



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Haidyn N. Washburn	Project Number J0629
Project Title The Leaching of Phthalates from Polyethylene Terephthalate Bottles into Water	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to see if harmful chemical phthalates leach out of polyethylene terephthalate bottles into drinking water.</p> <p>Methods/Materials 2 flats of water bottles were purchased from a store. Due to unknown storage of water I had 2 control variables: store bought water and well water were poured into 1 liter glass bottles. Independent variables were plastic bottles filled with store bought water and plastic bottles emptied of the store bought water and refilled with well water. 8 bottles per variable were then exposed to 144 degrees in a sauna 2 hours a day for 14 days. 8 bottles per variable were left in the sun for 14 days. After exposure all liquids were poured into glass bottles and taken to lab for ultrasonic extraction and Gas Chromatography/Mass Spectrometry.</p> <p>Results After analysis of the well water control tests using the GC/MS, sample one had zero phthalates in the water and sample two had .90466 ppb phthalates in the water. After analysis of the well water exposed to heat using the GC/MS, samples one and two had zero phthalates, sample three had 1.32083 ppb, and sample four had 1.71226 ppb phthalates in the water. After analysis of the well water exposed to sun using the GC/MS, one had 2.58315 ppb, sample two had 1.96569 ppb, sample three had 1.34942 ppb, and sample four had 1.71226 ppb phthalates in the water. After analysis of the store bought water control tests using the GC/MS, sample one had 1.48591 ppb and sample two had 0.90294 ppb phthalates in the water. After analysis of the store bought water sample exposed to heat using the GC/MS, samples one and two had zero phthalates, sample three had 1.58953 ppb phthalates, and sample four had 0.84735 ppb phthalates in the water. After analysis of the store bought water sample exposed to sun using the GC/MS, spectrometry sample one had 1.08912 ppb phthalates, sample two had zero phthalates, sample three had 2.89470 ppb, and sample four had 0.81811 ppb phthalates in the water.</p> <p>Conclusions/Discussion These results are disturbing because the phthalate found was Dimethyl Phthalate. This chemical is found in pesticides, bug repellent and rocket fuel. It can harm the reproductive systems in both males and females and is classified as a teratogen by the National Toxicology Program.</p>	
Summary Statement To determine if harmful, chemical phthalates are leaching out of recyclable plastic water bottles into our drinking water.	
Help Received Mother took photos; Dr. Leonard Fong supervised my testing and allowed me to work at APPL Labs	