



CALIFORNIA SCIENCE & ENGINEERING FAIR

2018 PROJECT SUMMARY

Name(s) Alfred Vargas; Audrey Vargas	Project Number S1127
Project Title Solar Desalination Using a Parabolic Trough	
<div>Objectives/Goals<p>Our objective was to construct a parabolic trough system that desalinates water at its maximum potential by analyzing the optimal position of the absorber pipe. We postulated that the focus point of the parabolic trough would be the point at which the device would most effectively desalinate water. Moreover, we decided to construct this device made from inexpensive materials in order to emulate people's necessities in developing countries and to show a solution to the water crisis.</p></div> <div>Abstract<p>Our device takes the form of a parabolic trough. Supported by a simple buttress system consisting of Polyvinyl Chloride pipes, a copper tube (absorber pipe) is located at an experimented distance from the metal parabolic trough (metal reflective sheet). We would then move the position of the absorber pipe.</p></div> <div>Methods/Materials<p>Our device takes the form of a parabolic trough. Supported by a simple buttress system consisting of Polyvinyl Chloride pipes, a copper tube (absorber pipe) is located at an experimented distance from the metal parabolic trough (metal reflective sheet). We would then move the position of the absorber pipe.</p></div> <div>Results<p>We moved the absorber pipe farther and closer to the focus point of the parabolic trough 0.16 cm. Our data shows that as the position of the absorber pipe is closer to the focus point of the trough, more water is desalinated. However, our results fluctuated numerous times. This can be justified by the changes in weather patterns and solar energy.</p></div> <div>Conclusions/Discussion<p>Our experiment mostly supports our hypothesis because our results show a direct relationship between the amount of desalinated water to temperature and solar intensity. Moreover, as the position of the absorber pipe moved closer to the focus point of the parabolic trough, the device desalinated the salt water at its maximum potential. Furthermore, this is also supported by the Parabolic Reflective Property. This mathematical law, developed by mathematicians Pascal and Kepler, states that any type of ray entering the parabola will refract to the parabola's focus point and concentrate on that point. This is one reason why the device desalinated salt water efficiently near or on the focus point - the absorber pipe was placed on the focus point of the trough, and all of the infrared rays are concentrated on that point, exposing more heat to the pipe and the salt water inside of it. However, this device relies heavily on the sun as well as the environment, proving our hypothesis to be mostly valid because the weather influences the amount of desalinated water produced by this device.</p></div>	
Summary Statement <p>This project is about creating an inexpensive device, taking the form of a paraboloid, which desalinates saltwater using solar radiation.</p>	
Help Received <p>Our advisor guided us throughout the project giving feedback about our project. However, we performed the experiments, the design, and the data of the project.</p>	