



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jacob A. Bartholomew</b>	<b>Project Number</b> <b>J0502</b>
<b>Project Title</b> <b>Effect of Temperature on Crystal Growth</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This experiment examines how the rate of cooling and surrounding temperature affect crystal growth in identical saturated salt (sodium chloride) solutions. My hypothesis is if one solution is cooled in a refrigerator and one in a non-drafty room temperature area, then the one that cools more slowly in the room temperature will grow larger.</p> <p><b>Methods/Materials</b> Salt crystals were grown in two different conditions: room temperature and refrigerated. Two crystals were in room temperature cooling down and were kept at room temperature during crystal growth for twelve days. Two other crystals cooled down in the refrigerator and were kept at a refrigerated temperature during crystal growth for twelve days.</p> <p><b>Results</b> My hypothesis was supported by this experiment: the room temperature crystals grew larger than the refrigerated crystals. The crystals in room temperature grew larger and stronger because they cooled more slowly, while the refrigerated crystals grew and then collapsed after three days. In addition, the room temperature crystals were stronger than the refrigerated crystals and could tolerate the movement and handling during their measurements.</p> <p><b>Conclusions/Discussion</b> Different rates of cooling and different surrounding solution temperatures do affect salt (sodium chloride) crystal growth in identical saturated salt solutions. The room temperature crystals that formed were stronger and grew larger overall than the refrigerated crystals. This was because the room temperature solutions cooled at a slower rate, which gave the salt crystal seeds time to form stronger, more durable crystals. Also, the room temperature solutions evaporated at a faster rate, which left behind more salt deposits on the rock salt seeds. In the first three days, the refrigerated crystals were somewhat larger than the room temperature crystals. This might have been because salt solubility in cold temperature is lower than that at hot temperatures, and more salt was available to form larger crystals at a faster rate. The refrigerated crystals collapsed because they formed too fast and were very fragile. Also, the faster cooling rate of the refrigerated solutions gave the crystals less time to form strong crystals.</p>	
<b>Summary Statement</b> This experiment examines how the rate of cooling and surrounding temperature affects crystal growth in identical saturated sodium chloride solutions.	
<b>Help Received</b> Mother helped with display format and helping with before and after pictures of crystals. Neighbor taught me how to use Excel to compute and graph crystal data.	