



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jenny Zhang	Project Number S1722
Project Title The Effect of Complete Chemical, Soluble Synthetic, and Controlled Release Fertilizers on Primary Productivity Growth	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Agricultural crops are grown on vast areas of farmland that require the use of fertilizers to enhance plant growth and health. The overuse of fertilizer by farmers is common and as a result, agricultural runoff carries fertilizer nitrogen and phosphorous particles into natural bodies of water. Eutrophication, an increase in primary productivity, occurs and causes a massive, toxic algae boom that is detrimental to the ecosystem. By determining the type of fertilizer that results in the least amount of primary productivity growth, eutrophication levels in bodies of water can be reduced, resulting in a healthy ecosystem.</p> <p>Methods/Materials Buckets each containing two liters of water from Machado Lake in Kenneth Mallory Memorial Park were seeded with 2.4 milligrams and six milligrams of the three (complete chemical, soluble synthetic, and controlled release) fertilizers to simulate medium and high fertilizer runoff respectively. The experiment lasted a duration of two weeks, in which the containers were aerated with an air pump and polyethylene tubing and placed outside in direct sunlight for 14 hours a day to model an average light dark cycle.</p> <p>Results The overall algae growth from in the water seeded with complete chemical fertilizer was 1440%, the highest amount of growth compared to the 1143.75% and 856.24% percents of growth experienced by the soluble synthetic and controlled release fertilizer respectively. However, the percent of algae growth from mesotrophic bodies of water with medium amounts of nutrients to eutrophic bodies of water with high amounts of nutrients was highest in controlled release fertilizer runoff with a 54.54% growth, followed by a 51.91% growth in complete chemical fertilizer runoff and a 29.61% growth in soluble synthetic fertilizer runoff.</p> <p>Conclusions/Discussion Farmers should use controlled release fertilizers on their crops to prevent nearby bodies of oligotrophic water from experiencing eutrophication. Meanwhile, farmers located near eutrophic bodies of water should refrain from using controlled release fertilizers and instead use soluble synthetic fertilizers until the amount of nutrients in the water decreases to an oligotrophic level, and controlled release fertilizers can be employed.</p>	
Summary Statement The purpose of this experiment is to determine the effect of complete chemical, soluble synthetic, and controlled release type fertilizer runoff on primary productivity growth in bodies of freshwater.	
Help Received Mother drove me to various stores and provided me with the necessary funds to purchase materials	