



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Sierra H. Laird</b>	<b>Project Number</b> <b>J0511</b>
<b>Project Title</b> <b>The Effect of Different Chemicals on the Color of Fire</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to see how different chemical substances react with fire to produce different colored flames.</p> <p><b>Methods/Materials</b> Materials: Safety goggles, latex gloves, apron, nickle chromium inoculating loops (2), propane campstove, butane lighter, 1 plastic spoon for each of the 9 chemicals, 1 3-inch aluminum foil square for each chemical, camera, 1 c hydrochloric acid, distilled water, Rainbow Moments birthday candles, dry pinecones, paraffin wax, Chemicals (1 T each): copper sulfate, copper chloride, sodium borate, sodium chloride (sea salt and table salt), potassium chloride, calcium chloride, strontium chloride, magnesium sulfate. Method: Materials were ordered and gathered. I did research on safety issues, flame tests and chemical reactions. My aunt and mother helped me with the experiments. We put on safety goggles and aprons and conducted the tests outside. We cleaned the jars, spoons and table. We put each chemical into a jar with some distilled water and let it dissolve. We put the tip of a loop into the solution and then into the flame and recorded and photographed the color. Between each test we cleaned the loop with hydrochloric acid and also cleaned the table from any contamination. We also coated pinecones with paraffin wax and different chemicals.</p> <p><b>Results</b> All of my results were either the same or slightly warmer than the researched predicted results. The nickle chromium loops added a small amount of orange which explains why some results were slightly warmer. When I put the pinecones with strontium chloride onto a bonfire, they produced bright red flames.</p> <p><b>Conclusions/Discussion</b> Different chemicals react with fire to produce different colored flames because the electrons moving around the nucleus have different energy levels in each element. When heated, the electrons get excited and move to a different orbit and as they cool down they move back to their normal orbit and this extra energy produces light waves. Each element has different amounts of extra energy, producing different colors.</p>	
<b>Summary Statement</b> My project consists of flame testing different chemicals to determine the color of flame they produce.	
<b>Help Received</b> My mother and aunt helped me in finding some of the researched websites. They ordered the chemicals and loops and helped me with the experiment. They also helped me to figure out the type of graph that would show my results the best.	