



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Hakan S. Alpay	Project Number J2102
Project Title Efficacy of Light Shelves?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to examine the effects of light shelves on the distribution of natural light in the interior of a building and the reduction of glare in the area near the perimeter windows.</p> <p>Methods/Materials A model of a portion of an office building was constructed, with a large window and a removable light shelf. The scale of the model was 1 in = 1 ft. The model was placed outside at different times of the day: 9 am, 12 pm, and 5 pm. At each of these times, the amount of light in the areas 2 feet, 10 feet, and 18 feet from the window inside the model were measured with a light sensor. The measurements were taken twice. The first time, the measurements of light were recorded without the light shelf on the facade, and the second time, with the light shelf on the facade dividing the large window into two areas. The experiment was executed five times, each on a sunny day.</p> <p>Results With the light shelf, there was a moderate amount of light in the area 2 feet from the window, while there was a slightly lower amount of light in the areas 10 feet and 18 feet from the window. Without the light shelf, there was an extremely high amount of light in the area 2 feet from the window and a very low amount of light in the areas 10 feet and 18 feet from the window.</p> <p>Conclusions/Discussion The results showed that when the light shelf was in place, the amount of light in the areas furthest away from the window, such as 10 feet and 18 feet, were higher than the amount of light in these areas without the light shelf. In addition, the amount of light in the area closest to the window, specifically 2 feet, was decreased when the light shelf was in place in contrast to the amount of light in this area without a light shelf. The results suggest that light shelves, constructed in conjunction with the south facing exterior windows, increase the distribution of natural light in a building and prevent glare in the areas close to the perimeter windows.</p>	
Summary Statement My project tests a light shelf to see if it distributes light within a space and prevents glare near the window it divides.	
Help Received My father helped me build my model of a portion of an office building.	