



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Dave S. Ho</b>	<b>Project Number</b> <b>S1811</b>
<b>Project Title</b> <b>Case Study: Various Modern Chemical Hazards on the Taxis Behavior and the Regenerative Ability of Dugesia tigrina</b>	
<b>Objectives/Goals</b> To discover the reaction of ubiquitous freshwater invertebrates such as brown planarian ( <i>Dugesia tigrina</i> ) towards external manmade chemical stimuli from acid rain and eutrophication. To analyze the severity of several compounds with regards to freshwater ecosystems in North America.	
<b>Abstract</b> <b>Methods/Materials</b> 1. Place 4 brown planarian at the 4 intersections ABCD surrounding the center intersection of the petri dish. 2. Load the desired chemical onto the center intersection point via transparent sponge. Label this point as the loading dock L. 3. Wait 5 minutes. 4. Measure the distance each planarian travels from its starting position. Note whether this is towards or away from the center. 5. Measure the distance away from the center loading area. 6. Note for any changes in the behavior of the planarian. MATERIALS: Tank, distilled water, Oxygen Pump, Tweezers, Nitric Acid (0.1 M), Sulfuric Acid (0.1 M), Sodium Nitrate (NaNO <sub>3</sub> ), Sodium Phosphate (Na <sub>2</sub> PO <sub>4</sub> ), Sponge, Ruler, Camera, Stopwatch, Glassware, Pipets, Goggles, Chemical Apron, Organism Refrigerator, Disinfectant.	
<b>Results</b> The severity of acid rain and eutrophication has been reaffirmed. In every case, <i>Dugesia Tigrina</i> were rendered inactive, erratic, or dead. This issue is only aggravated higher up the trophic levels due to biological magnification. The result of increasing the toxin concentration in water for the planaria was also discovered. An increased concentration generally increased the death toll, and decreases the erratic 'sniffing' condition. The presence of nitric acid in water is more devastating than any of the other chemicals tested with regard to the <i>Dugesia Tigrina</i> . Therefore, more environmental studies should be directed towards the removal of nitric acid from water sources.	
<b>Conclusions/Discussion</b> Should future research be done on this topic, it is suggested that a broader array of chemical be tested. Presently, millions of artificial chemical species enter our water every day. A more precise understanding of toxins affecting planarian behavior can be done by testing more chemicals. In addition, this experiment was conducted with only two levels of concentration: low and high. A more reliable trend can be established by increasing concentration by increments. However, this leaves more room for error, that can only be buffered through an even greater number of trials.	
<b>Summary Statement</b> In an effort to direct global environmental efforts, I attempted to rank the severity of specific manmade compounds on North American freshwater ecosystems by observing how the compounds affected the fitness of <i>Dugesia tigrina</i> .	
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