



CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s) Sharon Tang	Project Number J0515
Project Title Ions Lend a Hand to Conductivity	
Abstract Objectives/Goals Question - How do the concentrations of different solutes affect the conductivity of water? Hypothesis - I believe that the higher the concentration of solute in an ionic solution, the higher the concentration of ions will be present. When the concentration of ions is higher, the conductivity of the solution should rise. Manipulative variables - Concentrations of solutes in their solutions and the different solutes. Dependent variable - Conductivity of the solutions. Methods/Materials Method - In this experiment, various amounts of three different solutes were added to water and the changes in conductivity were observed. Other variables that affect solution conductivity such as temperature, contact areas between solution and electrodes were kept constant. Copper electrodes were taped to a container to measure resistance of a solution as the amount of solute was varied. Gentle stirring of the solution was required to reduce "polarization" (the clouding of ions around electrodes). Materials - NaCl, KCl, Sugar, Distilled Water, Digital Volt Meter, Scale & Copper electrodes. Results 1. In general, adding salt to the solution led to greater conductivity. 2. I discovered that the resistance of the solution increased over time, if I let it sit alone. I found that this was due to #polarization# and gentle stirring can reduce it. 3. Sugar does not boost the conductivity as much as salt does. 4. Possible inaccuracies: a. Tap water was used to rinse the containers adding contaminants. b. Instruments# inaccuracies. c. Impurities in solutes. d. Resistance measurements fluctuated depending on how hard I stirred. e. Salts may not have fully dissolved due to saturation. Conclusions/Discussion 1. In general, the higher the number of moles of salt in a solution, the higher the conductivity will be. 2. Only by adding certain solutes will the conductivity of the solvent increases significantly. Solute like sugar (that forms molecular solution) do not increase the conductivity of water by much compared with salts (that forms ionic solution). 3. Distilled water is not a very good conductor but tap water is probably due to all of the impurities it has. 4. Polarization can distort the conductivity measurement of a solution. Gentle stirring can reduce this phenomenon. 5. Solution conductance may help to check quality of chemical products quickly.	
Summary Statement To study the effect of the concentration of some solutes in water on the conductivity of the solutions.	
Help Received I nearly gave up on this topic when I first encountered the polarization effect which was unknown to me but my parents encouraged me to keep looking for a solution. Mr. Evans, my science teacher, taught me how to do a science fair project.	