



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Peter B. Beer	Project Number J1002
Project Title The Efficiency of Using FerroFluid and Magnets to Remove Oil Spills from Water	
Objectives/Goals The objective was to determine if ferrofluid and magnets will work as efficient agents to remove oil from water and to determine if the match between the type of oil spilled and the ferrofluid's carrier fluid affects efficiency. A second objective was to determine if oil will be removed more efficiently in fresh water than in salt water because the salinity could affect magnetism by weakening the magnetic field.	
Abstract Methods/Materials Vegetable, mineral and motor oils were measured (2.5ml) and placed in petri dishes containing 14 ml of fresh water. One dish contained mineral oil and salt water. Ten drops of ferrofluid with mineral oil as its carrier fluid was added to each dish. Neodymium magnets were placed in a plastic bag and dragged through the oil spill 6 times in a circular motion. The remaining substance was poured into graduated cylinders and recorded for amount of oil left behind and observed for any remaining ferrofluid.	
Results Ferro fluid and magnets were most effective in removing mineral oil from fresh water with an efficiency of .9/1. Removing mineral oil from salt water was less effective than fresh water with a .4 efficiency, but more effective than removing the other oils from fresh water (vegetable oil = .2 efficiency; motor oil = 0.0 efficiency). Each type of oil spill had some visible ferrofluid left behind with vegetable oil having little to none.	
Conclusions/Discussion As predicted, ferrofluid's carrier fluid must have similar characteristics to the oil being extracted in order to remove the maximum amount of oil. Salt water reduced the amount of oil removed because salinity weakened the magnetic field.	
Summary Statement Can Ferrofluid and magnets effectively remove oil spills from different types of water without further hurting the environment and without spending a lot of time, money and resources.	
Help Received Mother helped manage ferro-fluid properly for safety.	