



# CALIFORNIA STATE SCIENCE FAIR 2017 PROJECT SUMMARY

<b>Name(s)</b> Alan C. Hernandez	<b>Project Number</b> <b>J0607</b>
<b>Project Title</b> <b>Cold Pack Chemistry</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objectives and goals were to see a temperature difference in 200mL cup of water. I would use different amounts of ammonium nitrate, a crystal that has a chemical reaction with the water. The amounts were 10g, 20g, 30g, 40g, and 50g. My goal was to see if 50g would have the biggest temperature change when added to water. I was basically trying to see which amounts of ammonium nitrate make the water temperature change the most. <b>Methods/Materials</b> The most important materials I used were ammonium nitrate, a crystal in coldpacks. I also used water to cause the chemical reaction, a scale to measure the ammonium nitrate amounts, and the most important, a thermometer to measure the temperatures as the chemical reaction is caused. This would all happen in a cup with 200ml of water, 1 for each amount of ammonium nitrate. Then taking the beginning temperature, 15-20 seconds later the middle temperature and so on until the temperature did not change. Lastly, subtracting the beginning temperature to the ending temperature, finding the temperature difference for each cup. <b>Results</b> I had 5 different results for the 5 different amounts of ammonium nitrate. All of them coming from subtracting the beginning temperature to the ending temperature. For cup #1, 4 degrees in difference. Cup #2, 10 degrees in change. Then 14 degrees in change for cup #3. Lastly my biggest change in temperature, cup #4 and cup #5, 20 degrees and 25 degrees. Cup #5 proving my hypothesis that cup #5, 50g of ammonium nitrate would have the biggest change in temperature with 25 degrees. <b>Conclusions/Discussion</b> Using a digital thermometer was more successful than using a laser thermometer which made my temperatures inaccurate at first. Though not with the digital thermometer which made my temperatures more accurate. I also concluded that I might have used ammonium nitrate crystals that had already started to dissolve since they looked pretty wet. Which did not let me have as big temperature differences. Though over all the biggest temperature difference was found when I used 50g of ammonium nitrate, a bigger amount than what they use in coldpacks.	
<b>Summary Statement</b> I measured the temperature difference in 5 cups of water with 200mL of water each with a different amount of ammonium nitrate a crystal that causes 2 chemical reactions one the endothermic reaction the other the exothermic reaction.	
<b>Help Received</b> My parents: Adriana Romo and Cesar Hernandez. My science teacher, Mrs. Simpson.	