Concentrated Solar Thermal

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Ten percent of the world's population does not have access to clean drinking water. The purpose of this experiment was to find and build a non-electric, easily constructed heat source which could power a small water distiller. I hypothesized that a small distiller can be powered solely by thermal energy from the sun and the temperature will vary based on the focal point of the parabolic mirror. For this experiment I built a twenty-one inch diameter concave mirror, constructed from a twenty-one inch metal trash can lid, a solar blanket, caulk, and packing tape. I performed three separate thirty minute tests using the concave mirror to heat 100 ml of water while recording the temperature at 5 minute intervals. I found that the water temperature peaked at 63 degrees C in the 400mL beaker, 84 degrees C in the 150mL beaker and 87 degrees C in the flower vase. Although the water temperature never reached its boiling point in any of the three tests, I observed large quantities of steam emitting from the beaker and large drops of condensation forming on the beaker walls in each test. Steam and condensation provide the means for powering a distiller. From this observation I have concluded that the tests and results confirm my hypothesis that a small distiller can be powered solely by solar thermal energy when concentrated by a simple homemade concave mirror. For further study, I would use a larger mirror or multiple mirrors and build a fully functional distiller.

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