



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Danny J. Lee</b>	<b>Project Number</b> <b>J0519</b>
<b>Project Title</b> <b>Coral: Disguised or Bona Fide: The Chemical Analysis of Authentic and Artificial Red Coral</b>	
<b>Objectives/Goals</b> Which chemicals and methods can identify real coral from counterfeit ones? Which solvent can remove the artificial colors from coral efficiently? Which synthetic dyes and conditions can colorize white coral effectively?	
<b>Abstract</b> <b>Methods/Materials</b> Experiment A: (1) Test of the reactions of coral with acetone, alcohol, ammonia, NaOH, Drano, HCl, vinegar, phosphoric acid, and NaCl with 81 different coral samples. (2) Test of density on eight different coral samples with a graduated cylinder, electric scale, and calculator. Experiment B: (1) Test of the reactions of coral with different concentrations of HCl using balloon and lime solution methods. (2) Same test but in a reduced amount of solution. Experiment C: Test of the removal of artificial dyes from coral with bleach, hydrogen peroxide, Simple Green cleaner, stain remover, paint remover, Gel Gloss cleaner, and Goo Gone cleaner. Experiment D: (1) Test of the colorization of coral with base, acid, disperse, direct, and KMNO(4) synthetic dyes in room temperature. (2) Same test but in heated temperature. (3) Test of the colorization of coral with red base dyes in various NaOH solution concentrations in heated temperature for different time periods. <b>Results</b> Experiment A and B: Genuine coral reacted with HCl to produce CO(2), which filled up the balloon and reacted with a lime solution to form white limestone. Also, the density of real coral was 2.72 g/ml. Experiment C: Bleach was the best artificial color removing solvent that did not destroy coral's texture. Experiment D: A synthetic red basic dye in a 15% NaOH solution colorized the white coral effectively in a heated condition for thirty minutes. <b>Conclusions/Discussion</b> The experiments show that real coral reacts with HCl in concentrations of 40% and above to form CO(2) efficiently, and a 10% HCl solution can react with coral and will not cause mass reduction. Also, bleach is the best color removing solvent, and a 15% NaOH in a synthetic basic red dye is the best color enhancing solution. It is important to understand the properties of coral, so people can identify counterfeit coral sold in the market and avoid financial losses. The various chemicals applied in the experiments can help chemists analyze coral (calcium carbonate) more in depths and find new uses of this compound. Marine biologists can also use this information to further research for more knowledge of coral's commercial uses.	
<b>Summary Statement</b> Using different chemicals and chemical methods, experiments were done to identify real red coral from fake ones, to remove the artificial color, and to find dyes that can enhance inexpensive white coral's color into a valuable red color.	
<b>Help Received</b> Mrs. Williams for her guidance and instructions. My dad for his essential advice and tips. My mom for gathering supplies.	