

## Flame Test Lab

### PURPOSE:

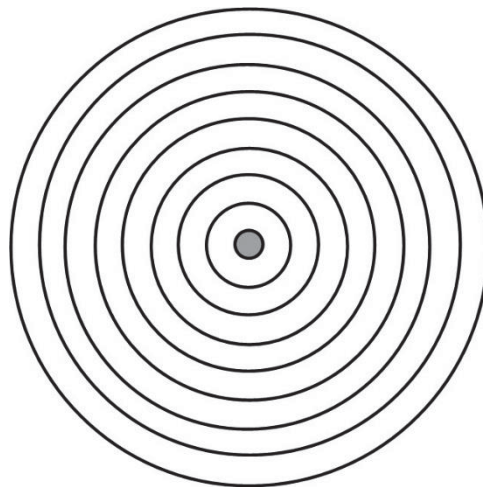
To observe and measure the atomic spectra of several elements and then use those measurements to make conclusions about the structure of the atoms that formed the spectrum and to identify the sample present in unknown solutions.

### PROCEDURE:

1. Fill a 250 mL beaker with tap water. This will be used to extinguish wooden splints.
2. Obtain a wooden splint from one of the metal chloride solutions.
3. Carefully light the Bunsen burner and slowly pass the wooden splint back and forth through the flame.
4. Carefully observe the flame and use the spectrosopes to measure the atomic spectra of each flame.
5. Record sample name, color of flame and the atomic spectra of the flame.
6. Carefully immerse the wooden splint in the tap water, and make sure it is fully extinguished.
7. Repeat steps 2–6 with another sample, until all samples have been tested.
8. Repeat steps 2–6 with the unknown samples. Determine which sample is present in this solution.
9. Once the laboratory work is complete, wash hands with soap or detergent.

### DATA TABLE:

| Sample            | Color of <u>Flame</u> | Atomic Spectra | <i>Assigned Unknown</i>  | Color of <u>Flame</u> | Atomic Spectra |
|-------------------|-----------------------|----------------|--|-----------------------|----------------|
| LiCl              |                       | 7   6   5   4  |  |                       | 7   6   5   4  |
| NaCl              |                       | 7   6   5   4  | Draw the electron movement for each spectral line from the spectra of your assigned unknown. |                       |                |
| KCl               |                       | 7   6   5   4  |  |                       |                |
| CaCl <sub>2</sub> |                       | 7   6   5   4  |  |                       |                |
| SrCl <sub>2</sub> |                       | 7   6   5   4  |  |                       |                |
| CuCl <sub>2</sub> |                       | 7   6   5   4  |  |                       |                |



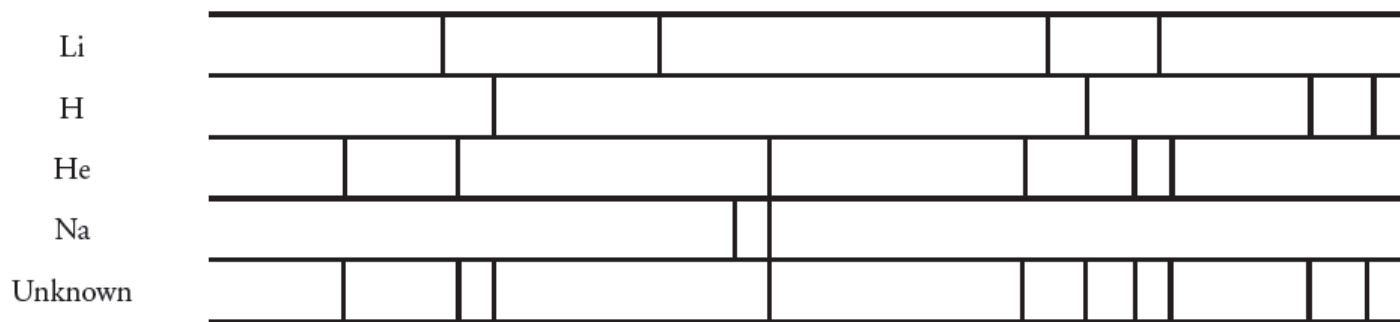
### POST-LAB QUESTIONS:

- 1) Explain how the spectral lines were formed by the compounds when they were heated.
  
- 2) Why do you think the chemicals have to be heated in the flame first before the colored light is emitted?

3) Identify your assigned unknown using, not only the flame color, but also the spectral lines and wavelengths. Justify your choice with a minimum of 1 written paragraph.

Unknown \_\_\_\_: Identity: \_\_\_\_\_ Justification:

4) Below are the diagrams for the bright line spectra of four elements and the spectrum of a mixture of unknown gases:



a. Which element(s) are not present in the Unknown? Justify your answer.

b. Which element(s) are in the Unknown? Justify your answer.

5) Purpose at least one possible method for improving the accuracy of the results in this lab experiment.