



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<b>Your Name</b> (List all student names if multiple authors.) <b>Elizabeth L. Llanes</b>	<b>Science Fair Use Only</b>  <h1 style="margin: 0;">J1415</h1>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>Laser Range Finder</b>	<b>Division</b> <input checked="" type="checkbox"/> <b>Junior (6-8)</b> <input type="checkbox"/> <b>Senior (9-12)</b>
<b>Preferred Category</b> (See page 5 for descriptions.) <b>14 - Physics &amp; Astronomy</b>	
<b>Abstract</b> (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p><b>Objective:</b> Determine if a laser range finder can measure distances as accurately as a ruler, within a 2% to 4% error.</p> <p><b>Methods:</b> A diode laser, a 50/50 beam splitter, and a broadband mirror were mounted on a 4 foot board. The laser was turned on using a 3V battery. The light from the laser struck the beam splitter and was split into two beams: the first going through and the other perpendicular to the first beam. An object was placed in front of beam splitter such that the perpendicular beam struck the object. The light that went through reflected off the mirror, and the mirror was rotated such that the perpendicular beam and the reflected beam met at the object. The measured angle of the rotation of the mirror is then used in a formula to calculate the distance to the object.</p> <p><b>Results:</b> The laser range finder's measured accuracy was 0.84% as compared to a measurement by ruler.</p> <p><b>Conclusions:</b> The results proved my hypothesis to be too pessimistic. The laser range finder was more accurate than I expected.</p>	
<b>Summary Statement</b> (In one sentence, state what your project is about.) Used a laser & optics to find the distance to an object & compared it to a ruler.	
<b>Help Received in Doing Project</b> (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Mother helped type up report; father helped derive formula.	