



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Michelle C. Xu	<b>Project Number</b> <b>J1420</b>
<b>Project Title</b> <b>A Mathematical Model of Leaf Counting for Carbon Sequestration</b>	
<b>Abstract</b> <b>Objectives/Goals</b> I started my project in order to create a method to count the number of leaves on a tree. I believe that by combining Leonardo da Vinci tree rule with Fibonacci numbers into one mathematical model (DV+F), I can reliably estimate the number of leaves a tree has, which would be more accurate than the Crown Size model based on well-established Leaf Area Index (LAI_Cs). <b>Methods/Materials</b> Materials: a Vernier, measuring tape, a ladder, and a computer; Major steps to investigate are: 1. Manually count the total number of leaves on a few small trees 2. Obtain model required parameters (DV+F and LAI_Cs) with repeated measurements on the selected small trees 3. Compare model calculated leaf count to the manual counts. Check if DV+F model is better than LAI_Cs model 4. For manually uncountable (large) trees, use computer simulation to validate my DV+F model <b>Results</b> The comparison between the two methods, my DV+F model and LAI based Crown Size model, shows that the leaf count derived from my DV+F model is much closer to the actual leaf count, which represents the better estimation. <b>Conclusions/Discussion</b> My DV+F model provides a new way to estimate the number of leaves on trees. The comparison between my DV+F model and the well-established LAI based Crown Size model shows that my DV+F model is much more reliable and accurate. With such a better leaf counting method, tree studies on carbon sequestration can be done more accurately.	
<b>Summary Statement</b> To create a method to count the number of leaves on a tree	
<b>Help Received</b> Mr. Ireland helped answer questions; Parents guided me with C programming and helped with project display assembly.	