# CALIFORNIA STATE SCIENCE FAIR
## 2003 PROJECT SUMMARY

**Name(s)**
Quinn Y. Stewart

**Project Number**
**J1331**

**Project Title**
# Does the Type of Water Purification Method Affect the Amount of Bacteria in Lake or Stream Water?

**Abstract**

**Objectives/Goals**
My goal was to learn about the fundamentals of water purification. I used three treatment methods: iodination, boiling, and filtration. I believed that boiling would be the most effective method, filtration would be the second most effective method, and iodination would be the least effective method. I thought this because my background research told me that boiling kills all harmful bacteria in a matter of minutes, filtration physically removes debris, but may not completely eliminate all bacteria, and iodination does not physically remove debris and may not kill all bacteria that the chemical does not reach.

**Methods/Materials**
The key materials I used were samples of lake and creek water, my three purification materials (iodine tablets, a pump filter, and a saucepan and a stove), and nutrient agar plates. I gathered water from a lake and a stream, then applied my three water purification methods to the different samples. I manipulated the type of water purification methods on two different sources of water. I used replicates instead of trials to reduce the risk of inconsistency of the water quality within the samples. I used 4 replicates for each combination of water source and treatment method, for a total of 32 different cultures. I estimated the amount of each plate covered by bacterial growth after letting the cultures stand for four days. I also observed samples through a microscope.

**Results**
I found that the percentage of visible bacterial growth on each plate ranged from 0% for the boiled lake water, to an average of 3.41% for the iodinated lake water. I also found that the average untreated lake plate was 11% covered in bacterial growth. My obervations using the microscope showed more debris in the iodinated samples than the filtered samples.

**Conclusions/Discussion**
I concluded that the type of water purification method does affect the amount of bacteria left in water from a lake or stream. I also found that thermal purification was the most effective, filtration was the second most effective, and iodination was the least effective. Thus my hypothesis was correct.

**Summary Statement**
My project is about the effectiveness of water purification methods on two sources of water.

**Help Received**
My father reviewed drafts of my report.