Emily Soder & Swami Velamala

Plant-Powered Homeostatic Habitat

This project researched how sustainable energy can be created using plants without harming them, as well as ways to regulate the internal environment of a greenhouse so that plants can be grown efficiently. We created a greenhouse and used Arduino sensors to create a cause/effect system that recorded soil moisture, temperature, and light values, then counteracted it with a water pump and fan if the values were too low. It was shown that it decreased the need for human interaction significantly. We researched how energy can be generated from plants, and found that when plants break down the glucose created in photosynthesis for cellular respiration, excess electrons are released into the soil. By putting electrodes on either side of the plant, a current is able to pass through and collect these electrons. We experimented with different plants and electrodes to find the most efficient way to generate energy. We found that this system with the two main elements put together could generate enough energy to power the 5V system, with a surplus of energy that could be used for other needs the customer might need.