



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Noah Patterson	Project Number J2115
Project Title Daphnia Heart Rate: How Do the Central Valley's Most Common Water Pollutants Affect the Heart Rate of Daphnia magna?	
<p style="text-align: center;">Abstract</p> <p>Objectives I wanted to learn how the Central Valley s most common water pollutants, which are chlorine, motor oil, and pesticide, affect the heart rate of Daphnia magna. My hypothesis was that chlorine would affect the daphnia s heart rate the most, followed by pesticide, with motor oil effecting the daphnia the least.</p> <p>Methods To begin my project, I sorted out 480 daphnia into 48 plastic cups filled with 100 mL water so that each cup was filled with 10 daphnia. Then, I extracted 1 mL of water from 36 of the cups and replaced what was taken with chlorine solution, motor oil, and pesticide. At this point, 12 cups were holding 10 daphnia and had 99 mL water and 1 mL chlorine, 12 cups held 10 daphnia and had 99 mL water and 1 mL pesticide, and 12 cups held 10 daphnia and were filled with 99 mL water and 1 mL motor oil. In increments of 10, 20, 30, 60, and 960 minutes, I tested the daphnia s heartrate for 15 seconds and multiplied my results by 4 to find the heart beats per minute.</p> <p>Results Motor oil ultimately caused the daphnia s heart rates to decline the most and ended up leading the daphnia to death quicker than the other two pollutants. Pesticides effected the daphnia in a different way as it increased the average daphnia s heart rate so that they ended up dying as their rates spiked so high to the point of a heart-attack. What stuck out to me the most was that chlorine effected the daphnia the least (and I hypothesized it would be the most effective) because even though the daphnia s heart rates slowly declined, and many of them died, the daphnia that did survive made a full recovery. My results proved my hypothesis wrong as they told me motor oil affected daphnia the most, pesticide affected them second most, and chlorine affected them the least.</p> <p>Conclusions My results and data proved my hypothesis wrong as they conveyed that motor oil affected daphnia heart rate the most, followed by pesticides, and chlorine affected them the least as I hypothesized the exact opposite. My results have also showed me how much each pollutant is affecting our environment. When the daphnia are affected, the entire environment is affected. In conclusion, my project has showed me that whenever a chemical or pollutant is introduced to our environment, our whole community is going to end up effected.</p>	
Summary Statement My project is about how much the Central Valley s most common water pollutants, which are chlorine, motor oil, and pesticides, will ultimately affect the heart rate of Daphnia magna.	
Help Received I borrowed a microscope from Duncan Polytech, a local high school. I asked questions to a college aged science mentor, Titus Patton, who is a former Science Fair participant. My adviser, Reggie McLean, helped lead me through the science fair process. My parents helped me purchase my used materials.	