



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Chrissie L. Alving-Trinh</b>	<b>Project Number</b> <b>J1601</b>
<b>Project Title</b> <b>Do Photosynthesis and Growth Rate Affect Stomatal Density?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My project was to determine if photosynthesis and growth rate affect stomatal density in a growing plant. I believed that photosynthesis drives stomatal density in the growing plant and that younger plants would have higher photosynthesis rates causing higher stomatal densities. <b>Methods/Materials</b> Plants were grown from beans in jars with damp paper towels and a heat/light source. Other plants were covered to block light. Samples were taken from the leaves and cotyledons of plants at different ages. Stomatal impressions were taken using super glue on microscope slides. Density was calculated using 100x magnification and a 0.5 mm by 0.5 mm mask. First, in 30 samples, height and age were compared to stomatal density; height and age were used as a way of measuring growth rate. Second, density of stomata of 4 cotyledons (which have their own food source) was compared to that of 6 leaves (which use photosynthesis). Finally, the stomatal density of 3 plants grown in the dark was compared to that of 10 grown in the light. <b>Results</b> Height and age did not correlate with stomatal density (correlation coefficients of -0.043 and -0.153, respectively). The average stomatal density in cotyledons was 5 while that of leaves was 69. Plants grown in the light had an average stomatal density of 72 vs. 29 for those grown in the dark. <b>Conclusions/Discussion</b> These experiments did not show that growth rate affects stomatal density. However, they did show that photosynthesis results in a higher stomatal density in the young plant.	
<b>Summary Statement</b> My project investigated how photosynthesis and growth rate affect stomata, which are microscopic structures on the under side of a leaf allowing exchange of carbon dioxide and water.	
<b>Help Received</b> Science fair coaches lent me equipment and helped answer questions; Parents helped purchase, critique, and glue board; Dr. Carpenter took picture of slide at Kaiser.	