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Citrus Batteries

The objective of this project is the production of electricity using citrus fruit with a copper and zinc electrode, determining the pH of each citrus fruit juice, and relating the two measurements. Four types of citrus fruits will be used lemons, limes, grapefruit, and oranges. Using a volt meter and a pH meter, two types of measurements will be made for each individual fruit. Upon placing a galvanized nail and a penny in to the fruit, the positive ions are attracted to the penny and the negative ions are attracted to the nail. This creates a potential difference (volts). The potential difference is the source of the battery's power. Connecting several citrus batteries together generates a large enough voltage to power an L.E.D light. A similar battery in use is the lead-acid battery. In a lead-acid battery there is an anode (galvanized nail) and the cathode (penny). After measuring the voltage generated by each fruit battery, the pH meter will be used on each of the fruit juices. To make sure all of the fruit are tested equally the same nail and penny will be used throughout the project. Since a larger number of ions (H+) should create a larger potential difference, the assumption would be that the fruit with the lowest pH would produce the largest voltage. $\text{pH} = -\log[\text{H}^+]$