Solar Powered Water Purification Devices: Which Color Is Best?

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The purpose of this experiment was to determine which color of solar powered water purification device would purify water at the fastest rate. The hypothesis was if the bottom of a water purifying device is painted black, then it will clean water more quickly than red, blue, or white because dark colors absorb wavelengths of sunlight better than lighter colors that reflect it. To test the hypothesis, the mass of an empty juice jug had to be measured. Then, four solar powered water purification devices of the four different colors were made, using two jugs each. Next, each device was filled with 200 mL of water and 20 mL of soil. The devices were leaned diagonally against a box and allowed to take in the sun for 24 hours, letting water evaporate and condense in the collecting jug. After, the evaporated water was measured in grams by putting the collecting jug on a digital scale and subtracting the mass of an empty jug from the total mass. This process was repeated for ten trials. It was concluded that the black solar powered water purification device purified the most water compared to the red, blue, and white devices, proving the hypothesis correct. The black device purified the most water in all but two trials, for an average of 1.43 grams per trial. The blue device purified more than the red device in all but one trial, purifying an average of 0.75 grams per trial. The red solar powered water purification device purified the second lowest average mass of water, with an average of 0.39 grams. The white solar powered device purified the least average amount of water, only 0.09 grams. This information can be used in the future to provide more efficient and affordable ways to purify water, especially in third world countries.

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