

The history of edible landscaping environmental sciences essay



**ASSIGN
BUSTER**

Bridget Bell Professor James Neuenfeldt BIO 100 Honors Project Edible

Landscaping Imagine yourself driving down a quaint neighborhood street.

You pass by lawn after beautifully manicured lawn, when suddenly, towards the end of the block, you spy a yard akin to the Garden of Eden. It is complete with ripe fruits and veggies of the most vibrant colors. Fruit trees display their bounty of the most mouth-watering looking apples, peaches, and oranges to hungry passers-by. Plump red tomatoes, green leafy heads of lettuce, and vines of string beans gripping tightly to training trellises abound within the confines of this front lawn, which is not really a lawn after all, but a garden of organic goodness. This is edible landscaping at its finest.

The homeowner has successfully transformed his front yard from a grassy span of nothingness into a useful and productive piece of real estate that provides a great number of benefits to the residents of the home, as well as to the community and environment in general. If a homeowner decides to turn his lawn into an organic garden, a few things must be done to ensure a quality yield. First, the resident must have a test conducted on the soil to determine which nutrients it is mainly composed of. A standard soil test includes the pH and fertility levels by quantifying the nutrients boron, copper, manganese, calcium, phosphorus, potassium, magnesium, and zinc to determine their availability to the plants. The pH level of the soil plays a large role in the growth of the garden because the overall acidity should be fairly neutral, and the pH level should be between six and seven on a scale from zero, very acidic, to fourteen, very alkaline. The soil can be adjusted to suit the growing needs of the garden by adding lime or fertilizers

accordingly. Another way to ensure a bountiful harvest is to include fungus and bacteria into any soil amendments. Certain types of fungi have a <https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

mutualistic relationship with garden plants such as arbuscular mycorrhiza (AM). This fungus infiltrates the cells in the roots and forms arbuscules, specialized units that are the locations where the exchange of nutrients takes place between the AM and the plant. Mycorrhiza is a symbiont and must have a host plant to be cultured, and the plants in the garden benefit from this association. " The hyphae, or root-like structures, of AM merge with the roots of plants, to deliver phosphorus, water and micronutrients to the plant. The plant utilizes these resources to grow and photosynthesize, capturing carbon dioxide from the air and transforming it into carbohydrates, which the plant feeds to the mycorrhiza (Grantham, 2011)." Bacteria like rhizobia aide legumes and other plants in forming nodules. " These bacteria fix nitrogen from the air and convert it to ammonium nitrogen, a form that can be used by the plant (" Soil basics," 2012)." In fact, bacteria are the most prolific cells in the soil and perform decomposer duties by secreting enzymes like glomalin. Sugars and starches get broken down into nitrogen and carbon providing an energy source for the bacteria. Any remaining nutrients are then released into the soil for the plant to benefit from. These components of fungus and bacteria are part of a larger soil food web that consists of all of the organisms that reside in the ground. The primary food source, organic matter, nourishes not only the bacteria and fungi, but actinomycetes and nematodes as well. Actinomycetes are another type of bacteria that are " responsible for the distinctive scent of freshly exposed, moist soil (" Soil Bacteria," n. d.)." Nematodes, or roundworms, have been known to assist in pest control due to their ability to infect insects with their symbiotic bacteria (Shapiro-Ilan, et al., n. d.). Good soil has profound effects on the agricultural productivity of a garden, and the proper care must be

<https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

taken before any seed or bare root is purchased or planted if the plot is to be long-lived. During the soil amendment period, the homeowner should be planning out which plants he should put in his yard. It should also be decided whether his front yard will be a traditional garden or a permaculture-style oasis. A combination of both is the ideal approach. It would be beneficial for the plants if shallow-root feeders were grouped with the deep-root variety so that they would be drawing nutrients from different parts of the soil. The concept of companion planting would ensure the gardener will be able to sit back and watch his front yard grow and produce fruits, vegetables, and herbs without harmful chemicals or fertilizers. The science behind planting certain types of plants with one another has been around for a great number of years. The Native Peoples of the Americas used corn, beans, and squash because they knew that when planted together, the "Three Sisters" would produce a more plentiful harvest. The corn would become a trellis for the climbing vines of the beans while they simultaneously provided added support to the corn stalks themselves. Squash or pumpkins would be sown around the perimeter of the planting area which would provide ground cover, act as a natural mulch due to their shallow roots, and prevent weeds from reaching the sunlight and photosynthesizing. Fish would be buried beneath it all providing fertilizer for the seedlings. The beans also draw nitrogen from the air while their symbiotic bacteria convert it into a form usable by the plants, thus increasing the overall fertility of the garden. Furthermore, the spines on the squash would discourage predation by wildlife as they would deter creatures from getting too close to nibble on the beans or corn. However, the Three Sisters are not the only companion plantings available to the knowledgeable <https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

homeowner. According to Louise Riotte for Mother Earth News, there are many plant combinations that provide benefits to the garden. Some pairings aid in the overall growth of the plants while some repel pests for one another. For example, asparagus (*Asparagus officinalis*) and parsley pair well, because together they promote vigor in both plants. Add tomatoes into the mix, and the asparagus reaps the added benefits of protection from asparagus beetles. The solanine, a volatile alkaloid, present in the tomatoes acts as a natural deterrent to the pests. The juice of the asparagus also has been known to kill parasitic nematodes such as the stubby root and root-knotting varieties that infest the roots of tomatoes. Basil contributes to this grouping of plants as well, thereby completing the set. Beans and potatoes are also mutually beneficial to one another. The bush beans protect the potatoes from the Colorado potato beetle, while the potato, in turn, guards the beans from Mexican bean beetle predation (Riotte, 1992). Companion planting could be a permanent solution to the monoculture prolific in our present agricultural system. By taking this concept into consideration and implementing it into his garden system, the homeowner can be confident that his plot will be utilizing sustainable practices rather than having to rely on chemicals to achieve the same results. At this point, the results from the soil test and the subsequent amendments thereafter have readied the substrate for planting. The homeowner has chosen his edible landscape design and may now commence with its implementation. He has decided which plants are to be sown into his plot after researching companion planting and thinking about his own personal taste as well. The plants are then dispersed as to the dictates of the design and grouped together so as to reap the full benefits. Herbs such as hyssop, rosemary, sage, thyme, <https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

peppermint, and southernwood are interwoven throughout the garden to discourage certain butterflies from laying their eggs in the garden, because caterpillars are a main source of grief for farmers everywhere. The bright colors of the flowers of these herbs do encourage pollination at the same time by attracting bees and other animals. Pollination is a huge concern for gardeners across the country. Pollen must be moved from one flower to another by a pollinator or by the wind in order for fertilization to occur. This leads to successful seed and fruit production. Viable seeds will be sure to develop, and the fruit will be full-bodied (" Pollinator Partnership," 2012), but without the efforts of bees and other animals, the plants would not be able to reproduce as easily or at all. Hummingbirds, bats, butterflies, beetles, flies, and, of course, bees, all carry bits of pollen from blossom to blossom, making up 75% of the pollination necessary to produce many types of vegetables, fruits, and nuts that depend on these animals (" Pollinators," 2012). The homeowner would need to take this into consideration and may intersperse certain attractive flowers like marigolds and geraniums as well throughout his yard inviting wildlife to spread his garden's pollen all around. The decline in recent years of bees worldwide is of great concern to gardeners, and evidence has shown that the destruction of habitat and the misuse of chemicals has affected their populations. The homeowner would be providing a safe refuge for the wildlife, while benefitting from their presence within his garden through pollination and pest control, expressing a mutualistic relationship between them all. Whether realizing it or not, the homeowner is taking part in the " kill the front lawn" movement sweeping the nation. This concept sprung from people refocusing their efforts on health and sustainability and freeing themselves from the corrupt food

<https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

system in America. According to author Michelle Moore, " Part of the effort is designed to reduce water and chemical consumption as the typical front yard consumes up to 60 gallons of water per day and 90 million pounds of pesticides are applied to lawns each year. Another part of the movement arose from people's desire to have fresh home grown food in an urban space (Moore, 2012)." People are more aware now of how their food is grown and where it comes from, and they want to have more input on what exactly they put into their bodies. The installation of gardens into yards, both front and back, has exploded in recent years, as more individuals recognize the benefits of fresh organic food. The " kill the front lawn" movement enlists the notion that having grass in your front yard is unsustainable. Gabriela Worrel writes in Planning magazine that, " we like lawns so much that they have become the number one irrigated crop in the U. S., according to a NASA sponsored study published in 2005." She estimates that there are as many as 49, 000 square miles of lawn in the country, which is an area almost equivalent to the the size of Greece. Worrel figures that irrigated lawns comprise three times the amount of irrigated corn, and that it requires 200 gallons of water per person per day to keep it all hydrated. The effects on the environment of having a grassy lawn rather than an edible landscape design are also felt in other ways. Gabriela Worrel goes on to say that, " According to the U. S. Environmental Protection Agency, a traditional gas-powered lawn mower emits carbon monoxide (a poisonous gas), as well as hydrocarbons and nitrogen oxides, which react in the atmosphere to create ground-level ozone, leading to smog and harming human and plant health (Worrel, 2009)." Lawns also usually need to be treated with chemicals which seep down into the groundwater over time and pollute waterways from <https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

runoff. In addition, having a productive edible garden in the front yard would lower the amount of miles the food has to travel between sites to get from producer to consumer. Overall emission output from these transport trucks would be lowered causing the air quality to remain the same rather than get steadily worse. William H. Roley, Jr. states in the article " Edible Landscaping" that the " costs for transportation, marketing, and packaging are substantially reduced" because the garden produces food locally (Roley, 1993). This idea can be applied not just in monetary terms but to the environment as well, because the effects of the factories needed to produce the packaging and the fossil fuels used by the tractor-trailers would ultimately be reduced over time also, thus confirming the idea that a garden in the front yard is more sustainable than having grass. The garden plants may need some added nutrients after being sown, and the use of organic fertilizers can be implemented by the gardener in many ways. First, certain types of soil require different combinations of nutrients. As the plants grow, some may need any soil deficiencies to be addressed, and " dry fertilizers, such as fish meal, kelp meal and rock phosphate, usually deliver specific nutrients to the soil (Douglas, 2012)." Differing meals of cottonseed, blood, soybean, and fish contribute nitrogen to the soil. Phosphorus is supplied through rock phosphate and bone meal, while greensand, kelp, and granite meal deliver potassium. Compost and manure can also be used, as can liquid fertilizer. Fish emulsions and seaweed formulas work well with vegetables and can be applied directly to the plant leaves to quickly deliver nutrients. By now, the homeowner is starting to see the results from his intensive work and planning. Seedlings have sprouted up all over the plot and grown into a beautiful wonderland of greenery. By using a permaculture

<https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

approach to his garden, he will be able to somewhat relax while the specific combinations of plants react to one another stomping out infections and infestations. The overall maintenance of the garden will be easier, and he will have more time to enjoy the beauty of the plants throughout the season and enjoy a higher yield as an added bonus. The quality of the produce will also be much higher for a number of reasons. The fruits and vegetables grown in the homeowner's front yard garden makes the preparation and care he has taken all worthwhile. Not only will the produce be fresher, but the nutrients they provide will have profound effects on his body. Plants have vitamins that are essential, and they cannot be synthesized or manufactured by the human body. Vitamin A aids in cell reproduction and immunity, and it promotes bone growth and good vision. It can be found in a number of fruits, vegetables, and nuts including cantaloupes, broccoli, and pecans. Vitamin B3, niacin, contributes to the conversion of food to energy by affecting the digestive system. This nutrient is prevalent in peaches, peas, and sunflower seeds. Folate is found in most green leafy vegetables as well as oranges and peanuts, and promotes red blood cell production and DNA creation. It is a vital component of the spinal cord (Decuypere, 2012). The fruit color wheel is a good indicator of the vitamin content of a fruit or vegetable. Darrell Miller says that by 'eating a rainbow,' "you are guaranteed a diverse amount of essential vitamins and minerals (Miller, 2008). Red fruits and veggies contain lycopene, ellagic acid, and Hesperidin which have been know to lower the chance of prostate cancer and support joint tissue, among other things. Orange and yellow fruits and vegetables are rich with beta-carotene, flavinoids, potassium and vitamin C. The valuable nutrients lower cholesterol and blood pressure and promote

<https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

collagen formation. Green items contain chlorophyll, calcium, folate, and fiber and are known to give a boost to the immune system as well as support retinal health and vision. Blue and purple fruits and vegetables are filled with lutein, zeaxanthin, and resveratrol which support healthy digestion and improve calcium and other mineral absorption. Finally, white fruits and veggies have nutrients like beta-glucans and lignans that balance hormone levels and reduce the risk of breast, colon, and prostate cancers. By basically having his own health food store in his front yard, the homeowner will be on his way to a more fit lifestyle in a short time. By utilizing the space in his front yard as an edible landscape, the homeowner has experienced the newly burgeoning culture of the urban gardener. In her book *Food Not Lawns*, author Heather Flores states that "one's yard can be a vehicle for personal growth and transformation--as well as the transformation of the surrounding community, the local ecology, and ultimately, the planet (Worrel, 2009)." With the soon-to-be overflowing garden, the homeowner may choose to donate some of his harvest to a local food pantry, or he may choose to sell it at a local farmer's market. Either way, he will reap the bounty of his garden for years to come because he took the time and energy to check and amend the soil composition, create and utilize a permaculture-style design, research and implement companion planting strategies, and fertilize and control pests with organic methods. His garden will be the tastiest and most nutritious front lawn on the block. Work Cited Douglas, E. (1996-2012). What organic fertilizer should I use on vegetables? Green Living on National Geographic. Retrieved November 10, 2012, from <http://greenliving.nationalgeographic.com/organic-fertilizer-should-use-vegetables-2523.html> Dr. Decuyper's nutrient charts. (2002-2012). Vitamin <https://assignbuster.com/the-history-of-edible-landscaping-environmental-sciences-essay/>

Chart. Retrieved November 10, 2012, from <http://www.health-alternatives.com/vitamins-nutrition-chart.html>

Flores, H. (n. d.). Food not lawns. Food Not Lawns. Retrieved November 10, 2012, from <http://www.foodnotlawns.com/index.html>

Grantham, A. (2011). Mycorrhiza matter. Rodale Institute. Retrieved November 10, 2012, from <http://www.rodaleinstitute.org/20090806/gw1>

Miller, D. (2008, January 12). Color wheel of fruits and vegetables. Disabled World. Retrieved November 10, 2012, from <http://www.disabled-world.com/artman/publish/fruits-vegetables.shtml>

Moore, M. (2012). The edible garden. The Greenhouse Catalog. Retrieved November 10, 2012, from <http://www.greenhousecatalog.com/greenhouse-garden>

Pollinator partnership. (1996-2012). Pollinator Partnership. Retrieved November 10, 2012, from <http://pollinator.org/pollination.htm>

Pollinators home page. (2012, September 28). Pollinators Home Page - U. S. Fish and Wildlife Service. Retrieved November 5, 2012, from <http://www.fws.gov/pollinators/Index.html>

Riotte, L. (1992). Carrots love tomatoes. Mother Earth News, (130), 48.

Roley Jr., William H., (1993). Edible landscaping. The Futurist, 27(2), 18.

Shapiro-Ilan, D. I., Gaugler, R., & Shelton, A. (n. d.). Nematodes. Cornell University. Retrieved November 10, 2012, from <http://www.biocontrol.entomology.cornell.edu/pathogens/nematodes.html>

Soil bacteria and actinomycetes. (n. d.). Soil Biological Communities. Retrieved November 10, 2012, from [http://www.blm.gov/nstc/soil/bacteria/Soil basics: Biology](http://www.blm.gov/nstc/soil/bacteria/Soil%20basics%20Biology).

(2012). Cornell Garden Based Learning. Retrieved November 10, 2012, from <http://blogs.cornell.edu/horticulture/soil-basics/soil-basics-biology/>

Worrel, G. (2009). Lawn be gone. Planning, 75(8), 20-25