



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Lee A. Hewitt	Project Number J0715
Project Title How Does Cold Affect Hearing Aid Battery Life?	
Abstract Objectives/Goals The objective of these experiments was to determine if patients' reports that cold negatively impacts the life of a hearing aid battery are accurate Methods/Materials The life of a hearing aid battery was measured at room temperature, a cool temperature, and a freezing temperature. The cool temperature was obtained by placing the hearing aid in a refrigerator, the freezing temperature by placing the hearing aid in a freezer. The battery was checked three times a day to verify that it and the hearing aid were still functioning. After each trial, a Dry and Store Global was used to remove moisture from the hearing aid. Materials included: a Phonak hearing aid, size 13 batteries, a refrigerator/freezer, two refrigerator/freezer thermometers, a battery tester, a hearing aid stethoscope, earmold tubing filled with nail polish, a Dry and Store Global, and recording sheets. Results When comparing the manufacturer's estimated battery life with my test situations, I found that the battery lost an average of 31 hours of life when run at cool temperatures and 151 hours of life when run below freezing. When compared with my baseline, I found that the battery lost an average of 109 hours of life when tested at cool temperatures and an average of 229 hours of life when tested below freezing. Another pattern also appeared in my test results. Each test in the refrigerator and freezer resulted in a decrease in battery life, even though the hearing aid completed a cycle in the Dry and Store Global after each test. Conclusions/Discussion I concluded that patients' reports of shortened battery life in cooler temperatures are valid and that those who live in colder climates will have to change their hearing aid batteries more often. However, the tests also showed a decrease in battery life from one trial to the next, even though the hearing aid was conditioned in the Dry and Store Global after every trial. This may indicate that another variable, in addition to temperature, can cause battery life to decrease over time.	
Summary Statement This project demonstrated the negative effect of cold on hearing aid battery life.	
Help Received Mother helped type report and provided hearing aid equipment and patient testimony.	