



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Alexander R. Lay	Project Number 31818
Project Title Bacteria Hysteria: Which Backpacking Water Purification Method Removes the Most Bacteria from a Sample of River Water?	
Objectives/Goals The objective of this experiment was to learn which type of water purification works best to remove bacteria from river water. The hypothesis stated that if samples of river water are purified by filtration, boiling, or iodine tablets, then the water samples purified by boiling will have less bacteria colonies growing on agar plates. Methods/Materials Materials list: 10 liter water container, river water samples, 22 agar plates, 3 sterile cups, 20 5ml sterile syringes, 48 sterile cotton swabs, insulated cardboard box, electric heating pad, Katadyn Hiker backpacking water purification filter system, iodine tablets (Potable Aqua brand), pot with lid for boiling water, sharpie pen, 70% Isopropyl Alcohol, plastic sheet, timer, thermometer, 1 liter glass beaker. Method: The river water sample was purified in one of three ways; Filtering with a Katadyn Hiker filter, boiling for 60 seconds, or placing 2 iodine tablets in 1 liter of river water for 30 minutes. This procedure was repeated 3 times. Agar plates were prepared for each of the purified water samples and incubated for 5 days. Results After 5 days, each plate was observed and the bacteria colonies counted. The filtered water plates showed no growth. The boiled water plates showed no growth. The plates purified by iodine tablets contained one colony on one plate. No growth occurred on the control plates that contained no river water and only one of the 3 plates with unpurified river water contained growth of 16 colonies. On day 3 of incubation, the temperature rose to 120 degrees Fahrenheit, which was outside the temperature range for optimum bacteria growth. Conclusions/Discussion The result did support the hypothesis that boiling water would reduce the levels of bacteria the most, though the Katadyn Hiker filter worked just as well. The fact that the control plates that contained unpurified river water did not show bacteria in all the plates indicated that the data collected may not be valid to draw a conclusion. The high incubator temperature may have affected bacteria growth. It would be good to repeat the experiment with a constant incubation temperature.	
Summary Statement This project compares purification of river water by filtration, iodine tablets, and boiling for one minute.	
Help Received Mother took photos; Father helped collect the river water.	