**Colourful Fireworks**

Have you ever wondered why fireworks are so colourful? Today you will learn the  
secret of this mystery while demonstrating safety with the Bunsen burner.

**Question to ponder:** What do you think gives fireworks their bright colours?

**Materials:** 8 -Labelled test tubes with different salt solutions in a test holder; 8-wooden splints;  
 Bunsen burner; flint (lighter); safety goggles; saran wrap to cover test tubes/splints after use

**Safety:**

* Push chairs in and stand while working with Bunsen Burners. Do not lean over the Burner at any time.
* Remove loose clothing and tie back long hair.
* Wear safety goggles at all times!
* Take Extreme Care when lighting a Bunsen burner – never leave the lit burner **unattended.**
* Avoid moving around the room when other burners are lit!
* Attempt to spark flint up to three times when lighting (turn off gas before it stinks)
* Always turn Bunsen burner off using the main gas valve attached to the hose!
* Dip wooden splints back in salt solution if they catch fire.
* Take care when collecting wooden splints from test tubes that you return them to the  
  correct salt solution.
* Only test one wooden splint soaked in salt solution at a time.

**Procedure (to be completed in groups of three):**

1. Collect your bin with materials. Walk slowly to avoid tipping over test tubes in the bin.
2. Connect the Bunsen burner to the closest gas outlet using the tube.
3. Check the flint to ensure each person can spark the flint.
4. Follow steps to practice lighting the Bunsen burner until each person in group has attempted to light the Bunsen burner. **Turn of the burner using the main gas valve!**

**Begin Fireworks Lab Activity**

1. Take the test tube holder with test tubes out of bin and place on table near the Bunsen burner.
2. Carefully remove stoppers/saran wrap covering test tubes (leave in bin). If needed, put one wooden splint into each labelled test tube. (only block D does this)
3. **The teacher will turns out lights so blue flames and colour changes are visible**.
4. Light the Bunsen burner to get a small orange flame then adjust the barrel to get a small blue flame.
5. Remove a pre-soaked splint from one test tube.
6. Place only the wet tip of the wooden splint into the hottest part of the frame (near the upper portion of flame where the inner blue flame meets the outer flame.
7. Look for a colour change. Remove the wooden splint from the flame before it starts to burn!  
   If the wooden splint catches fire carefully re-immerse it into the salt solution to put out the flame.
8. Record the colour of the flame seen for the given salt in appropriate spot in the **Table of Observations.**
9. Put the wooden splint back in the correct salt solution. Procedure continues on the next page!
10. **Repeat steps 9-13 with wooden splints from different salt solutions.**
11. The Table of Observations should be complete.
12. Turn off your Bunsen burner. Use the main gas valve. The handle should be at 90 degrees to the nozzle.
13. Sit and wait for the teacher to turn the lights on. All students should be done.
14. When the burner has cooled down remove the rubber tubes from the nozzles and place them back in the bin.
15. **Block D:** Cover the test tubes and splints with saran wrap and place them in the bin.  **or**  
    **Block A:**  Remove the used wooden splints from test tubes and place them into the garbage. Then return test tubes and rack to the bin.
16. Carefully return bins to the counter.
17. Complete analysis questions only when burner is off and it is safe to do so!

**Chem 4 – I can name and write chemical formulas for ionic compounds. Emg Dev Prf Ext**

**Table of Observations Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
| **Give Chemical Name** | **Chemical Formula** | **List ion ratio for Metal and Non-metal Ions in each Compound!** | **Colour of Flame** |
|  | NaCl | **1 – Na+ : 1 – Cl -** |  |
|  | BaCl2 |  |  |
| calcium chloride |  |  |  |
| lithium chloride |  |  |  |
|  | CuCl2 |  |  |
|  | KCl |  |  |
|  | Sr(NO3)2 |  |  |
| Unknown |  |  |  |

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Partners\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Comp 3 – I can process, analyze, and evaluate results to write a conclusion and critique results/experiment design. Emg Dev Prf Ext**

**Analysis:**Based on your Table of observations **is the metal or non-metal ion responsible for the change in the colour of the flame** that was seen when the wooden splint was burnt? How do you know?

Use your observations to predict what colour flame would be produced by each of these ionic compounds.

|  |  |  |
| --- | --- | --- |
| **Compound Name** | **Chemical Formula** | **What colour flame would be seen?** |
| calcium nitride |  |  |
| potassium oxide |  |  |
| lithium sulphide |  |  |
| copper (II) selenide |  |  |

Fireworks are a myriad of bright colours that light up the sky at night. **What elements** might be responsible for producing the following colours?

|  |  |
| --- | --- |
| Green \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Red \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Yellow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Blue \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Lilac Purple \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Orange/Yellow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Bright white \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Dark red \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |