



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Ronak S. Singh	Project Number J2123
Project Title The Effect of Ambient Temperature on the Performance of Hybrid Cars	
Abstract Objectives/Goals The objective of this experiment was to determine the effect of ambient temperature on the performance of a hybrid car. Methods/Materials A lithium-polymer battery was used to simulate the electrical component of the powertrain in the gasoline electric hybrid car. The battery was charged at four different temperatures: 31F (freezing), 42F (mild winter), 72F (room temperature) and 125F (summer in the Northern California valley). The battery was discharged by connecting it to a motor and running it at a fixed current until the battery was discharged. The battery was then charged to full capacity and the amount of charge it took was recorded. Results When the battery was charged at the summer temperature of 125F, it held the most charge. It also charged to capacity at 72F and 42F. When the battery was charged at the freezing temperature of 31F, it did not hold much charge. When the frozen battery was warmed up and recharged, it attained full capacity. Conclusions/Discussion Based on my findings, a hybrid car would work well in my hometown, Chico, CA. The electric component of a hybrid car would not work well in temperatures below freezing until the battery warmed up. A hybrid car would not perform as efficiently in colder climates such as in Alaska, especially on shorter commutes. A plug-in hybrid, which solely works on battery power, would be most negatively impacted.	
Summary Statement My project is to determine the effect of ambient temperature on the performance of a hybrid car.	
Help Received My father helped with the experimental setup.	