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EvanesCo: Our Solution to Cooling Rooms

EvanesCo is a very unique and individual project that we, Wamogo Regional High School students from tenth grade biology, are very proud of. The word "evanesco" means to "vanish" or "disappear" in Latin, and was thought up of by some students who partake in Latin. Since we're making the warmer air "disappear", the word works perfectly, not to mention is unique, different, and hard to forget. EvanesCo is a proper and highly developed project because of our background knowledge of hydrogels, how we carried out successful experiments, and having accurate conclusions that would lead us to develop forward.

Our project is centered around the idea of self-cooling buildings. We are using hydrogels, which are hydrophilic cross linked acrylic polymers, that expand when put into water. They can multiply to nearly 400x their size and weight. Besides being used for cooling, they can also be used for contact lenses, wound dressings, and more (France, 2014). The hydrogels cool a room by using the water that they have absorbed to evaporate, and cool the surrounding air around the gels by about five degrees celsius (CityMetric Staff, 2014). It also can affect the change of pH and other chemicals in the environment, if needed. (Chu, 2013). We are all knowledgeable about what these hydrogels are made of, and how they can cool down buildings without the heavy cost of air conditioning.

In addition, we had a total of five experiments in which each of the experiments gave us a significant amount of information. With our first experiment, we focused on finding which size

hydrogel, since we had three, cooled the air the most. In this experiment, the hydrogels were put into separate beakers with thermometers suspended above them. The results were not entirely significant, however there was a change of two to three degrees. The results of this experiment may not have been significant, but the couple degrees got us excited about scaling the experiment to a larger size. The next experiment we conducted, we put the hydrogels in a controlled environment instead of being out in the open. This experiment left the hydrogels in an enclosed space, which would impact results because the colder air would be contained. The third experiment was when we put the hydrogels onto ceramic trays, and then measured the temperatures underneath them. We came to the conclusion since hot air rises, cold air sinks (Bailes, 2012), that it would be beneficial to record the temperature above and beneath. We found that the placement of the hydrogels did not in fact affect the results. For our fourth experiment, the experiment group created a very complex controlled environment in a box. They aimed to simulate what it would be like if it were actually in the senior lounge. Creating this complex but very accurate model was inspired by Steve Spangler, and the experiment he did using hydrogels as well. Next our heating and ventilation advisor, Mr. Bridgewater, suggested to us that creating an air flow will definitely help keep a room cool. The experiment group then added a fan to create circulation, so they could get a more accurate simulation of a room. The last experiment helped us to develop an understanding of what the size of the hydrogel does to affect the temperature. We came to the conclusion that the jumbo hydrogels, the temperature will decrease for a longer period of time and that they won't evaporate excess water as fast as the smaller sized hydrogels. From all of our experiments we found that using jumbo sized hydrogels, in a controlled environment, and with a form of air circulation will give us the most accurate results.

The conclusions that we made at the end of each experiment were important because we had to make our project better with each trial. With the first conclusion, we found that the regular sized hydrogels worked three times more efficiently than the jumbo or small hydrogels. Then, with the second experiment, there wasn't much of a change in temperature, since there was no air flow in the boxes. We hypothesized that putting an airflow in the box would help keep the temperature going down, and we then added that element the next experiment. With the third experiment, we concluded that all three sizes of hydrogels were able to cool the air, compared to the ambient temperature. At the fourth experiment, we concluded that we are decreasing our efficiency by using ceramic plates. For our fifth and final experiment, we concluded that by creating an airflow into the box, the output temperature was colder than the ambient and intake air.

To conclude, EvanesCo is a fantastic project that Wamogo has to offer. Not only can it lower air conditioning costs, as well as improve the environment because it's very nature friendly. All of the students have gotten personally interested in the study of the hydrogels, we have very extensive knowledge of them, and are happy to share it with others who are interested. We are also very skilled with developing and improving our experiments so that we can get the most accurate, and best conclusions.

Works Cited

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