Honors Chemistry Name: Date:

Lab 4.1: Flame Test

Purpose: To identify an unknown chemical by using visible light spectroscopy by comparing the unknown spectra to the known spectra.

Equipment: reaction well plate, 9 wooden splints soaked in deionized water, lab burner, a few crystals of sodium nitrate, barium nitrate, calcium nitrate, copper nitrate, potassium nitrate, strontium nitrate, lithium nitrate and an unknown (Letter ___).

Hypothesis: *Reference what you should be able to do after making your observations and why these observations could help you identify the unknown.*

Procedure:

1. Be sure you are wearing your goggles and aprons.
2. Place a few crystals of each of the known chemicals, sodium nitrate, barium nitrate, calcium nitrate, copper nitrate, potassium nitrate, strontium nitrate and lithium nitrate into the wells of a spot plate using clean spatulas. Be very CAREFUL not to mix any of the chemicals together!!!
3. Obtain a wet wooden splint. Shake off the excess water. Touch the moistened splint to the first sample to be tested, sodium nitrate. A few crystals should stick to the splint. Carefully place them into the lower, outer region of your burner flame. Observe the color of the flame. Record your color **very accurately** in your data table.
4. **Repeat step 3 using a new wooden splint each time** until you have tested all of your known chemicals.
5. Mix a little copper nitrate with lithium nitrate. Observe the color of the flame.
6. Clean out your spot plate and rinse it with bottled water. Dry it very well.
7. Obtain your unknown sample from your teacher. Record the letter of your unknown into your data table. Repeat step 3 using your unknown sample. Match up your unknown to one of your known chemicals and identify it. Your grade will be based on your accuracy so you may want to double check your unknown test!!!
8. Dispose of the wooden splints in the trash. Wash any unused chemicals down the drain with lots of water.

Honors Chemistry Name: Date:

Data Table: Create an appropriate qualitative data table for your known and unknown chemicals.

Chemical	**Observation**
Sodium Nitrate	
Barium Nitrate	
Calcium Nitrate	
Copper Nitrate	
Potassium Nitrate	
Strontium Nitrate	
Lithium Nitrate	
Mix of Lithium Nitrate and Copper Nitrate	
CLEAN CHEMICALS DOWN THE SINK AND RINSE YOUR WELL PLATE BEFORE MOVING TO UNKNOWNS	
Unknown: Letter _____ Unknown Letter _____	

Honors Chemistry Name: Date:

Analysis: What chemical do you believe <u>your</u> unknowns are? Provide **evidence** to support your choice. Make sure to include your unknown letter!

Questions:

1. Based on your results and observations would this method be practical in determining the identity of metal ions in a mixture? Explain your reasoning.

2. Does the metal ion determine the color of the flame, or does the nitrate ion determine the color of the flame? Explain how you know.

3. How is this lab related to the events that take place on 07/04/20XX?

4. Describe the common characteristics of an emission spectrum that would be observed if a spectroscope were used, instead of your eyes, while you made your observations.

5. Why do metal ions produce different colors?

6. Explain, referencing electrons, how light is produced when chemicals are burned.

7. Look up two other types of spectroscopy. Explain how they work and what they are used for in the real world.

   Type 1:

   Type 2: