



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b>  <b>Desalinating Water Using a Centrifuge and Varying Layers of Filtration</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> In this lab, an investigation was performed to determine whether centrifugal force would be able to remove salt from water. This project utilized technology (a centrifuge and personally designed centrifuge filters) in order to desalinate water, a process which can be used to aid in water reclamation and increase the supply of potable water within a community. Further, the design of this desalination system reduces the environmental impact of desalination in terms of a reduced material and energy footprint.</p> <p><b>Methods</b> A saturated saline solution was exposed to centrifugal force via a small electric centrifuge (acquired through my high school physics department). In order to filter the salt from the saline solution, personally constructed filter capsule designs were placed inside plastic 5mm centrifuge tubes. Different combinations of filters were used to determine which materials provided optimal filtration. The three filter materials used were carbon (which was contained inside a cheesecloth capsule), coarse grain sand, and fine grain sand (both of which were contained in a cotton cloth capsule).</p> <p><b>Results</b> Results show that the carbon and coarse sand filter combination removed 100% of the salt from the saturated saline solution. A T-Test was performed to determine that these results were statistically significant with more than 95% confidence. This indicates that desalination can be achieved using a centrifuge and the filter design used in this experiment.</p> <p><b>Conclusions</b> Desalination using a centrifuge and the carbon and coarse sand filter design used in this experiment is possible, and because this method requires only one cycle of filtration, this method of desalination reduces the material and energy footprint left by traditional reverse osmosis desalination systems.</p>	
<b>Summary Statement</b>  In this lab, a centrifuge and varying layers of filtration were utilized in order to attempt to desalinate a saturated saline solution.	
<b>Help Received</b>  Julie Beckius, Andrea Brown	