30 Secs	30 Secs	30 Secs	30 Secs	30 Secs	Exothermic OR Endothermic
Baking Soda + Vingar							
Baking Soda Solution + Calcium Chloride							