



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Maya D. Miklos	Project Number J1113
Project Title Soiling Our Earth? Analysis of Nitrogen Levels in Fertilizer Runoff	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Excessive nitrogen runoff from fertilizers results in an overabundance of algae blooms in water systems and also pollutes drinking water supplies. The goal of my project was to determine if there is a difference between the levels of nitrogen runoff in organic compared with inorganic fertilizers. I hypothesized that there would be less nitrogen in the runoff from organic fertilizers as compared to inorganic fertilizers, since the nitrogen in organic fertilizers is covalently bonded into amino acids, while the nitrogen in inorganic fertilizers is found in water soluble forms.</p> <p>Methods/Materials Test pots were set up so that the estimated nitrogen content of fertilizer added was 0.5 grams. Five different fertilizers were tested; three organic (compost, alfalfa, blood meal) and two inorganic (Miracle Grow, Vigoro). Each experiment had four replicates, two of which contained soy bean seedlings. Pots were watered and runoff was collected at 12 different times over 21 days. The runoff was assayed for nitrate, nitrite, and ammonium levels using the API Freshwater test kit. Plant heights were measured, recorded, and photographed 4 times over the course of the experiment.</p> <p>Results The sum of all 12 nitrogen runoff measurements was lower in the organic than the inorganic fertilizers. Using a student's paired T test, there was a statistical difference between the two groups for nitrites and ammonium but not for nitrates.</p> <p>Conclusions/Discussion My data supported my hypothesis; overall there was less nitrogen in the organic fertilizers as compared to the inorganic fertilizers. An important finding was that there were differences between the organic fertilizers in the amounts of nitrogen released, the forms of nitrogen, and the timing of the release. For example, alfalfa released large amounts of nitrates (80 parts per million (ppm) on day 1) and ammonium (75 ppm on day 3) early on, but undetectable nitrites throughout. In contrast, compost released moderate levels of nitrates (50.6 ppm) and nitrites (4.31 ppm) but low levels of ammonium (8.3 ppm) steadily. Comparing plant growth, all plants grown in alfalfa died by day 5, while the average growth for plants grown in compost was 16 cm by day 21. My data suggests that it is not simply a matter of comparing total nitrogen runoff; Amounts and timing of the different forms of nitrogen released should be important considerations in fertilizer selection.</p>	
Summary Statement My project compared the forms, amount and timing of release of nitrogen runoff in organic and inorganic fertilizers.	
Help Received Father helped with data analysis, mother helped with board arrangement.	