



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Jessica M. MacMillan	Project Number S1017
Project Title Amoeba Filtration to Reduce Cholera Outbreaks	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Missions has always been a big part of my life. I am passionate about loving people and helping them in any way I can. I am interning in South Africa over the summer doing missions work with an emphasis on environmental engineering. I want to take my findings from this project and apply them during my internship this summer. There is a need for people to know the skills, such as those I tested in my project, to reduce cholera outbreaks. This problem is easily preventable with the right practices, and I want to provide accessibility to the information to prevent it.</p> <p>Methods/Materials In my project I used T-shirts, chiffon, and dry fit as my filters and amoeba from Flinn Scientific, inc. and Carolina. I used a Moxi Flow Cytometer & cassettes from Orflo to count amoeba in the water. I also used various test tubes and beakers in my lab.</p> <p>Results Of my 16 tests, 14 filtered in the 90%-100% range. There were a few outliers, but for the most part the filtration was successful. This cannot completely filter amoeba from the water, but it can filter 90%-100% reliably. If amoeba can be filtered then when cholera attaches to it, creating an even bigger particle, the filtration rate should go up even more.</p> <p>Conclusions/Discussion Consistent with all of the fabrics, the test with two layers filtered more than the tests with a single layer. Both cotton and chiffon followed the same trends even though, as a whole, chiffon was more successful. The tests with three and four layers were both less than the prior tests which was interesting. The only test that did not follow this trend was the dry fit material, which followed a more logical pattern of filtering more with each additional layer. There could be any number of reasons that this could be true, the cell counter could have counted incorrectly, or there could be abnormalities in the fabric. Another possibility is that with more layers of fabric comes a slower filtration rate, at least on the small scale. Pouring the water with amoeba through, I would have to stop to allow time for the water to filter through before pouring more to not flood the fabric. While pouring slower it could allow more time for the amoeba to pass through the fabric thus creating a lower filtration rate as was observed in the results.</p>	
Summary Statement Since cholera attaches to amoeba in some areas of the world, I am filtering amoeba from water using easily accessible materials to create a design that reduces cholera outbreaks that will be realistic for people in poverty.	
Help Received Dr. Rita Huff, my teacher, supervised my project and use of equipment at school	