



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Katherine S. DePonte	Project Number J1110
Project Title Which Keeps Food Coldest: Ice Cubes, Blocks, or Ice Substitutes?	
Objectives/Goals The purpose of this project was to see if one type of ice in a lunch box had any advantage over other types of ice. Ice cubes, a block of ice and blue ice substitutes were tested.	
Abstract Methods/Materials To conduct this experiment these materials were used: a lunch pail, block ice, ice cubes and ice substitutes, a digital thermometer, apples, mayonnaise for the sandwich, turkey for the sandwich and bread for the sandwich. Each of the following steps was performed twenty times. A digital thermometer was used to check a lunch pail's temperature. A refrigerated apple was tested with the thermometer in four different places. The temperature of the mayonnaise and the temperature of the whole sandwich were also recorded. After six hours the temperature of the sandwich, mayonnaise, the apple and the inside of the lunch pail were again recorded.	
Results In general, the lunch pail, mayonnaise and apple were kept coolest by the "Freez Pak" and "Coleman" ice substitutes. The sandwich was kept coolest by the ice cubes, but with the ice cubes, the sandwich became soggy through excess condensation. The least average change in temperature after six hours when taking into account all the items was with the ice substitutes.	
Conclusions/Discussion All of the cooling agents were effective in keeping the lunch pail and its contents cool. Although the differences were not great, the "Freez Pak" ice substitute was most effective, followed by the "Coleman" blue ice, next came the ice cubes. Less effective in keeping the items cool was the Rubbermaid blue ice. The ice block was the least effective cooling agent.	
Summary Statement The purpose of this project was to determine if one type of ice in a lunch box had any advantage over other types: a block of ice, ice cubes and "blue ice" substitutes were compared.	
Help Received My teacher, Mrs. Hunker, for allowing me to borrow the school's digital thermometers.	