



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Jack C. Standish	Project Number J0811
Project Title Does Altitude Affect Background Radiation?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This experiment was conducted to find out whether altitude affects background radiation. The hypothesis stated that an increased altitude would result in increased background radiation.</p> <p>Methods/Materials The experiment used a cloud chamber, a cup that uses alcohol vapor to expose radioactive particles, to test the presence of background radiation. The cup was prepared and observed for 30 minutes, but no results were visible. The procedure was then modified to induce results. These changes included the method of securing the felt to the container, the size and shape of the container, the method of dry ice application, the material that the container was composed of, the time of day during the testing, the strength of the flashlight, the depth of the pan holding the dry ice and cloud chamber, and the altitude of the testing. All of these changes were implemented in 7 different rounds of testing. However, there were still no results. The cloud chamber was then replaced by a digital radiation monitor. Background radiation was measured at 41 different altitudes, from 0 to 12000 meters.</p> <p>Results When the raw data was placed in a graph, a pattern emerged. It suggested that background radiation increased exponentially with altitude. This pattern confirmed the hypothesis.</p> <p>Conclusions/Discussion After repeated trials and data evaluation, it was discovered that background radiation increased with an increase in altitude. Altitudes from 0-8000 meters had relatively safe radiation levels, up to around one microsievert per hour. At higher elevations, (8000-12000 meters) background radiation increased, posing a small but present health risk. This information can help people like airline pilots, extreme mountain climbers, frequent airline flyers, and astronauts by informing them on the health risks of background radiation at high altitudes. Knowing that background radiation increases with altitude can help individuals to know when to use protection against radiation and also when it is unnecessary. Additional research might include the collection of more data points to more accurately predict trends in background radiation levels at various altitudes.</p>	
Summary Statement This experiment was conducted to find out whether altitude affects background radiation.	
Help Received Mother provided transportation to some locations where background radiation was measured; Father took some digital meter readings on a domestic airline flight.	