



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Wil C. Valtakis, III	Project Number 34028
Project Title Removing Waste Oil from Water Utilizing Magnets	
Objectives/Goals The objective of this project was to utilize nanotechnology in the form of ferrofluid to remove waste oil from water effectively. Further testing will determine the amount of ferrofluid with the best efficiency. Abstract Methods/Materials The project started with petri dishes, and I took the volume into consideration to structure the experiment. I separated the dishes into three groups to run the test 3 times in order to gain an average in data. I started with 15mL of colored water in each dish, then added 2.5mL of mineral oil to all 10 of the petri dishes that held water. After this, it was time to decide how much ferrofluid to use in the experiment. In each group, I tested 1 drop of ferrofluid, 5 drops of ferrofluid, and 10 drops of ferrofluid. I thought this would give a good range of data. The next step was to use a magnet to remove the ferrofluid, and hopefully the mineral oil, from the water. Using a magnet held within a plastic baggy, I ran the magnet through the water across the petri dish, and clockwise in a circular motion to capture as much oil as possible. Each petri dish received two passes with the magnet. Afterwards, I utilized the graduated cylinder to measure how much oil was left with the water after those two passes of the magnet. Results With the data from my experiment and all my observations, 10 drops of ferrofluid proved to be the most efficient. The magnet was able to pull the oil from the water in all petri dishes, save the one that contained no ferrofluid at all. As the ferrofluid drops increased, so did the amount of oil I was able to remove. Conclusions/Discussion In conclusion, this was a very interesting topic to explore. The results proved my hypothesis, that the more ferrofluid I used would result in more oil being removed by the magnet from the water. I decided to do one more test, utilizing the 10 drops of ferrofluid and keeping the other fluids at the same level. With six passes of the magnet, the ferrofluid/oil combo was visible, but not able to be measured with the methods available. So I believe as a real world application, this method has a lot of promise. I would like to see if I can turn the waste oil itself into the carrier fluid so as to not introduce excess oil to the existing spill; but my experiment shows that it has a lot of potential to really assist in the cleanup efforts during a waste oil spill.	
Summary Statement Using magnets to remove oil from water utilizing nanotechnology.	
Help Received Mother took pictures and did proofreading, also gave instructions for using hot glue gun in board prep.	