



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Yosira Hernandez	Project Number S1409
Project Title Inappropriate Use of the Lotka-Volterra Predator-Prey Equation	
Abstract Objectives/Goals The purpose of this study was to demonstrate that the Lotka-Volterra differential equations may not be the appropriate equations to describe certain predator-prey models, which indeed may not be a true cyclical predator-prey relationship, but rather competition models. Methods/Materials In my examination of the Lotka-Volterra equation, I duplicated the data used in Gause's 1934 competition experiments between <i>Paramecium caudatum</i> and <i>Paramecium aurelia</i> , and his classic yeast competition experiments. I also used student data replicating Park's 1954 competition experiments with two <i>Tribolium</i> species. Data was graphed and examined for any sort of a classic cyclical predator-prey interaction. Both Gause and Park had used the Lotka-Volterra equation to describe a predator/prey relationship. Results I found the data sets and graphs do not indicate a classic cyclical predator-prey model and that the parameters for interaction and carrying capacities required by the Lotka-Volterra equation, do not fit into the equation. Conclusions/Discussion I concluded that the Lotka-Volterra equation may not be the appropriate equation for the competition math models in cases where the competition is not cyclical, but rather demonstrative of some sort of kill mechanism. Both Gause (in 1934) and Park (1954) used the Lotka-Volterra cyclical predator-prey equation to describe their work, when at the same time my duplicated experimental data and their data describe a simple competition kill mechanism that does not fit the parameters of the equation. The equations cannot be set up, nor solved.	
Summary Statement The purpose of this study was to demonstrate that the Lotka-Volterra differential equations may not be the appropriate equations to describe certain predator-prey models, which indeed may not be a true cyclical predator-prey relationship, b	
Help Received	