CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35932

Project Title
Beyond the Pond

Abstract

Objectives/Goals
My objective was to build an operational miniature ice hockey rink. I hypothesized that I could keep the surface of the ice rink frozen by running a super-cooled saturated brine water solution through copper tubing under the rink. The brine water solution would be kept below 12 degrees Fahrenheit after running through another set of copper coils in the refrigeration section. The refrigeration section will be a Styrofoam cooler packed with a mixture of standard and dry ice. The brine solution will be circulated by a fountain pump through the copper tubing back to a coffee bean can in the cooler.

Methods/Materials
1. 2 11"x17" cookie sheets for the rink
2. 10 quart Styrofoam cooler
3. 40' copper tubing
4. 1 fountain pump
5. 10 lbs ice + 10 Lbs dry ice

Results
I am able to sustain ice on the surface of the rink for a period of 8-10 hours.

Conclusions/Discussion
The ice was able to be formed and maintained as a result of two seperate "heat exchange" systems. The first heat exchange system is under the rink where the super cooled brine water absorbs the heat through the copper coils from the rink at a fast rate. This allows the ice to form. The heat collected from the rink is carried by the brine water to the cooler where the second heat-exchange system is located. The return copper coils transfer the heat from the brine water where it is then absorbed by the ice laying on top of the coils. The brine water returns to the resevoir in the cooler and waits to be recirculated again.

Summary Statement
My project is to create a fully functional miniature ice hockey rink using saturated brine water, cooled through a heat exchange system of copper coils.

Help Received
My dad taught me how to use the tools like the tubing benders. A guy at home depot gave me ideas of how to use the valves; a man at the Irvine Spectrum out ice rinkshowed me how they use cooling loops and what temperatures I needed for my rink. My mom helped me with design and decoration ideas. My