



CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

Name(s) Samuel A. De La O	Project Number J1504
Project Title What Materials Will Best Shield Radiation?	
Abstract Objectives/Goals The objective of this investigation was to determine what materials best shield gamma radiation. I hypothesized that if I placed different materials between the radiation source and the radiation detector, the radiation would be blocked at different levels. Methods/Materials This experiment was conducted by placing different shielding materials between an ion chamber that I built (I will call it a radiation detector) and a low level gamma radiation source (uranium ore). The materials used for shielding were plastic, cardboard, and a super dense sheet of lead. I recorded the amount of radiation detected after 30 seconds of exposure. This process was repeated three times, and then the average results of each material were calculated and graphed. During the experiment, the uranium ore was safely handled as per instructions from the supplier, and it is currently being stored in a safe place. Results The plastic blocked an average of 3% of the radiation. The cardboard blocked an average of 87% of the radiation. The lead sheet blocked 100% of the radiation. Conclusions/Discussion The data shows that the radiation detected decreased as denser objects were used for shielding. There were only two problems I encountered while testing my experiment. During the first trial, I forgot to place the radiation source an inch away from the radiation detector, so when I altered it during trials 2 and 3, the readings were different. I also messed up while building the radiation detector's amplifier circuit, so I had to rebuild it several times. For my next experiment, I would try to determine if lead would be a good shield if the radiation level were higher. I hypothesize that the thickness of the lead shield would have to increase to block 100% of the radiation if the radiation level were higher. In conclusion, I discovered that lead is good for shielding radiation and plastic is not. That is why lead is used as a protective blanket when X-Rays are taken.	
Summary Statement My project tests which materials (plastic, cardboard or lead) will best shield radiation.	
Help Received Dad helped purchase materials and solder and wire circuit board. Mom bought uranium ore on-line. Charles Wenzel gave advice through email on fixing problems I encountered while building the radiation detector.	