



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Amy H. Lee; Thomas T. Wooding	Project Number S1409
Project Title Lead Bullets Poisoned the Condors. Are Grizzly Bears Next?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine if lead from a hunter's bullet is absorbed in condor, bear, and human digestive fluids.</p> <p>Methods/Materials To represent typical bullets and shot used by hunters, lead bullets from a 30-06 and a .22 rifle and steel and lead shot from a shotgun were fired into separate boxes of dense paper. Then stomach solutions were simulated at a pH of 1 and 2 for a bear, 3 and 4 for a human, and 1.9 for a condor. The bullets and fragments [and paper with embedded fragments, referred to as simulated tissue] were collected and placed into the respective simulated stomachs and heated on a hot plate to 37 degrees C for appropriate digestive periods. The fluids were then filtered through acid-free filter paper and a potassium chromate test was conducted for the condor stomach, and sodium sulfate tests were conducted for the bear and human stomachs. For the condor fluid, a qualitative test was performed, but for the bear and human fluids, quantitative tests were performed where the amount of lead that was absorbed in the digestive process was calculated. The process was repeated three times for accuracy.</p> <p>Results For the condor digestive fluids, the steel shot contained no lead, but indicated a positive test result for absorption. The steel shot pellets were a bright gray color, but after the experiment, they became a dull gray color. The copper bullets showed a negative test result. The lead fragments with the simulated tissue was slightly yellow, indicating a low lead presence in the solution. The .22 fragments with simulated stomach tissue turned slightly yellow also. They tested positive and had the second brightest yellow result. The lead fragment results were positive and were the brightest yellow, indicating the highest lead content. For the bear stomach, the pH 1 was very faint white color. The pH of 2 showed an opaque color which represents a high amount of lead. For the human, the pH of 3 was a pale shade of white. The pH of 4 had a significant opaque color within drops of the sodium sulfate.</p> <p>Conclusions/Discussion The hypothesis that condors, bears, and humans absorb lead from hunter's bullets was supported.</p>	
Summary Statement This project is to determine the presence and amount of lead and corrosion in bullet fragments absorbed in simulated digestive fluids of a condor, bear and human.	
Help Received Mr. Cosner, our science teacher helped us run the project ; Mr. Eric Wooding assisted us in shooting the bullets.	