



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<b>Your Name</b> (List all student names if multiple authors.) <b>Amy K. Kasahara</b>	<b>Science Fair Use Only</b>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>Stinky Shoes: Do the Types or Materials of Shoes Affect the Amount of Bacteria in Your Shoes?</b>	<b>J1216</b>
	<b>Division</b> <b>X Junior (6-8) _ Senior (9-12)</b>
<b>Preferred Category</b> (See page 5 for descriptions.) <b>1 - Applied Mechanics/ Structures &amp; Mechanisms/ Manufacturing</b>	
<b>Abstract</b> (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges. <b>Objective:</b> The objective of my project is to determine whether the types or materials of shoes affect the amount of bacteria in the shoes, thus causing the odor. <b>Materials and Methods:</b> A. First I wore the same pair of shoes for three days in a row doing normal activities. B. I wore socks for the sneakers, loafers and slip-on shoes (synthetic closed-toe) and no socks for the dance shoes (leather closed-toe) and sandals as I normally do. C. Next I sterilized the cotton swab by microwaving it and dabbing it in a solution made of boiled water with 10% salt. D. Then I scraped along the inside of the shoes and my feet separately and rubbed it on the two types of agar (Tryptic Soy and Nutrient Agar), using new cotton swab for each divided surface. I tested not only the shoes but also the feet to see if the amount of bacteria on the skin is consistent throughout the experiment. E. After that, I labeled each dish and secured it with a rubber band. F. Finally, I placed the petri dish under a 90°F electric blanket tent and observed and recorded the results for 5 days. G. I repeated these steps with different types and materials of shoes (7 pairs). <b>Results:</b> Rubber sandals and the two synthetic shoes ended up with the most bacterial count and the natural materials (leather/cotton) had the least amount of bacteria in both agar types. I learned from research that the two agar types are preferred by foot bacteria. So I used both types to repeat the same experiment. They both presented very similar pattern of bacterial growth. <b>Conclusions:</b> My conclusion is that the materials of shoes affect the amount of bacteria. This may be caused by the breathable characteristics of natural material so the moisture is aired out. On the other hand, the construction of shoes (e.g. open-toe shoes) did not affect the amount of bacteria. The contact surface between skin and shoes produce enough moisture with synthetic material that the "openness" did not seem to reduce the amount of bacteria.	
<b>Summary Statement</b> (In one sentence, state what your project is about.) My project is about the shoe type or material which may affect the amount of bacteria in the shoes causing odor.	
<b>Help Received in Doing Project</b> (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Pharmacists Ms. L. Deph of Savon Drugstore and Mr. M. Matsumoto helped me get started on my project. Dr. H. Biessmann of UCI gave me helpful advice. Ms. K. McMasters of Carolina Biological Supply suggested the types of agars. Dr. G. Sun of UC Davis and the the inventor of Odor-Free fabric gave me insight in understanding the bacteria growth.	