



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Robert De Gregorio; Bill Nguyen</b>	<b>Project Number</b> <b>S1108</b>
<b>Project Title</b> <b>Assessing Absorption of Pb and Ni through the Phytoremediation of Cucumis sativus, Raphanus sativus, and Brassica alba</b>	
<b>Objectives/Goals</b> Unlike sifting and chemical purification, which respectively are too superficial and too costly for regular implementation, phytoremediation, the process by which plants vacuum heavy metals from soil, could viably put an end to heavy-metal deposits. So we tried to find a more inexpensive way to clean the soils with phytoremediation because impoverished areas of the globe not only lack the resources necessary to counter this accumulation but also would benefit most from such cleanup.	
<b>Abstract</b> <b>Methods/Materials</b> we have experimented with common, inexpensive plants known for their phytoremediative potential: cucumber, radish, and white mustard. After planting them in soil that we contaminated with 6 different heavy-metal concentrations#300 ppm Pb, 600 ppm Pb, 900 ppm Pb, 300 ppm Ni, 600 ppm Ni, and 900 ppm Ni#and allowing 4 weeks of growth, we removed the plants and dried them under heat lamps. We then took 0.6g of cucumber, 0.15g of radish, and 0.05g of mustard from each plot to soak in a diluted sulfuric-acid solution that broke down their fibers and removed the heavy metal. Using equal parts plant material and dithizone-chloroform solution as a heavy-metal indicator, we added enough sodium hydroxide to neutralize the acidic liquid so that the indicator, which is sensitive to basicity, would undergo a change in color. Afterward, we ran the samples through a spectrophotometer and compared their wavelengths and absorbencies to those of the standard solutions, ranging from 0.1 ppm to 10,000 ppm Pb or Ni, which we prepared prior.	
<b>Results</b> Our results suggest that, of the three types of plants, radish absorbs lead most readily, while white mustard best absorbs nickel.	
<b>Conclusions/Discussion</b> Although the United States might possess the resources to finance initiatives like Superfund, our findings could prove vital to the prosperity of third-world countries, where built-and-abandoned war bases and manufacturing plants have in many regions precluded rural cultivation. Planting radish or white mustard, then, would not only expand the agricultural opportunities of these marginalized nations but also serve as an affordable means of eliminating toxic heavy metals from the environment.	
<b>Summary Statement</b> Our project is trying to utilize plants to absorb common heavy metal contamination from soils around the world in a inexpensive manner.	
<b>Help Received</b> Lynn Conrad-Johnson and John Allen helped us in the chemical steps of our project at Oak Grove High School	