



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jonathon W. Horbaly	Project Number S0313
Project Title Radioactive Pebbles, Space Suits, and Cloud Chambers	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I investigated if the effectiveness of different materials' ability to block radiation was affected by their mass. The hypothesis is: of all the materials tested, including layers of a multi-piece space suit produced by ILC Dover, the shielding that allows the least radiation (in vapor trails) through it will have the highest mass.</p> <p>Methods/Materials I built a cloud chamber, placed a source and different shields, and measured how many vapor trails appeared on the other side.</p> <p>Results The source (without shielding or background radiation) gave off an average of 59 trails in one minute, and there were an average of 12 trails per minute on the far side of the entire space suit (which had a mass of 25g), four beyond the binder paper (mass less than 1g), 0 beyond the aluminum foil (mass less than 1g), 13 beyond the Mylar film from the space suit (mass less than 1g), 3.5 beyond the Mylar emergency blanket (mass less than 1g), and 14 beyond the outer shell of the space suit (mass 8g). However, due to the erratic nature of background radiation and similar masses of the shielding, it is not responsible to make a connection between the mass of the shield and how effectively it blocks radiation with this data.</p> <p>Conclusions/Discussion However, due to the erratic nature of background radiation and similar masses of the shielding, it is not responsible to make a connection between the mass of the shield and how effectively it blocks radiation with this data.</p>	
Summary Statement I attempted to test whether the mass of different shields (including a portion of a space suit provided by ILC Dover) affected their ability to block radiation in a self-designed cloud chamber.	
Help Received Father helped design, construct, and set up/run cloud chamber and refine experimental design; Teachers (Ms. Beth Dixon and Mrs. Dee Adams) helped refine report and experimental design; STEM Expo judge Gerald Oliver helped refine experimental design; used sample of space suit made by ILC Dover; used	