



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Judd C. Howard	Project Number J1710
Project Title Pool vs. Jacuzzi: A Study of Bacteria Levels in Water	
Abstract Objectives/Goals My hypothesis is that Jacuzzi water is dirtier than swimming pool water and bacteria can grow better in small warm environments. Because Jacuzzis are smaller bodies of water and warmer than swimming pools, I hypothesize that the numbers and concentration of bacteria will be higher. Methods/Materials 1-22 x 28 inch poster board;37 adhesive labels;33 Nutrient agar plates;8 quart size Ziploc baggies;1 digital thermometer;1 digital camera;32 sterile cotton swabs;1 roll scotch tape; Journal to record experiment/observations. Procedures 1. Purchased materials. 2. Identified locations of test sites. 3. Labeled poster board with 8 columns as follows: Pool A, Jacuzzi A; Pool B, Jacuzzi B; Pool C, Jacuzzi C; Pool D, Jacuzzi D. 4. Pre-labeled 8 Ziploc baggies with Pool A, Jacuzzi A, etc. 5. Took temperature of pool and Jacuzzi and tested water pH level for all sites and recorded temperature and pH level on individual labels on each bag. 6. Collected 1 water sample from pool and 1 water sample from Jacuzzi at each location. 7. Took samples home and swabbed 4 agar dishes per water sample with cotton swabs. 8. Taped shut and put label on each dish (4 samples each location). 9. Opened and closed one agar dish for control sample. 10. Set up test on poster board to observe daily. 11. Made observations, counted and recorded bacteria growth near 8pm daily. 12. Came up with method of counting agar plates with large amounts of growth by using a sharpie pen to mark growth. 13. Took photos and wrote notes daily on number of bacteria growing per day. 14. Drew conclusions from outcome of experiment. Results The data and results show that two of the test sites supported my hypothesis, that Jacuzzi's have more bacteria than pools, and two did not. Conclusions/Discussion I predicted that Jacuzzis would grow more bacteria than pools. This was my theory because some bacteria grow better in warm environments. Because Jacuzzis are smaller and warmer than pools, the number and concentration of bacteria should be higher. My background research stated that temperature and pH level affected bacteria growth. The data and results show that two of the test sites supported my hypothesis. The temperature of a body of water does not predict the number of bacteria that are present in them. Some factors that would contribute to bacteria growth in pools and Jacuzzi's are the pH level, the maintenance schedule and usage.	
Summary Statement My project is a study of bacteria in bodies of water and whether there are more bacteria growing in swimming pools or Jacuzzi's.	
Help Received My mom helped me format the report and glue my display board	