



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Patrick Yiu	Project Number S1322
Project Title Fibonacci and Phyllotaxis	
Abstract Objectives/Goals This project in its present form is the result of investigation and experimentation on the correlation between the Fibonacci sequence and the spiral phyllotaxis, or leaf arrangement, of various plants occurring in nature. This is being done in order to model various occurrences of the Fibonacci sequence in nature and to explore possible applications of the Fibonacci sequence in real-world situations. Methods/Materials Phyllotactic ratios (leaf arrangements) were determined by means of measuring the ratio of a complete turn between each successive leaf growing around the stem of a specimen. Helianthus annuus and Ulmus americana, among other plant species, were observed and the phyllotactic ratios of each specimen were recorded. Initial hypotheses predicted that there would be a direct correlation between both the Fibonacci sequence and the spiral phyllotaxes of various plant specimens. Upon further analysis, a correlation was confirmed between the Fibonacci sequence and plant phyllotaxes. Results The leaf arrangements of each specimen were compared to the Fibonacci sequence in order to find any patterns, and each consisted of members of the Fibonacci sequence. The numerator and denominator of each leaf arrangement ratio consisted of a member of the Fibonacci sequence and its second successor. The results support my initial hypotheses that there is indeed a direct correlation between the spiral phyllotaxes of plants and the Fibonacci sequence. Given that there in fact is a correlation, the Fibonacci sequence can then be harnessed and applied to human purposes by first observing its application in nature.	
Summary Statement The Fibonacci sequence is a wonderful relation with virtually infinite applications, and it is perhaps best expressed in the spiral phyllotaxis of flora throughout nature.	
Help Received Friend helped to proofread project; Mother helped to glue display board together	