



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Arshia A. Mehta	Project Number J1022
Project Title Pure2: A Low Cost, Portable, Microbe-Resistant Water Filtering System Powered by Solar Radiation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This year, I focused on eliminating heavy pathogen from contaminated water, using methods besides boiling, which is inefficient and harms our environment. The overall theory I wanted to prove through experimentation was that pasteurization is only temperature needed to purify water to point where it is consumable. Pasteurization is relatively lower than boiling point, (149 degrees F versus 212 degrees F) which saves energy.</p> <p>Methods/Materials For prototypes, I used polypropylene and polyethylene plastic, bubble-wrap, foam, pressure-heat sealer, waterproof sealant, and individual plastic pieces found at local hardware store. Created three prototypes, pouch, pillow, and pack. Focused on simplicity, quantity, and insulation, respectively. For filter I used PVC pipe, and porous earthen material. Constructed so filter attaches to prototype, water runs through, and ends in prototype, which is left in sun. Focused on ensuring waterproof quality of prototypes, and insulation ability, so water could heat to pasteurization temperature fast. Tested each filter plus prototype combo for metal/quality using testing strips (i.e. nitrite, pH, copper.) Tested for bacteria count using a local laboratory.</p> <p>Results Tested in two categories, original (contaminated sample) and processed (purified sample). Compared both to ideal level. Found that processed sample had matching levels of test variable compared to ideal level, (i.e. ideal pH is 7, processed sample had 7 pH). Original sample had relatively higher/lower quantities of metal/quality compared to ideal (i.e. original sample had a 6 pH). For microbe, lab results came back stating that original sample had 7 colonies of coliform bacteria and other pathogen, whereas processed sample had 0 colonies.</p> <p>Conclusions/Discussion Proved that pasteurization is the only temperature required to turn contaminated water consumable. Rather than wasting energy and harming the environment by boiling water over open fire, we can use plentiful solar energy, which works the same, and is more efficient. Also formed a bill of materials cost, and prototypes plus filter result in cost varying from 10 cents to 5 dollars, depending on prototype. In the end, achieved most all goals, and would like to start manufacturing this product soon.</p>	
Summary Statement Through microbial analysis, I have discovered that heating water to its pasteurization temperature, using solar radiation, is just as effective as the inefficient boiling point.	
Help Received Designed and built prototypes/filter by myself. Tested with testing strips by myself, found microbial data of before and after sample from Zone 7 Water Laboratory.	