



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kevin Shih</b>	<b>Project Number</b> <b>S0229</b>
<b>Project Title</b> <b>The Effect of Solutes on Drag</b>	
<b>Objectives/Goals</b> The purpose of this project was to find the effect of solutes on drag in an aqueous solution.	
<b>Abstract</b> <b>Methods/Materials</b> Materials used include: 5.0L of 0.5M Sucrose solution, 0.5M Sodium chloride solution, 0.5 M Sodium bicarbonate solution, 0.5 M Sodium carbonate monohydrate solution, and water; 2.43 m long 50.8mm black PVC pipe, Digital Scales, 37.4g 25.4mm magnetic ball, Ferrite ring magnet, 2 50.8mm plastic pipe fittings, 4 1L plastic bags, 2 magnetic reed switches, 4 copper wires, AA battery holder, Line-in input wire, 5 10L buckets, and one 500mL beaker. The PVC pipe was filled with solution and the magnet was dropped into the solution. The magnet caused each switch on the parallel circuit to close, generating two pulses of electric current. The time elapsed between the two pulses was measured using an audio recording program and line-in, which allowed the drag coefficient of the solution to be calculated (using the drag equation).	
<b>Results</b> The drag coefficients of the solutions were found to be as follows: Sodium Chloride: 19.05, Water: 19.33, Sodium Carbonate: 20.96, Sucrose: 21.25, Sodium Bicarbonate: 22.15. Using graphs and linear regression of the data, it was found that there was a moderate positive linear correlation between the molar mass of the solute and coefficient of drag. A strong negative correlation was found between solubility and coefficient of drag.	
<b>Conclusions/Discussion</b> Based on the data, the first part of the hypothesis, that molar mass of a solute will have a positive correlation with the coefficient of drag of the resulting solution is supported. However, the second part of the hypothesis, that the solubility of a solute will have a positive correlation with the coefficient of drag is not supported.	
<b>Summary Statement</b> The central focus of this project is to find the relationship between solute properties and drag of the resulting solution.	
<b>Help Received</b> Father helped with setting up the experiment and bought some materials used in the experiment.	