



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Sophia R. Williams	Project Number S1618
Project Title World Population Model: War and Disease, Good or Bad?	
Abstract Objectives/Goals Determine how fast the world's population would grow if there was no violence, war or disease, and find how would that growth would impact the earth's natural resources (natural gas, oil, and electricity) using a mathematical model. The prediction was made that when there were no deaths from war, violence, or disease the population would increase much faster than current population rates and that this larger population would consume oil, electricity and natural gas at a more accelerated rate. Methods/Materials The number of deaths and their causes calculated from data from the World Health Organization and The World Factbook were inputted into the Cohort-Component Method which was made efficient by incorporating sub-variables and separating the formula into six formulas determined by sex and age. Using Microsoft Excel, the variables in the equation were experimented with to show how much population growth would change depending on given conditions. The information on the earth's supply of nonrenewable resources data was analyzed to find the average consumption of natural gas, electricity and oil per person. Then a linear function was created where the input variable represents the population. Results It was found that the population would grow faster when the appropriate changes were made, which caused an increase in resource consumption. Further investigation, revealed that when the birth rate was equal to the death rate the population decreased slightly when research says that it should stay at a constant rate. This showed a degree of error within the formula. Conclusions/Discussion The hypothesis was confirmed. The conclusion was that when there are no deaths from war, violence, or disease the population would increase much faster and would consume natural resources at a more accelerated rate. And although further experimentation revealed error, it also showed that increases in population when there are no deaths from war, violence, or disease can be offset if the death rate and the birth rate within the population were equal.	
Summary Statement Using a mathematical model, this project shows how world population would be affected if there was no war, violence, or disease, and how that change would impact the earth's natural resources.	
Help Received Mom, Karen Miller, helped me edit my work and, along with my teacher, Patricia Williamson, helped me think through my ideas and methodology.	