Hydroponics:

Future of Farming and Healthy Eating

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Hydroponics—Future to Farming and Healthy Eating Outline

I. Introduction
   A. Zombie encounter.
   B. Media's use of zombies and "end of the world" in movies and advertisements
      1. *The Walking Dead*
      2. *Doctor Who* and examples of hydroponics used in episodes set in future.
   C. Thesis statement-- Educating others on hydroponics will not only help to eradicate the issues caused by over-farming and shortage of farmland but will also help to promote healthier eating habits.

II. What is hydroponics?
   A. Definition
   B. What benefits come from it?
      1. Benefits to the land
         a. No more over farming of land--less and less land for farming
         b. Keeping soil clean--control over chemical components in or dumped in soil
      2. Benefits to the people
         a. Eating healthily
         b. No preservatives or artificial additives
         c. Joy of getting hands-on experience

III. The use of hydroponics in the industry vs. the use of hydroponics in the home
   A. In the farming industry
   B. In the normal household kitchen/garden

IV. Water—lack of freshwater—no problem
   A. Wastewater
   B. Seawater

V. Hydroponics—future of farming-- How can the use of hydroponics be spread?
   A. Educational classes
      1. Middle school and High school curriculum
      2. After-school classes
      3. Community Center
   B. Disney's use of hydroponics

VI. Conclusion

A rancid smell drifts in through the cracks of a broken window. A couple sits, catching their breath, on a torn, moldy couch in front of the measly meal they scavenged from a nearby cabin. A look outside shows exactly why they are tired and out of breath. Scattered about like confetti after a Mardi Gras parade are brain-dead, decaying bodies, consumed by only the need for flesh and brains. The couple on the moldy couch could very well be one step closer to relaxing and being comfortable if they tried growing their food instead of foraging for it. They could easily turn a small basement into a prosperous garden using just water in a soil-free process called hydroponics. This may not be the most realistic of situations, but this scene and many like it seem to monopolize TV and movie screens. Media conveys the end of the world through zombie apocalypses and radioactive disasters. Most look at hydroponics, or growing vegetation with water plus nutrient additives and no soil, as being a future science. For example, in Russell T. Davis's *Doctor Who* episode "Water of Mars," the way the Martian water contaminates the astronaut scientists is through the hydroponic vegetation system. It's easy to see why people would view hydroponics as a science of the future, but it goes back a lot further than one would ever think and has proved to be very beneficial. The lack of freshwater is a big problem in hundreds of countries. New methods and filtering systems can not only filter seawater but wastewater as well, making it easier to provide food for these countries. Many different companies use hydroponics to grow fruit and vegetables for grocery stores and restaurants. Many companies and farming entrepreneurs are offering more and more educational classes and lessons to help educate people about new farming methods, including hydroponics. Walt Disney was a big supporter of moving forward; at Disney World, they offer a behind-the-scenes view of their hydroponic methods. They even have a restaurant that only

serves the vegetables and fruit from there hydroponic gardens. It is just as easy for everyone to use the same methods in a backyard garden or kitchen. As it is, every day, more land gets sold for development and less land is used for farming. What land is left for farming is severely over farmed and undernourished. Educating others on hydroponics will not only help to eradicate the issues caused by over farming and shortage of farmland but will also help to promote healthier eating habits.

It is best to start at the beginning by explaining not only what hydroponics is, but how it started. Merriam-Webster dictionary defines hydroponics as "the growing of plants in nutrient solutions with or without an inert medium to provide mechanical support" ("hydoponics," 2014). In simple terms, that is growing plants with just water and nutrient-rich fertilizer rather than with soil. This can be a hard practice since the leading cause of death in house plants is over watering. This is caused by the lack of oxygen to the roots, causing asphyxiation. When growing plants in this method, one must consider that the water has to be "alive"; plants soak up their food in the form of ions dissolved in oxygen. Ultimately, the gardener must take into consideration the plant's needs by balancing the blend of oxygen, water, and nutrients. "For best results…take into account; temperature, humidity, and CO2 levels, light intensity, ventilation, and the plant's genetic make-up" ("Hydroponics," 2010). This method of growing vegetables and other plants is a great way for people who love the city life, but still wish for a garden and healthier home grown food.

Many would refer to hydroponics as a new science, but this mindset could not be more wrong. There are several accounts and beliefs about hydroponics dating back to Biblical times; many believed that the hanging gardens of Babylon were the first plants grown through this

method. Other studies show that the Aztec culture developed floating gardens using reeds and roots since they were unable to grow crops on the marshy land they were forced to live on. Further studies only date hydroponics as far back as the 1600s, when scientist Jan van Helmont showed that plants gain nutrients through water. After Helmont's experiments, many other scientists developed studies on plant growth without soil. This included two German professors who made immense advances in plant fertilization; Julius von Sachs published the first nutrient solution formula, while W. Knopf was known as "Father of water culture." Even with all the studies that have been done on what is now known as hydroponics, the actual term was not coined until the 1920s. Dr. William Gericke, of the University of California, devised the term while conducting his research in the 1920's and 30's. This same research is the foundation to all commercial methods today (Snyder, 2001). After Gericke left the university, D.R. Hoagland and D.I. Arnon took over the hydroponic research. They developed the most commonly used solution used in hydroponics today (Gossett, 2010, pp. 588-590). Hoagland, Arnon and other scientists strived to highlight the ease and benefits of growing their own fruits and vegetables.

It is estimated that by next year, 2015, the number of people living in the 21 megacities around the world will rise to a record 340 million. With these astonishing numbers, it will be a battle to change the foundation and the way the population is fed and supported (Brownstone, 2013). As the population grows, more farmland is purchased and used for urban development, while less land is used for farming and food production. The amount of waste is also growing, causing even more farmland to be used for disposal. Soon the world will be boarding the Axiom, heading off on an adventure while Wall-e cleans up the over flowing dumps and landfills. The use of hydroponics would help ease the need for land. It would also help keep the land

that's being used to stay clean and grow the vegetables needed in a sterile and chemical free environment. Some states, like Oregon, have established farmland protection programs to keep farmland protected for agricultural purposes. Oregon Revised Statutes 215.243 describes it as "Preservation of a maximum amount of the limited supply of agricultural land" ("DLCD Farmland Protection Program," 2013). Most counties around the world, however, do not have programs like this. Canada, for instance, does not have any laws against dumping waste on land (Foss, 2000). This makes for some very dangerous situations in the farming industry. This careless dumping makes it even more important to influence others to start new methods of crop production. Hydroponics cuts out the dangers of chemically contaminated soil.

Chemical free means healthier food, and everyone could use that. The U.S. has the highest obesity rate in the world sitting at #1 with 33.9%. Alabama sits at #3 in the country at 32.2% obesity rate (http://obesity.procon.org). With such a high obesity rate, one would think that the U.S. would try harder to lower the obesity and start eating healthily. A big step in the right direction would be growing vegetables and herbs right in one's own kitchen or backyard. The product would be considerably tastier than store bought. Plus, one would get the joy of having grown it. With no preservative or chemical additives, the food would also be considerably healthier. There's a reason organic food is more expensive and in high demand. It is much more beneficial, both financially and personally, to grow the produce on one's own.

The use of hydroponics in farming is on the rise. Many modern-day farmers are trying to incorporate hydroponics, and other methods like it, into their production. Samuel Bien, director of operations and business development of GrowPonics in Oklahoma, broke ground both literally and figuratively on a "hydro-organic" facility in 2010 in Rogers County, Oklahoma.

The facility, which is about three acres, produces enough lettuce and produce each month for Bien to sell to his surrounding community instead of having to import from out of state. Bien wants to spread this idea and see the trend sweep around the U.S. He wants to use his business background, from the University of Oklahoma, to help local farmers sell their produce. His main objective is to flood the market with organic produce to help drive the market price down (Wilkerson, 2010). Even though greenhouse-grown vegetables are more consistently grown in size, quality, and shape, the U.S. only uses 6% compared to over 90% of European countries vegetables coming from greenhouses. Mainly this is because most foreign countries lack the soil and fresh water to produce the necessary produce for the population. The U.S. is not far behind due to over farming, waste disposal, and lack of land for farming. There can be many contributing factors for farmers during the growing and harvest times. Weather can be a major problem. One season can be mild and produce a prosperous crop while others can be drastically dry or wet. Hydroponics would take the weather issue away entirely since it uses a controlled environment.

Many people take advantage of the accessibility of clean or fresh water. In many of the megacities there is not as much of a problem finding suitable water resources. In many smaller cities and villages, however, fresh, clean water is almost impossible to find. In Australia, unlike land, usable water is not as easily accessible. In 2013, Charlie Paton developed a means to get that fresh water. By using evaporation and condensation, Paton developed a method in which he could filter the seawater and make it usable (Hall, 2013). In Spain, the use of wastewater increases, especially in areas where other water resources are vastly limited. Irrigation with wastewater has been broadly endorsed for its advantages to the environment. In an

experiment done by M. Adrover, G. Moya, and J. Vadell, they discovered that the treated wastewater had the same effect and benefits that the freshwater had on the crop (Adrover, Moya, & Vadell, 2013). Doctor Who should have found a way to filter the water on Mars the same way!

Hydroponics is a fast-growing method that should be taught widely across the country. Some people, like Bien, have already taken that proverbial step forward. In Vinton, Iowa, a former engineer, Mike Elwick, bought a middle school plus its surrounding property and turned it into a learning opportunity. He not only provides produce for the food trucks around the area, but he also sells from a road-side stand. In the future, he plans on teaching urban gardening classes for young and old alike ("Ground Floor," 2014). Elwick said, "It's more than just a business, it is educational" (Elwick, 2014). Elwick, like many others, recognized the need for educational classes and hands-on experience in a growing field. The use of after-school classes at agricultural facilities and community centers would help spread the word about this growing vocation. There is a ride at Walt Disney World in Orlando, Florida, where you get a tour of their laboratories and a lesson on "Living with the Land." They also offer backstage tours and hands-on classes on the methods they use, including hydroponics. After the tour, there is a restaurant upstairs that serves the vegetables, fruit, and other vegetation they grow in their laboratories. Everyone should take a page out of Walt Disney's book. Walt Disney was all about moving forward and developing the new. The Disney Company strives to continue his legacy of progressive thinking and development.

Educating others on hydroponics will not only help to eradicate the issues caused by over farming and shortage of farmland but will also help to promote healthier eating habits.

The need for food and nourishment is a constant in everyone's life; it cannot just be ignored. The over farming of land and under-education of society on the importance of healthy food production seems to be at a standstill, if not getting worse. The joys of getting one's hands "wet" and actually producing one's own food is a freeing and euphoric experience, with benefits to the land and to the person. Don't let the lack of land deter you from stepping into the future and starting a healthier life. Pick up a newspaper, look in the yellow pages, or explore the community center; find a new way to be healthier. If by any chance the world does sink into a zombie apocalypse, the knowledge of how to grow food without soil will surely save many uninfected, from starvation and potential consumption.

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