

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 may or 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:

<u>POWDERS:</u>	<u>LIQUID REAGENTS:</u>
A: Baking Soda B: Corn Starch C: Alka Seltzer D: Table Salt	I: White Vinegar II: Iodine Tincture III: Distilled Water

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 10-99)
- One unknown sample will be a mixture of three powders (identified with a number between 100-999).

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, transfer your answers on the Report Form.

PROCEDURE:

PART I: IDENTIFICATION

1. Record the composition of the four powders and of the three liquid reagents by reading the contents on the commercial package.
2. Break an Alka Seltzer tablet into two halves. Grind one half of the tablet into a powder using your evaporating dish as a mortar and the bottom of a test tube as pestle.
3. Place 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.
4. 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.
5. To each of the 12 solid samples add a few drops of the three liquid reagents, in the manner indicated in the diagram below:

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

6. Record your observations and briefly describe how you can identify each powder.

PART II: ANALYSIS

1. Check out your three unknown mixtures and record their numbers.
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.

WHAT CHEMISTS DO: IDENTIFICATION AND ANALYSIS - REPORT FORM

PART I: IDENTIFICATION:

1. Label reading:

State the composition of each of the four powders and each of the three liquid reagents:

A: Baking soda: _____
B: Corn Starch: _____
C: Alka Seltzer: _____
D: Table Salt _____

I: White Vinegar: _____
II: Iodine Tincture: _____
III: Distilled Water: _____

2. Results:

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

3. Conclusions: Briefly describe how you can identify each powder.

A: Baking Soda: _____
B: Corn Starch: _____
C: Alka Seltzer: _____
D: Table Salt: _____

PART II: ANALYSIS

1. Report your unknown numbers:

Two-powder mixtures: # _____ # _____ Three powder mixture: # _____

2. Results:

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

3. Conclusions:

(a) Two-powder mixtures:
Unknown # _____ contains: _____
Unknown # _____ contains: _____

(b) Three-powder mixture:
Unknown # _____ contains: _____