

Student name: Abivansh Arva

Student number: 201750975

CLEAR No. 4

Word count: 453

[Include only words written under the five criterion headings below. Exclude all section headings. Words over the 500 limit will NOT be marked.]

## **Wait, How Do Fireworks Get Their Colour?**

### **My chosen context (63)**

Many individuals find fireworks fascinating, as are the night sky's colors, patterns, and noises. I've always wondered why fireworks take a while to explode after being set off, how they attain their colors, and how they form intricate patterns. As humans, individuals excel at comparison, especially when analyzing patterns. I believed that comparing one variable should be enough to identify an unknown substance.

### **Theoretical concepts/ideas (54)**

Through the chemistry labs below, I have discovered answers to many of my childhood questions and realized the significance of comparison.

- Reactivity (Wet lab 4)
- Identifying unknown substances with more than one variable (Dry Lab 4)

Wet Lab 4 uses the flame test to test for reactivity, sparking my curiosity about how fireworks work.

### **My prior assumptions (123)**

Before undertaking this lab, I held the belief that identifying unknown substances typically involves recognizing patterns. However, this lab has enlightened me to the fact that the color of fireworks is dependent on the specific metal used in their composition. The colors are typically influenced by the electronegativity of the metal in question. While recognizing patterns is a useful method for identifying unknown substances, it is not as accurate. This lab has revealed to me that comparison becomes more accurate when you possess existing data about the subject. Utilizing multiple variables in data comparison increases the robustness of conclusions, contributing to a more robust experimental design. This approach reduces the

susceptibility of findings to potential falsification, aligning with the goal of scientific experiments.

### **What I learned (116)**

As we advanced through the reactivity experiment using the flame test, I came to understand the influence of electronegativity on the vibrant colours of fireworks. Observing the progression along the periods of the periodic table, it became evident that different metals have different colour when exposed to flame. In my General Education class, I've gained an appreciation for the inherent falsifiability of scientific experiments and hypotheses. The essence of experimentation lies in the effort to diminish this falsifiability. This particular experiment has depicted the importance of incorporating multiple variables when comparing data. The inclusion of more than one variable significantly enhances the robustness of conclusions, contributing to a more comprehensive and reliable interpretation of the results.

### **Reflecting on what I learned (97)**

Navigating my higher education journey in Chemistry, this lab helped in the pursuit of unraveling the mystery behind the diverse colors of fireworks, my curiosity has extended to understanding how reactivity plays a role in delaying the explosion of fireworks once ignited. In essence, this lab has not only fueled my curiosity about the chemistry of fireworks but has deepened my appreciation for chemistry in general. Moreover, this laboratory experience has underscored the value of incorporating multiple variables in experimental design. This would be significant help when trying to design a robust experiment in the coming future.