SCH Name:_____

Flame Test Lab

Purpose

To create a key for the colours produced by metal ions in solution when heated in a flame.
To use the key to identify unknown metal ions in solution.

Materials

Samples of metal ion solutions Bunsen burner Test wire

Procedure

1. Work in pairs.
2. Properly set up and light a Bunsen burner to produce a blue flame.
3. Test one solution at a time. Use the metal loop to pick up a small amount of the solution. Place the wire in the flame for a few seconds.
4. Record your observations. Repeat for all 7 samples.
5. Follow steps 3 and 4 to test each of the 5 unknown samples.
6. Place all equipment and solutions back in their appropriate places and clean the desks.

Safety

$CuSO_4$ (copper (II) sulfate) and $BaCl_2$ (barium chloride) are highly toxic by ingestion; avoid contact with eyes, skin, and mucous membranes.
LiCl (lithium chloride) is moderately toxic by ingestion; avoid contact with eyes, skin, and mucous membranes.

Observations

Table 1:_____

Known Sample	Chemical Symbol of metal ion	Flame colour

Table 2:_____

Unknown Number	Flame colour

SCH Name:_____

Questions

1. Identify the unknown compounds. How confident are you in your conclusions? Explain why.

2. Could flame tests be useful in determining identities of metals in a mixture of two or more salts? If so, what problems may arise? If not, why not? EXPLAIN your answer.

3. What must happen to the electrons in atoms for them to produce light in an element's characteristic colour?

4. What are two other applications of flame colours?

5. When an electron drops from a high energy level to a lower one, it emits a photon. If the energy change is large, then the wavelength is small. If the energy change is small, then the wavelength is large. Which represents a larger change in energy, a red photon, or a blue photon? Why?

6. Why do different metals have different characteristic flame colours? Hint: Think about the model of the atom and energy levels.

7. You observe a beautiful fireworks display. In the finale, a single firework starts green, then turns yellow, then red - just like a traffic light. Draw a diagram of the composition of the firework.