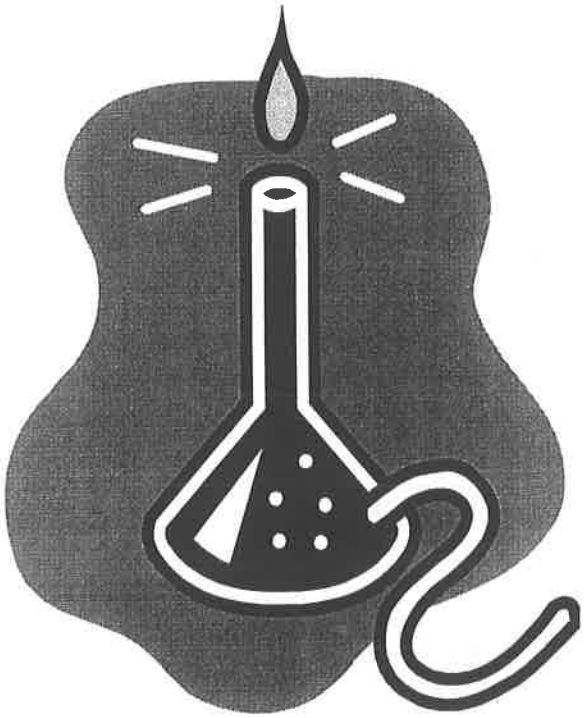
NAME:_____ DATE: _____

FLAME TESTS

PURPOSE:

INTRODUCTION:

The normal electron configuration of atoms or ions of an element is known as the "ground state". In this most stable energy state, all electrons are in the lowest energy levels available. When atoms or ions in the ground state are heated to high temperatures or bombarded by charged particles, some electrons may absorb enough energy to allow them to "jump" to higher energy levels. This excited state is not stable and the electrons "fall back" to their normal configurations. As the electrons "fall back" or return to ground state, the energy that was absorbed is emitted, or given off, in the form of visible light. The color of this light can be used as a means to identify the element involved. Such crude analysis is called a flame test.



Only metals, with their loosely held electrons, are excited in the flame of a Bunsen burner. Thus, flame tests are useful in the identification of metallic ions. Many metallic ions exhibit characteristic colors when vaporized in a flame. If the light emitted is passed through a prism or a spectroscope, it will separate into its characteristic spectrum. Each metallic element gives off its own bright light spectrum which is as unique as fingerprints are to man. In this experiment, characteristic colors of several different metallic ions will be observed and an unidentified ion will be identified by means of a flame test.

SAFETY:

MATERIALS:

PROCEDURE:

1. Wear your goggles and tie long hair back. Roll up long sleeves or lose sleeves.
2. Carefully light your Bunsen burner.
3. Take the solutions and remove the wooden splint in the solution with a test tube tong.
4. Place the wooden splint in the flame of the Bunsen burner
5. Record the color of the flame in your chart for each of the known solutions.
6. Use this information to identify the unknown substance.

DATA:

METAL	METAL ION	OBSERVATIONS
SODIUM		
POTASSIUM		
LITHIUM		
CALCIUM		
STRONTIUM		
BARIUM		
COPPER		
UNKNOWN		

QUESTIONS:

1. What inaccuracies may be involved in using flame test for identification purposes?

2. What pair of ions produced similar colors in the flame tests?

3. Explain how the colors observed in the flame test are produced.

4. Define the following terms:
   a. Quantum
   b. Ground State
   c. Excited State

5. How many protons, neutrons and electrons do <u>each</u> of the metallic ions have?