



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Optical Properties in Reflective Holograms	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine if the optical properties of mirrors and lenses will perform in reflective holograms.</p> <p>Methods/Materials Holograms were made on special glass plates purchases for this project. An isolation table was assembled from custom made high and low frequency isolation dampeners. A steel plate on the top of the isolation table provided magnetic attachment for all lenses, mirrors and the beam splitter that was used in this project. A 7 mw helium Neon laser provides light with a frequency of 633nm to expose the glass plates. A small suitable object was obtained at a gift store. Chemicals used to develop the glass plates were purchased from a scientific supply house. A metal lathe was used to produce some of the fixtures we used. 24 glass slides were exposed by the laser light. Exposure times of approximately five minutes were used to produce the holograms.</p> <p>Results Holograms with a mirror position behind the object and a magnifying lense positioned in front of the object allow the viewer to see a small section of the back of the same object and also, an enlarged portion of the front of this same object.</p> <p>Conclusions/Discussion In conclusion, we have found that the optical properties of mirrors and magnifying lenses are fully functional in reflective type holograms. Due to the extreme technical problems encountered in producing and locating holograms on the glass plates, repeating a certain exposure did not always produce a visible and sharp hologram to view. However the holograms that were successfully developed showed us that these properties that we were testing for were indeed present.</p>	
Summary Statement We proved that the optical properties of lenses and mirrors function in reflective type holograms	
Help Received Family friend provided machine shop, tools and some technical assistance	