



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

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| <b>Name(s)</b><br><b>Evan K. Taw</b>   | <b>Project Number</b><br><br>38067 |
| <b>Project Title</b><br><b>Which Type of Drinking Water Is Fresher and Better Hydrates Your Body?</b>  |                                    |
| <b>Objectives/Goals</b><br>There is a popular assumption that all water, especially bottled water, available to the public is essentially equal in their chemical and electrical property. However, there are differing types of water, which come from different sources. The objective of this project is to find out which type of drinking water is fresher and would better hydrate our body.<br><b>Abstract</b><br><b>Methods/Materials</b><br>I tested 8 different types of drinking water, which had the same temperature, from different sources: Aquafina (pure water purified by Reverse Osmosis), Core Hydration (perfect pH water with electrolytes and minerals), Evian (spring water), Essentia (pH 9.5 ionized hydration, pure water electrolytes), Kangen Water (pH 9.5 ionized alkaline water through electrolysis), Smart Water (vapor distilled water and electrolytes), tap water, and Voss (artesian water). I used a pH drop solution to test water pH levels - acidic or alkaline, an ORP meter to test for oxidation or reduction chemical reactions in each type of drinking water, and apples to find out which type of water oxidizes the apple slices faster by submerging them into the waters and removing them to oxidize. I used an apple corer to cut each apple into slices to maintain the same oxidation time.<br><b>Results</b><br>Kangen water showed negative ORP and 9.5 pH values while other types of waters all had positive ORP and different pH values. A positive ORP value means the substance is an oxidizing agent. A negative ORP value means the substance is a reducing agent, which has the ability to donate electrons. An acidic water has more hydrogen ions than hydroxide ions as the acid donates hydrogen ions. In contrast, a base accepts hydrogen ions, and as the base water soaks up hydrogen ions, it results to more hydroxide ions than hydrogen ions. Oxidation rates in water with a lower ORP and a higher pH values are slower because oxygen does not rapidly penetrate a surface in order to reach the free radicals. Consequently, drinking water with lower ORP and higher pH better hydrates our body.<br><b>Conclusions/Discussion</b><br>The results of my experiments confirmed that drinking water with a lower ORP and a higher pH value is not only fresher but also better hydrates our body. My findings would be helpful for chemists, material scientists, and water quality scientists in doing further research on how different sources of water benefit different people based on an individual's pH level, how hydrated they are, and diet. |                                    |
| <b>Summary Statement</b><br>This experiment proved that drinking water with a lower Oxidation-Reduction Potential value and a higher potential of Hydrogen scale is fresher and better hydrates our body.  |                                    |
| <b>Help Received</b><br>My mother helped me take pictures and printed them. During apple oxidation tests, my parents helped me put the apple slices in the waters and took them out at a consistent time so that the apples would all oxidize at the same time.  |                                    |