# CALIFORNIA STATE SCIENCE FAIR
## 2012 PROJECT SUMMARY

**Name(s)**
Eliana Stone

**Project Number**
**J0625**

**Project Title**
## Trends in the Emission Spectra of Elements

**Abstract**

**Objectives/Goals**
The overall goal of my project is to understand how the visible emission spectrum of an element may relate to its position in the periodic table. The first objective is to determine whether elements in the same group within the periodic table emit similar spectra of visible light. The second objective is to determine whether an element will have more colors and lines if it has a higher atomic number. The third objective is to determine whether spectra will be different enough to distinguish one element from another.

**Methods/Materials**
The materials were lithium, sodium, potassium, calcium, and cupric chloride salts, wooden splints, and distilled water. The equipment was a gas-stove burner and a quantitative spectroscope (a calibrated prism). To conduct my experiment, I put each of the individual salts or no chemical at all (as a control) on dampened wooden splints, and held each of them in turn in the stove#s flame. I then recorded three repeated measures of the emission spectrum observed for each salt.

**Results**
The first result was that the emission spectra of the three elements tested within Group 1 (lithium, sodium, potassium) were not similar. The second result was that the elements with a higher atomic number did not necessarily have more lines and colors in their spectra (e.g., lithium chloride had more lines and colors, but a lower atomic number than sodium). The third result was that the five elements tested all had distinct visible emission spectra.

**Conclusions/Discussion**
The main conclusion is that my hypotheses were only partially supported. The data support my third hypothesis, that the emission spectra of different elements are distinguishable, at least for the five elements tested. The data however did not support my first hypothesis, that elements in the same group will have similar emission spectra, nor my second hypothesis, that elements with a higher atomic number will necessarily produce more colors and numbers of lines.

**Summary Statement**
My project determined that the visible emission spectrum can be used to distinguish between elements, but that there was no consistent effect of group or atomic number.

**Help Received**
My mother and father helped me conduct my experiment, by holding the salts in the flame, and helped me assemble my poster and edit my abstract.