Name: _____ Pd____ Sci#___

# Lab: Element Flame Testing 1pt ec printing

**Objective:** To observe the _____ property of _____ & use _____ to identify the unknown substances based on the _____ they burn which is a _____ property.

## Background Knowledge:

1. All of the chemicals are _____, which is any compound made of _____ (a halogen) & a metal from group _____ (Alkali metal) or _____ (Alkaline Earth metals).
2. When a metal salt is burned, the heat raises the energy in the metal atom to a higher energy state. It becomes an excited atom. An excited atom is unstable since the lower levels do not have complete shells. Electrons will release the extra energy and to return back to the stable ground state.
3. Different elements need different amounts of energy to reach the excited state, so they release different amounts of energy when they return to the ground state. When the energy is emitted as light, each element produces a unique & predictable color.

| Metal | Color |
|---|---|
| Barium | Yellow-green |
| Calcium | Orange-red |
| Copper | Blue-green |
| Lithium | Crimson Red |
| Potassium | Pale Violet |
| Sodium | Yellow |
| Strontium | Red |

## Safety First!

1. You must wear goggles at all times– these chemicals sizzle!
2. Do NOT touch the salts. If you do, wash immediately.
3. Keep hair tied back and sleeves rolled up.
4. Pay attention to what you are doing and to those around you.

**Materials:** beaker, wood splints, paper towels, safety glasses, oil candle, salts

## Procedures:

1. Read the following directions, steps 2 - 10, as a group before starting.
2. Fill the beaker with water & place the candle on a paper towel.
3. Raise your hand to begin. Your teacher will light the candle.
4. Choose one vial. **OBSERVE** it with eyes only. Write down its physical properties on the data table.
5. **PREDICT** the flame color of this salt & record on the data table.
6. Dip the end of the wood splint (about ½ cm only) into the salt until you've collected a *small* amount of salt on its tip.
7. Slowly aim the end of the splint into the *side* of the flame, not directly above it. Look very carefully, the flame might briefly change color around its outside! Observe & **RECORD** the actual flame color**.**
8. Dunk the splint in the water to extinguish. Smoke or fire? DUNK IT IMMEDIATELY!
9. Repeat steps 4-8 for each vial, but use another splint or an opposite end. Please be very careful to NOT mix any of the salts or to get water in the vials.

**Clean Up:**

- Throw away used paper towels & splints.
- Make sure all vials are sealed tightly & placed in the plastic bag.

## Data Table *28 pts*

| Vial # | Observations – Physical Properties | Predicted Color | Actual Color | Predicted Element |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |

## Analysis & Conclusion *(11 points)*

1. Which of the salt compounds tested was your favorite and why?

_____

_____

2. How many of your color predictions were accurate, not accurate? Any major surprises?

_____

_____

3. Why do halogens, like chlorine, tend to form compounds with the alkali metals?

_____

_____

4. Let's say your friend was absent for this lab. Write them a note, with 5 safety tips, explaining how to be safe when working with flames in a lab.

1. _____

2. _____

3. _____

4. _____

5. _____

5. Imagine you work for a fireworks company and have access to the salt compounds you used in today's lab. Using 3 or more compounds, create a firework. What are the special effects and in what order would they appear? Use pictures to help explain how your firework would look.

_____

_____

_____

_____

_____

_____

Put picture here: