



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Janelle M. LaFontaine	Project Number J1521
Project Title The Effect of X-Ray Beam Energy on Image Quality of Objects	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine whether x-ray image contrast is improved using lower energies.</p> <p>Methods/Materials X-ray images of an anthropomorphic head were obtained using a diagnostic x-ray machine with varying energies. The department film processor was used to develop the x-rays. A densitometer was then used to measure the multiple radiograph backgrounds and optical densities. Image contrast was calculated as the relationship of the Background Density (B) minus the Optical Density (OD), divided by the Background Density (B).</p> <p>Results The resultant x-ray images taken at lower energies produced better contrast and more detailed bone structure than those taken at higher energies. Radiographs taken at higher energies proved to have less contrast, therefore penetrating through the skeletal detail, creating darker and sometimes overpenetrated images.</p> <p>Conclusions/Discussion Image contrast is improved on radiographs by utilizing the lower kVp energy, producing better detailed bone description.</p>	
Summary Statement By using a lower kVp, x-ray image contrast is improved.	
Help Received I worked in the Radiation Oncology Department at the Naval Medical Center of San Diego under the supervision of Richard LaFontaine, Ph.D., Medical Physicist.	