EXPERIMENT #1

WHAT CHEMISTS DO: IDENTIFICATION AND ANALYSIS

PURPOSE:

1. To identify several common household chemicals by their chemical properties.
2. To analyze mixtures of common household chemicals of unknown composition.

PRINCIPLES:

Part of the fun of chemistry is being able to identify different substances by tests. To identify substances, chemists use reagents which are known chemicals or mixtures of chemicals. When a reagent is added to a sample being tested, it mayor it may not produce an observable change. Both the positive and the negative result will help identify the unknown sample being tested.

In this simple system of common household chemicals, four powders and three liquid reagents are used:

POWDERS	LIQUID REAGENTS
Baking Soda	White Vinegar
Corn Starch	Iodine Tincture
Alka Seltzer	Distilled Water
Table Salt	

A series of tests will be performed that will help you, to find out how each of the powders behaves when the liquid reagent is added.

When performing the tests, look for both POSITIVE RESULTS (color changes and the production of gas bubbles) as well as NEGATIVE RESULTS (no observable change) since both positive and negative results carry the same significance in chemical analysis.

After you establish the tests that identify or indicate a difference between the four powders, you will analyze three samples of unknown composition:

- Two of your unknown samples will be mixtures of two powders (identified with a number between 10 and 99).
- One of your unknown samples will be a mixture of three powders (identified with a number between 100 and 999).

RECORDING YOUR DATA:

1. Prepare data tables in your notebook using as a model those given in the Report Form.
2. After completing each step of the procedure, record your results in the data tables prepared in your notebook (not on the Report Form).
3. When you are sure of your observations and conclusions, ***THEN*** transfer your data to the Report Form.

PROCEDURE:

PART I: IDENTIFICATION

1. Place a small amounts (use your spatula) of the four powders in each of the 12 depressions of your spot plate as shown in the diagram below.

   Note that more is not necessarily better. A small pea size it adequate for testing. Too much sample may result is additional complications in the experiment.

   Contamination is the major cause for errors in this experiment. Be careful not to contaminate the liquids. Be careful not to contaminate each of your test samples.

2. Into three clean test tubes (need not to be dry), place about 2 mL of the White Vinegar, Iodine Tincture and Distilled Water. Label these test tubes. Place into each of the test tubes a Pasteur pipet. Throughout the experiment make sure that the same Pasteur pipet is always used for the same liquid reagent.

3. To each of the 12 solid samples, add a few drops of the three liquid reagents, in the manner indicated in the diagram below.

   Note that enough liquid should be added to cover the solid sample.

White Vinegar →	Baking Soda	Corn Starch	Alka Seltzer	Table Salt
Iodine Tincture →	Baking Soda	Corn Starch	Alka Seltzer	Table Salt
Distilled Water →	Baking Soda	Corn Starch	Alka Seltzer	Table Salt

4. Record your observations of the chemical reactions and briefly describe how you can identify each powder by its chemical reaction.

   Some examples of chemical reactions: Solid Formed, Color Change, Gas Evolved, Temperature Change.

PART II: ANALYSIS

1. Check out your three Unknown mixtures and record their numbers.
   Note: your unknown mixture may be a combination of the following: Baking Soda, Alka Seltzer, Corn Starch and Table Salt.
2. Test each unknown sample with each of the three liquid reagents in the same manner as it was done in Part I. Record the result of your tests.
3. State the composition of each mixture.
4. Determine the chemical composition of the four powders and of the three liquid reagents. You can do this by an internet search, reading the label or asking your professor.

EXPERIMENT #1

NAME: _____

DATE: _____

PARTNER: _____

WHAT CHEMISTS DO: IDENTIFICATION AND ANALYSIS
REPORT FORM

PART I: IDENTIFICATION

Results:

	Baking Soda	Starch	Alka Seltzer	Table Salt
White Vinegar				
Iodine Tincture				
Distilled Water				

CONCLUSIONS:

Briefly describe how you can identify each powder by **chemical analysis**. You conclusions should be brief, but to the point.

(HINT: Consider in which way the four powders are different from each other, based on their behavior towards the three liquid reagents).

A: Baking Soda:

B: Corn Starch:

C: Alka Seltzer:

D: Table Salt:

PART II: ANALYSIS

1. Report your unknown mixture numbers:

   Two-powder mixture: _____

   _____

   Three-powder mixture: _____

2. Results

	Unknown #	Unknown #	Unknown #
White Vinegar			
Iodine Tincture			
Distilled Water			

3. Conclusions:

   Two-Powder Mixture

   Unknown # _____ contains: _____

   _____

   Two-Powder Mixture

   Unknown # _____ contains: _____

   _____

   Three-Powder Mixture

   Unknown # _____ contains: _____

   _____

   _____