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Learning to Eat Appreciatively and Thoughtfully (EAT): Connecting with Food through School Gardens

Lina A. Yamashita
Oberlin College

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Honors Thesis in Environmental Studies

Lina Yamashita

Oberlin College

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Advisors/Readers:

Tom Newlin **Roger Laushman** **Brad Masi** **Cheryl Wolfe**

I affirm that I have adhered to the Honor Code in writing this thesis.

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Introduction: How my Interest in Food Education and School Gardens Grew

Eating dinner together as a whole family every Sunday – the only day in the week my father did not work and was at home for dinner – was a family tradition throughout my childhood. Meals were simple and in no way gourmet, but I never felt deprived of good food – just about anything that my mother had prepared would be delicious because I would be hungry by mealtime, particularly since she never allowed snacking before meals. More than the details of the food, however, I remember the cozy atmosphere of the dining room and the feeling of contentment during and after each meal.

My passion for cooking (and not just eating) food developed during the summer after my sophomore year in college. For the first time, I cooked almost every day. I discovered the joy of experimenting with and combining different condiments and vegetables, and soon could not get enough of the sizzling of onions and garlic as they slowly released their juices and infused the kitchen with their sweet, nutty, magical aroma. I often e-mailed my mother for advice and asked for her recipes.

My fascination with food and cooking grew further the following summer in 2007 while I lived in the Bay Area. Food continually delighted me viscerally while cooking and eating, and emotionally as I checked out every vendor and stall at the weekly farmers' markets, tasted samples of fresh fruits and artisanal foods, and bought fresh, seasonal produce. The farmers' markets were one of my highlights of last summer.

Unfortunately, however, many young people today do not learn to cook, or eat nutritious, regular meals together with their families, or go shopping for produce, as I have. Because of this, they do not develop any real appreciation for food. To make matters worse, many public schools fail to teach students anything at all about the complex environmental and cultural history of

food – how it is produced, preserved, prepared, and distributed. At the same time, schools serve lunches that often lack nutritional value.

Consequently, schools are failing to foster *food literacy*. This is the ability to understand where food comes from and how it is produced, appreciate the cultural significance of food, make healthy decisions, and recognize the implications – social, environmental, political, cultural, and economic – of the food we eat. Food literacy among young people is critical because it can allow them to lead healthy lives and ultimately make decisions that help alleviate the problems associated with or exacerbated by our current food system. These include climate change (i.e., using fossil fuels in food production and distribution), social inequities (e.g., small farmers losing out to agribusinesses), and an ever-growing obesity epidemic particularly among children that is threatening to shorten their lifespan.

Although these are clearly large, overwhelming, complex issues, we need to start somewhere in order to address them effectively. Perhaps, K-12 schools are the most appropriate, logical, and practical setting to begin cultivating food literacy among our future citizens who will be equipped to make decisions that reflect an understanding of the critical problems that we face. Specifically, I believe that food literacy can be fostered through school gardens by providing students the opportunity to learn to grow and harvest their own food, cooperate with their peers, and develop a first-hand appreciation of and connection to their food and environment.

About this Thesis

My desire to explore the argument that school gardens can help develop food-literate students planted the seed for this thesis. I was particularly inspired by Alice Waters and the Edible Schoolyard program that she founded in 1995. The Edible Schoolyard is a garden at the

Martin Luther King Jr. Middle School in Berkeley, California, that is a formal part of the academic curriculum.[1] The school also has an on-site kitchen where students cook with the produce they harvest from the garden. Wanting to learn more about the program, I sought to answer questions such as: What led Waters to start the Edible Schoolyard? What is her philosophy? What are her specific goals for the program? How does it operate? How has it been integrated into the curriculum? What has it accomplished? What factors have helped sustain the Edible Schoolyard? What challenges has it faced? Could the program be replicated elsewhere? What kind of outreach work is the Edible Schoolyard doing? What other exemplary gardening and food education programs exist in the US?

My curiosity about the Edible Schoolyard also led me to wonder the origin and history of school gardens themselves. When and where were they established? What was the purpose of the early school gardens? Who were some of the supporters of school gardens? What are the factors that influence the support of school gardens or lack thereof? What were some of the instructional values associated with school gardens, and how have they changed?

I felt that the answers to these questions would be crucially informative in my investigation of how school gardens and food education can become integrated into the K-12 schools in Oberlin. This is a pertinent area of research, now that there is a garden at every school in Oberlin except Langston Middle School. The matter is also close to my heart, since I helped start a garden at the Oberlin High School in spring 2007. This thesis was ultimately driven by my personal investment of time and effort into the high school garden and my hope for its sustainability and eventual integration into the school curriculum.

I begin the thesis by tracing the history and philosophical origins of school gardens in Europe. I explore several philosophers and educators who were particularly supportive of

[1] More information about the Edible Schoolyard is available at www.edibleschoolyard.org/homepage.html.

connecting young people with nature and explicitly argued the importance and potential of school gardens. The next few sections of the thesis turn to the rich history of school gardens in the US. I introduce the ideas of educators and philosophers that underpin the school garden movement, focusing specifically on the work of Horace Mann, Liberty Hyde Bailey and John Dewey. I then describe the growth of school gardens and gardening literature at the turn of the twentieth century, and elucidate the reasons for the widespread support of school gardens.

In particular, the federal government demonstrated a strong support of school gardens during the First and Second World Wars. I delve into the specific roles that the government played in enhancing the school garden movement and encouraging the use of garden produce in school lunches. After the Second World War, however, the number of school gardens plummeted. I analyze the post-war social and cultural factors that can explain the general waning of school gardens throughout the US. Essentially, I argue that the post-war mass consumer culture, which led to people's disconnection from their food, environment, and communities, was largely responsible for the decline. At the same time, I also explore the changes or lack thereof at schools that reinforced the loss of school gardens. Specifically, I focus on the landscape of the school grounds, the school lunch program, and the nature of what was taught and how.

Despite the trends of schools and of the larger society that reinforced people's disconnection from their communities, however, not everyone was content. Therefore, some people began to respond. Following an exploration of the goals of environmental education and community gardens, both of which originated in the 1960s and 70s as attempts to restore people's connection with their surroundings, I describe the subsequent establishment of several organizations and programs that continue to promote gardening and food education.

Accompanying the emergence of organizations supporting food education and garden-based learning has been the growing research and articulation, by scholars and educators since the 80s, of the large picture of what the goals of education should be and how they can be achieved to ensure that students thrive in the real world. I introduce Howard Gardner's theory of multiple intelligences—that there are eight distinct intellectual competences or intelligences that humans can have, including linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, naturalistic, intra- and inter-personal intelligences—and present his argument on the importance of teaching for understanding.[2] I then explore how school gardens can be an appropriate setting for applying Gardner's theory. I also present the current thinking and research on the benefits of environmental education that is place-based in nature.

While the goals of education have continued to be articulated by researchers, school gardens have been gaining ground since 1995, when the construction for the Edible Schoolyard began and Delaine Eastin, State Superintendent of Public Instruction, announced the goal of building a garden in every school. I investigate California's leadership, as well as the efforts of other states, national organizations, and individuals, towards the development of educational programs, literature, and curricula to facilitate food education and gardening projects.

I then return to the Edible Schoolyard and examine it in more detail, not only because my interest in the program was one of the motivating factors for writing this thesis, but also because it is well-known and serves as a model. I delve into its operation and accomplishments and describe the results of a study that assessed the impacts of the Edible Schoolyard on students. I consider the program's replicability and suggest questions for future research that could further inspire and sustain school garden and food education programs across the country.

[2] Howard Gardner, *Intelligence Reframed: Multiple Intelligences for the 21st Century* (New York: Basic Books, 1999).

Following the exploration of the Edible Schoolyard, I study another exemplary project that is based in Burlington, called the Burlington School Food Project (BSFP). Its goals are similar to those of the Edible Schoolyard, but BSFP is distinctive in that it is built on the close partnerships and collaboration among different community members, organizations and businesses, all working to integrate food education in the Burlington schools and incorporate locally grown produce into the school lunch programs. I describe the results of an evaluation report that assessed the accomplishments of BSFP; I also make suggestions based on the report for further areas of study and work that could further ensure the sustainability and success of BSFP.

I then turn to Oberlin, and consider the feasibility of incorporating school gardens and food education into the classrooms. I describe the results of a survey that I conduct with teachers in order to get a sense of their attitudes towards school gardens and food education. I then delineate some of the concerns that teachers had regarding the use of school gardens, and explain possible ways in which those can be overcome. I also include a chart for each core subject (social studies, science, English/Language Arts, and math) that indicates how specific standards can be addressed by using school gardens and/or teaching students about food (see Appendix C).

Finally, I conclude by placing school gardens and food education in the context of our large and overwhelming problems that we face today, including climate change, social inequities, and obesity. Arguably, one of the root causes of these problems is our mass consumer culture that condones people's disconnection from their communities, environment, and food. In order to address and ultimately solve these issues, we have to begin somewhere. I feel that equipping our children with food literacy through school gardening and food education experiences is an important, rational, and feasible step. I hope that this thesis will enable the reader to begin

appreciating the significance and potential of food education and school gardens for both our youth and the world at large.

The History and Philosophical Origins of School Gardens in Europe

The instructional values of gardens were first formally recognized, in writing, by John Amos Comenius (1592-1671), a Czech educator and writer. Deriving didactic laws based on his observations of the natural world, Comenius argued, "the desire to know and to learn [about the natural world] should be excited in boys in every possible manner."[3] He specifically suggested that this desire could be stimulated by creating school gardens, "unto which the scholars may be allowed to go from time to time and where they may feast their eyes on trees, flowers, and plants."[4]

One of the benefits often associated with many school gardens and environmental education programs today is that these engage the head, heart, and hands. This notion can be traced back to the work of Johann Pestalozzi (1746-1827), a German educator. Pestalozzi argued the importance of teachers helping children to develop harmoniously the three types of "inner powers" or capacities – the intellectual (head), practical (hands), and moral (heart).[5] By practical power, he meant the power of "giving external expression to the products of the intellect…of performing the practical duties which belong to home and business life."[6] Although Pestalozzi did not explicitly write about school gardens, his emphasis on the importance of active learning influenced the establishment of school gardens in the US and particularly of 4-H clubs, which

[3] M.W. Keatinge, *The Great Didactic of Comenius* (Montana: Kessinger Publishing, 1992), p. 129.
[4] *Ibid*., p. 131.
[5] John Alfred Green, *The Educational Ideas of Pestalozzi* (New York: Greenwood Press, 1969).
[6] *Ibid*., p. 114.

have often been involved in gardens as a way to engage in practical, hands-on learning.[7] (Three of the "H's" – head, heart, and hands – directly correspond with the inner powers that Pestalozzi wrote about.)

Friedrich Froebel (1782-1852) was another German educator and philosopher who founded the first kindergarten ("garden of children") in 1840 in Germany.[8] In *The Education of Man*, Froebel wrote, "nothing, perhaps, unites teachers and pupils so intimately as the thoughtful study of nature and of the objects of nature."[9] He believed that young people's interaction with open nature "develops, strengthens, elevates, and ennobles," and argued that the prime purpose throughout the study of natural objects "is not to impart knowledge to the child, but to lead the child to observe and to think."[10]

Austria and Sweden were among the first to pay heed to the instructional values touted by these educators and established school gardens on a national scale.[11] In 1869, Sweden passed a law requiring schools to establish school gardens for the purpose of agricultural instruction.[12] That same year, the Austrian Imperial School Law decreed, "in every school…a garden for the teacher according to the circumstances of the community, and a place for the purposes of agricultural experiment are to be created."[13]

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[7] National 4-H Headquarters, "4-H History" (available at http://www.national4-hheadquarters.gov/about/4h_history.htm; accessed March 21, 2008).
[8] J.L. Hughes and L.R. Klemm, *Progress of Education in the Century* (Toronto and Philadelphia: The Linscott Publishing Company, 1907).
[9] Friedrich Froebel, *The Education of Man*, translated by William Nicholas Hailmann (New York: D. Appleton and Company, 1887), p. 163.
[10] *Ibid*., p. 339.
[11] H.W. Foght, *The American Rural School, its Characteristics, its Future and its Problem* (New York: The Macmillan Company, 1918), p. 181.
[12] *Ibid.*
[13] Erasmus Schwab, *The school garden: Being a practical contribution to the subject of education*, translated by Mrs. Horace Mann (New York: M.L. Holbrook, 1879), p. 53.

Shortly after this law was passed, Erasmus Schwab (1831-1917) was appointed inspector of public schools in Olmutz.[14] (Olmutz is a city in Moravia, which was part of the Austro-Hungarian Empire and is now located in the eastern part of the Czech Republic.) Schwab explains that during his inspection one day, he saw a large, open, unused space outside of the school, which made him consider the great educational potential it would have if a school garden were there.[15] Feeling compelled to organize and share his thoughts on school gardens, Schwab wrote a pamphlet titled "The Public School Garden" in 1871. He was passionate about the instructional value of school gardens, arguing that "geography and geology, numbers, language may all be collaterally taught."[16] He also asserted that school gardens "will make it easier for the teacher to teach simply, freshly, lovingly, practically, to educate youth naturally."[17] At the end of the pamphlet, Schwab declared confidently:

> "A time will come when it will be difficult to understand how, for centuries hitherto, public school instruction and educational institutions have been able to exist without school gardens, so simple and obvious is the idea…"[18]

The second edition of Schwab's pamphlet appeared at the Vienna Exposition of 1873, where an Austrian model school was exhibited.[19] Schwab claimed that his pamphlet, which went through four editions and spread across Europe, "made a kind of epoch in Austria" and "awakened in geometrical progression the interest of the public for the founding of school gardens."[20] Schwab's work and passion helped popularize the school garden movement, first within the Austro-Hungarian Empire and eventually throughout other European countries and the US.

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[14] *Ibid.*, p. 5.
[15] *Ibid.*
[16] *Ibid.*, p. 42.
[17] *Ibid.*, p. 76.
[18] *Ibid.*, p. 78.
[19] *Ibid.*, p. 14.
[20] *Ibid.*, p. 7.

Mann, Bailey, and Dewey: How Their Educational Ideas Shaped the School Garden Movement in the US

Meanwhile, in the US, an interest in improving public education was taking root among educators and philosophers in the 19th century particularly within Massachusetts. The American Institute of Instruction was founded in Boston in 1830 when a group of teachers met in Boston to consider and discuss issues concerning education.[21] It is considered "the first long-lived interstate association of teachers interested in the cause of education."[22] Shortly thereafter in 1837, Horace Mann (1796-1859), who was a member of the Massachusetts Senate at the time, signed a bill that created the first state board of education in the US.[23] He became the board's first secretary, and for the next twelve years, worked to enhance education in public schools in Massachusetts. Mann started and edited a bimonthly publication in 1838 called *The Common School Journal* and wrote twelve annual reports, through which he expressed powerfully his beliefs and concerns about education.[24]

Specifically, Mann believed in universal education and embraced active learning at schools. He asserted in his tenth annual report:

> I believe in the existence of a great, immortal, immutable principle of Natural Law….which proves the *absolute right* to an education, of every human being that comes into the world.[25]

At the same time, Mann embraced active learning, as indicated in his second annual report:

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[21] Thomas W. Bicknell, "A Brief Outline of the History of the Institute: Opening Address," in *The Lectures Read Before the American Institute of Instruction at Fabyan's, White Mountain, July 9, 1878*, ed. American Institute of Instruction (Boston: American Institute of Instruction, 1879), p. 3.
[22] Richard B. Michael, "The American Institute of Instruction," *History of Education Journal*, 3 (1[1951]): 27-32.
[23] B.A. Hinsdale, *Horace Mann and the Common School Revival in the US* (New York: Scribner, 1913).
[24] *Ibid.*
[25] Massachusetts Board of Education, *The Massachusetts System of the Common Schools: Being an Enlarged and Revised Edition of the Tenth Annual Report of the First Secretary of the Massachusetts Board of Education* (Boston: Dutton and Wentworth, 1849), p. 3. **google book**

> Knowledge cannot be poured into a child's mind like fluid from one vessel into another.…He [the pupil] must not be a passive recipient but an active agent….Every scholar in the school must think with his own mind.[26]

Mann also believed that schools should work towards achieving Pestalozzi's principle of harmoniously developing the children's inner powers of the head, hand, and heart.[27]

Mann's ideas and beliefs were reflected in the two movements that emerged during the late 19th and early 20th centuries and were critical in establishing school gardens in the US: the Progressive movement and the nature-study movement. Mann's passionate belief in education as a social equalizer was a precursor to the ideas espoused by the Progressive reformers. They were particularly concerned about the widening gap between the rich and poor and the environmental problems resulting from industrialization. Progressives regarded public schools as having the ability to alleviate some of society's ills by teaching "children the proper values needed to be a productive American citizen."[28]

At the same time, Mann's belief in the importance of active learning was shared particularly by educators who embraced the idea of nature study. One of its strong advocates was botanist and horticulturist Liberty Hyde Bailey (1859-1954). He argued that the purpose of the nature-study movement is to "enable every person to live a richer life" by putting the "pupil in a sympathetic attitude toward nature" and allowing the child to develop a "keen personal interest in every natural object and phenomenon."[29] He asserted that nature-study cannot be taught through "cut and dried…rigid school methods" and that nature-study is about "doing and

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[26] Horace Mann, *Lectures, and Annual Reports, on Education* (Boston: Cornhill Press, 1867), pp. 516-7.
[27] John F. Emling, *Value Perspectives Today: Toward an Integration with Jean Piaget's New Discipline in Relation to Modern Educational Leaders* (New Jersey: Fairleigh Dickinson University Press, 1977), p. 90.
[28] Library of Congress, "America at School, 1894-1915" (available at http://memory.loc.gov/ammem/awlhtml/awlscho.html; accessed March 21, 2008).
[29] L.H. Bailey, *The Nature-Study Idea: Being an Interpretation of the New-School Movement to put the Child in Sympathy with Nature* (New York: Doubleday, Page & Company, 1903), p. 4; p. 15.

accomplishing," stands for "directness and naturalness," and "relates the schoolroom to the life that the child is to lead."[30]

The growing Progressive and nature-study movements helps to put into context the decision by the Massachusetts Horticultural Society to send Henry L. Clapp of Boston to Europe in 1890 to study school gardens.[31] The Massachusetts Horticultural Society, which claims to be the oldest, formally organized horticultural institution in the US, was founded in 1829 to encourage "the science and practice of horticulture" and develop "the public's enjoyment, appreciation, and understanding of plants and the environment."[32] Therefore, the Society's decision to send Clapp to Europe suggests its desire to help achieve the goals of the nature-study movement by building school gardens. Upon his return in 1891, Clapp established the first school garden in the US in Boston at the George Putnam Grammar School. Clapp's school is "credited as the catalyst for the school garden movement."[33] School gardens subsequently appeared in many large cities throughout the US, including New York, Chicago, and Philadelphia.[34]

School gardens were often built for different reasons. Progressive reformers saw school gardens as tools for promoting social reforms. These included beautifying school grounds, taking children off the streets from vicious surroundings, Americanizing immigrants, instilling ethics of hard work and patriotism, and decreasing the number of juvenile delinquents.[35] Nature study

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[30] *Ibid*., p. 15; p. 32; p. 18; p. 35.
[31] K.C. Davis, *School and Home Gardening: A Textbook for Young People, with Plans, Suggestions and Helps for Teachers, Club Leaders and Organizers* (Philadelphia: J.B. Lippincott Company, 1918), p. 1.
[32] Massachusetts Horticultural Society, "Mission" (available at http://www.masshort.org/Mission; accessed March 21, 2008).
[33] Laura J. Lawson, *City Bountiful: A Century of Community Gardening in America* (Berkeley and Los Angeles: University of California Press, 2005), p. 60.
[34] *Ibid.*, p. 62.
[35] Louise K. Miller, *Children's Gardens for School and Home: A Manual of Cooperative Gardening* (New York: D. Appleton and Company Miller, 1904); M. Louise Greene, *Among School Gardens* (Philadelphia: Russell Sage

advocates believed that gardens could enhance children's education and instill their love for nature. Liberty Hyde Bailey strongly supported school gardens, arguing that they should serve as instructional "outdoor laboratories" and even asserted, "We shall be glad when all schools will…have a school-garden….The making of a definite garden is an epoch in the life of each school."[36]

Progressive educational reformer and philosopher John Dewey (1859-1952) was also an avid supporter of school gardens and recognized that they can facilitate nature-study and connect students to their environments. For example, Dewey argued in *The School and Society* (1915) that school gardens could allow children to connect with the larger world and recognize that "all the materials that come into the kitchen have their origin in the country."[37] *Schools of To-morrow* (1915), which Dewey co-wrote with his daughter, Evelyn Dewey, praised the work of public schools in Indianapolis for recognizing the educational values of gardening and making "every attempt…to arouse an interest in gardening."[38] The Deweys also acknowledged the significance of school gardens in enhancing communities by giving the example of Chicago, where students were contributing to their community by providing people with fresh vegetables and beautifying the neighborhoods.[39] A year later, in *Democracy and Education*, John Dewey noted that gardening "affords an avenue of approach to knowledge of the place farming and horticulture have had in the history of race and which they occupy in present social organization."[40]

In addition, Dewey was an advocate of hands-on learning and specifically noted the importance of giving children the opportunity to prepare a meal:

Foundation, 1911); and Brian Trelstad, "Little Machines in their gardens: a history of school gardens in America, 1891-1920," *Landscape Journal*, 16 (2[1997]): 161-174.
[36] Bailey, *The Nature-study Idea*, p. 58.
[37] John Dewey, *The School and Society* (Chicago: University of Chicago Press, 1915), p.74.
[38] John Dewey and Evelyn Dewey, *Schools of To-morrow* (New York: E.P. Dutton & Company, 1915), p. 93.
[39] *Ibid.*, p. 96.
[40] John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (New York: The Macmillan Company, 1916), p. 235.

> Take a child in the school kitchen; he is not merely preparing that day's midday meal because he must eat; he is learning a multitude of new things. In following the directions of the recipe he is learning accuracy….In measuring quantities he is learning arithmetic and tables of measures; in mixing materials, he is finding out how substances act when they are manipulated; in baking or boiling, he is discovering some of the elementary facts of physics and chemistry…The kitchen becomes a laboratory for the study of a fundamental factor in human life.[41]

Dewey also observed that as children actively engage in the preparation of food in a kitchen, they change from being passive and inert to buoyant and outgoing, and that this attitude change was "so obvious as fairly to strike one in the face."[42] Thus, he clearly placed high importance on the experiences and the holistic integration of knowledge that both school gardens and kitchens can provide for children. He essentially supported what we would call food education today.

The Growth of School Gardens and Relevant Literature at the Turn of the Twentieth Century

Because school gardens were believed to serve a variety of educational, social, and moral reforms, there was a lack of consensus on their specific objectives. Nevertheless, the school-garden movement grew quickly across the US. Cleveland and Philadelphia were among the first cities to acknowledge the instructional potential of school gardens. For example, Cleveland's Board of Education hired a curator of gardens, Louise Klein Miller, who supervised school gardens and gave lectures in schools in Cleveland.[43] Similarly, Philadelphia's Board of Education appointed a supervisor of school gardens and worked to incorporate school garden work into the school system.[44]

[41] John Dewey and Evelyn Dewey, *Schools of To-morrow*, pp. 294-6.
[42] John Dewey, *The School and Society*, p. 12.
[43] Laura J. Lawson, *City Bountiful*, p. 66.
[44] M. Louise Greene, *Among School Gardens*, p. 24.

To help promote the establishment of school gardens, state horticultural societies and agricultural colleges sent numerous bulletins and manuals on gardening to schools.[45] At the same time, the Department of Agriculture's (USDA) Office of Experimental Stations "catalogued the courses of study at all agricultural institutions, provided photographs and slides for teachers' use, sent representatives to visit and report on school gardens."[46] It also published a number of Farmers' Bulletins related to gardening and agricultural instruction. For example, in 1915, L.C. Corbett, horticulturist at the Bureau of Plant Industry under the USDA, published a bulletin titled "The School Garden," which provided information on gardening topics including the soil, fertilization, and germination.[47]

Numerous manuals for teachers on school gardens were also written by individuals during the early 20th century. For example, in 1904, Louise Klein Miller, who became the curator of gardens in Cleveland a year later, wrote *Children's Gardens for School and Home: A Manual of Cooperative Gardening*. Miller argued, "Gardening…engenders habits of thrift and economy; develops individual responsibility and respect for the rights of others; requires regularity, punctuality, and constancy of purpose."[48] She also recognized the educational value of gardens:

> Gardening…does not perform its complete function in the school unless it has some organic connection with the other work. It is nature study and illumines geography. The soil is part of the earth's surface, derived from the rocks….Children very early get the idea of the great interdependencies of animals, vegetables and minerals and soon realize that plants are the connecting link between the mineral and the animal worlds.[49]

On the other side of the country, Benjamin M. Davis, who taught biology at the Chico Normal State School in California, also wrote a gardening manual for teachers in 1905. He wrote,

[45] H.W. Foght, *The American Rural School*, p. 198.
[46] Laura J. Lawson, *City Bountiful*, p. 78.
[47] L.C. Corbett, *The School Garden*, Farmers' Bulletin no. 218, Bureau of Plant Industry, USDA (Washington: Government Printing Office, 1915).
[48] Louise K. Miller, *Children's Gardens for School and Home*, pp. 4-5.
[49] *Ibid.*, p. 117.

"The chief aim of school-garden instruction is to direct the child to the observation of the life, growth, and habits of living things."[50] Davis recognized the multidisciplinary nature of school gardens, explaining that they are "valuable aid[s] in teaching some of the…common school subjects such as arithmetic, language, geography, history, and drawing."[51] To best facilitate garden-based learning among pupils, Davis proposed dividing them into three age groups. First through third graders would learn to rear common kitchen vegetables, fourth through sixth graders would learn the history and geography of plants that they grow in the garden, and seventh and eighth graders would use the garden to conduct scientific experiments.[52] Davis also provided an extensive annotated bibliography of references, books, periodicals, and bulletins that were published in the US on topics ranging from plants to insects. This lengthy list of resources suggests the vast level of national interest in school gardens at the turn of the twentieth century.

Similarly, in 1910, Maria Louise Greene, who visited and studied school gardens throughout the country, wrote an instructional book titled *Among School Gardens*, describing the importance of the school garden, which she defined as

> any garden where children are taught to care for flowers or veggies or both, by one who can, while teaching the life history of the plants…instill in the children a love for outdoor work and such knowledge of natural forces and their laws as shall develop character and efficiency.[53]

Like Dewey, Greene also acknowledged the significance of children preparing and eating the food they grow. She argued that the teacher "should be enough of a cook to give practical lessons

[50] Benjamin M. Davis, *School Gardens for California Schools: A Manual for Teachers* (Sacramento: W.W. Shannon Superintendent State Printing, 1905), p. 35.
[51] *Ibid*., p. 8.
[52] *Ibid*., p. 46.
[53] M. Louise Greene, *Among School Gardens*, p. 3.

in preparing the food raised in the garden and to be on the watch to introduce the use of vegetables."[54]

In addition to manuals, textbooks that provided numerous exercises and problems that teachers could use were also published. For example, Herbert D. Hemenway, Director of the School of Horticulture at Hartford, Connecticut, and according to Greene, one of the pioneers of the school garden movement, wrote *How to Make School Gardens* (1903). Hemenway provided lessons on gardening techniques such as weeding, seed planting, and transplanting, and gave a school garden bibliography of manuals and other resources for teachers. In 1909, C.R. Jackson and Mrs. L.S. Daugherty, who worked at the State Normal School in Missouri and introduced gardens there, wrote *Agriculture through the Lab and School Garden: A Manual and Textbook of Elementary Agriculture for Schools*. They explained the formation of soil, and offered examples of experiments, lab studies of plant enemies, field exercises on the classification and physical properties of soils, and math problems. The authors also suggested that teachers spend about a month giving preparatory lessons on soil and seed germination prior to preparing the ground.[55] In teaching these lessons, Jackson and Daugherty emphasized the importance of allowing students to learn by doing, arguing, "[i]t is neither pedagogical nor scientific to tell a student what he can find out for himself."[56]

Similarly, Kary Davis, professor at the Knapp School of Country Life at George Peabody College for Teachers (now called the Peabody College of Education and Human Development at Vanderbilt University), wrote a textbook titled *School and Home Gardening* in 1918. He

[54] *Ibid*., p. 83.
[55] Caroline R. Jackson and Mrs. L.S. Daugherty, *Agriculture through the laboratory and school garden. A manual and text-book of elementary agriculture* (New York: O. Judd Company, 1909), p. 352.
[56] *Ibid*., p. vii.

described scientific experiments that students could conduct and recognized the multidisciplinary nature of school gardens:

> A very good plan adopted in some schools is to let the subject [school gardens] alternate with other regular school subjects….If objection to this is made, it is answered on the ground of correlation – that is, the garden work is so related to each of the other subjects as to be fully equal to it….the gardening work will actually give training in arithmetic, in language, in reading, in geography and in history.[57]

Davis elaborated on how school gardens could be connected to each subject. For example, with respect to geography, he asserted, "There are many valuable garden crops, which are used more or less commonly in America, about which many young people know nothing. The study of our own food products is good geography work."[58] Davis's textbook therefore indicates his belief in the value of food education, although he did not use this term.

The Federal Government's Role in Promoting School Gardens during the First and Second World Wars

Although the federal government, particularly the USDA, helped contribute to the growth of school gardening literature, it was not until 1914, more than twenty years after Clapp established the first school garden in the US, that Congress created the Division of Home and School Gardening in the Bureau of Education, under the Department of the Interior.[59] The Division produced a number of circulars for teachers, including those titled "Instruction for School-Supervised Home Gardens" and "Course in Vegetable Gardening for Teachers."[60] However, the Division only had a small budget for school gardens and could not fund them until 1918, when President Woodrow Wilson appropriated $50,000 from the National Security and Defense Fund to promote school and school-supervised home gardening and build the United

[57] Kary C. Davis, *School and Home Gardening*, p. 324.
[58] *Ibid*., p. 331.
[59] Laura J. Lawson, *City Bountiful*, p. 65.
[60] *Ibid*., p. 314.

States School Garden Army (USSGA).[61] The objective of the USSGA was "to nationalize and unify the great work in gardening now being carried on and to make it a *permanent part of the course of study in all the schools of America*."[62] Therefore, this suggests that the government was committed to supporting school gardens regardless of whether the nation was at war.

However, from the beginning, the primary purpose of the USSGA was to grow food for the war. As the name suggests, the very nature of the USSGA was militaristic. President Wilson referred to the USSGA as the "Volunteer War Garden Army," implying that the school gardens were for the war.[63] Each "company" or regiment had one captain, one to two lieutenants, and consisted of 150 soldiers; badges indicating the ranks were given to all children who enlisted.[64] J.H. Francis, who was appointed the director of the USSGA, reported that in summer 1918, 1.5 million boys and girls enlisted in the USSGA.[65] To aid these "soldiers" of the USSGA in growing food, the Bureau of Education published a manual for students and teachers for the fall in 1918 and one for the spring in 1919 after the Armistice was signed.

The fall manual included letters addressed to the boys and girls of the US from Franklin Lane, the Secretary of the Department of the Interior, and Philander P. Claxton, US Commissioner of Education. They emphasized the important, patriotic work of the USSGA. For example, the Secretary wrote, "You can make gardens now, and the boys and girls of France and Belgium will for all time be grateful to you."[66] Claxton asked the children to join the USSGA towards a concerted effort of growing food to "feed all the hungry children of Belgium."[67] The

[61] J.H. Francis, "The United States School Garden Army," Bulletin, No. 26 (Washington: Government Printing Office Francis, 1918), p. 4.
[62] US Bureau of Education, *The fall manual of the United States School Garden Army* (Washington, D.C.: Government Printing Office, 1918), p. 29, emphasis added.
[63] *Ibid.*
[64] J.H. Francis, "The United States School Garden Army," p. 5.
[65] *Ibid.*
[66] US Bureau of Education, *The fall manual*, p. 4.
[67] *Ibid*., p. 5.

fall manual also provided information about topics including composting, humus, storing vegetables, rotating crops, killing insects, and maintaining the garden.

Although World War I had already ended by the time the spring manual was written, the war against starvation was not over. The spring manual included a letter from Herbert Hoover, then Food Administrator, addressed to the members of the USSGA:

> Premier Lloyd George announced that one of the great tasks ahead for Great Britain and America is to organize the world against starvation. In this program…the schools of America have a great part to play….Many reasons exist for making 1919 the greatest garden year in history. The schools owe it to themselves as well as to the starving peoples of the world to see that during this year there is a garden for every child and that every child in a garden has adequate instruction and supervision.[68]

In order to help motivate the USSGA soldiers to continue with their work, Ethel A. Murphy, an English teacher at a girls' high school in Louisville, Kentucky, wrote a pageant on gardens for the Bureau of Education. Titled *Victory of the Gardens* (1919), this four-part play dramatized the beauty of Nature and seasons as well as the power of children working with Nature to grow food for "their little sisters and brothers of other countries."[69]

Despite the high importance that the federal government accorded to school gardens, especially through the fall and spring manuals, the USSGA was soon disbanded and the number of school gardens decreased. By 1921, less than ten years after its formation, the Division of Home and School Gardening lost government funding.[70] The Division, which was funded out of the defense budget, had failed to secure alternative sources of funding.[71] Thus, the Bureau of

[68] US Bureau of Education, *The spring manual of the United States School Garden Army* (Washington, D.C.: Government Printing Office, 1919) p. 6.
[69] Ethel A. Murphy, *Victory of the Gardens* (Washington: Government Printing Office, 1919), p. 18.
[70] Brian Trelstad, "Little Machines in their gardens," p. 169.
[71] *Ibid*.

Education was no longer involved in promoting gardening as a "permanent part of the course of study in all the schools of America," which was one of the objectives of the USSGA.[72]

One reason for the loss of support for school gardens may have been due to the improvement in quality of life during the Roaring Twenties.[73] Many school gardens had been established to promote social reforms. Therefore, the improved social and urban conditions likely did not compel social reformers to advocate for the maintenance of school gardens. Children also had the opportunity to pursue other activities besides gardening during vacations such as summer camp and Boy and Girl Scouts.[74] Although children's gardens did continue on a smaller, local scale and community gardens "gained public recognition for nutritional, recreational, and social benefits" during the 1930s Depression, the federal government did not actively support or fund gardens.[75]

Interest in gardens resurged, however, during World War II, with the onset of the victory garden campaign. The campaign was launched on December 19, 1941, when a National Defense Gardening Conference, attended by over three hundred horticultural experts, educators, youth organizations, federal and state agencies, was held.[76] At the conference, the goals of the victory garden campaign were established, which included increasing the local production and consumption of vitamin-rich fresh vegetables and fruits to promote health and save resources and lifting the morale.[77]

The federal government encouraged the construction of victory gardens in schools by providing assistance, educational consultants, supplies, and literature. For example, the USDA

[72] US Bureau of Education, *Fall manual*, p. 29.
[73] Brian Trelstad, "Little Machines in their gardens," p. 171.
[74] *Ibid.*
[75] Laura J. Lawson, *City Bountiful*, p. 169.
[76] *Ibid*., p. 174.
[77] *Ibid*., p. 175.

produced a number of bulletins, circulars, and short films on gardens.[78] The US Office of Education (formerly the Bureau of Education) encouraged victory gardens as a school or extracurricular activity, although it did not organize a school garden army as during the previous war.[79] Its biweekly publication, *Education for Victory*, contained articles on topics including "garden and canning instruction, lesson plans, instructor training in agriculture, summertime garden supervision, parental involvement, and farm volunteering."[80]

The Office of Education also established the Cooperating Committee on School Lunches in 1941 to encourage the consumption of food grown in school gardens for school lunch.[81] In 1942, the Committee wrote a circular titled *School Gardens for School Lunches*, and claimed, "school gardens can be one important and effective means of providing vegetables and small fruit so necessary to nutritious school lunches."[82] The Committee recognized that using school gardens for school lunches could "bring about a desirable relationship between instruction and practice in school gardening and food habits of school children and youth."[83] The Committee recommended the creation of a group at each school made up of staff members who would plan and determine how school gardens can be used in agriculture, science, health, and home economics classes.[84]

Similarly, H.W. Hochbaum, the Chairman of the U.S. Department of Agriculture's Committee on Victory Gardens, argued in his "Victory Garden Program Report" (1943):

> …there is a decided need for school vegetable-growing plots where older children will grow supplies of vegetables to be used fresh or processed in school luncheons….Class

[78] *Ibid.*
[79] *Ibid.*, p. 177.
[80] *Ibid.*
[81] Cooperating Committee on School Lunches, *School gardens for school lunches*, Circular no. 210 (Washington: US Office of Education, 1942).
[82] *Ibid.*, p. 1.
[83] *Ibid.*, p. 2.
[84] *Ibid.*, p. 3.

> work and garden cultivation and care must be well organized, with delegation and acceptance of individual and class responsibility.[85]

Consequently, the incorporation of fresh produce from gardens into the school lunch programs was encouraged, as well as the preservation of any extra food during home economics classes by "canning, drying, salting, pickling, and freezing."[86]

State agencies were also critical in promoting and actually building the victory gardens. Organizations including state agricultural extension services, companies, and Parent Teacher Associations, popularized the garden campaign via pamphlets, bulletins, magazines, newspapers, demonstration classes, and short film clips.[87] For example, at the state level, Ohio's extension service published a pamphlet titled *Garden for Victory* in 1943. Another pamphlet titled, *ABC of Victory Gardens: A Compilation of Facts, Figures, Tables and Charts to Make Backyard Gardening Easy* (ca. 1943), was produced and sent across Ohio. In addition, companies played a role in promoting victory gardens. The Ohio Fuel Gas Company published a pamphlet on victory gardens in 1944, titled *Planning, Planting, Preserving for Victory Gardens*. At the local level, in 1943, The Union Fork and Hoe Company of Columbus, Ohio, produced a pamphlet in 1943 called *How to Make a Victory Garden*. All of these pamphlets explained the necessity of planting a victory garden, provided illustrations of sample garden plots and offered details on how, when and where to plan a garden and grow and harvest vegetables.[88]

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[85] H.W. Hochbaum, The 1943 Victory Garden Program Report, USDA, Committee on Victory Gardens. (Washington, D.C.: Government Printing Office, 1943), pp. 3-4, available at http://www.ohiomemory.org/index.html.
[86] Laura J. Lawson, *City Bountiful*, p. 177.
[87] *Ibid.*, p. 188.
[88] Ohio Agricultural Extension Service. *Garden for Victory* (Ohio: Ohio State University, 1943), available at http://www.ohiomemory.org/index.html; *ABC of Victory Gardens: A Compilation of Facts, Figures, Tables and Charts to Make Backyard Gardening Easy* (Ohio Memory Online Scrapbook, ca. 1943), available at http://www.ohiomemory.org/index.html; Ohio Fuel Gas Company, *Planning, Planting, Preserving for Victory Gardens* (Ohio Memory Online Scrapbook, 1944), available at http://www.ohiomemory.org/index.html; Union Fork and Hoe Company, How to Make a Victory Garden (Ohio Memory Online Scrapbook, 1943), available at http://www.ohiomemory.org/index.html.

Local organizations played a critical role in involving children in gardening as well. For example, in 1943, the PTA of the Clinton School in Clinton, Ohio, wrote a letter to the parents, asking them to allow their children to partake in victory gardening help produce food. The letter also expressed the school's "interest and desire to have a real part in the great Nation-wide program of food production by making scrap books, garden posters."[89]

The Decline of School Gardens After the Second World War: Considering the Post-War Background and Trends of the US

Although there was a high degree of recognition of the instructional values of school gardens at the local, state, and national levels, this diminished once again after the war. This is reflected by the significantly fewer number of articles written on school gardens in the 1950s, 1960s, and 1970s compared to the early 1900s (Fig 1).[90] For example, during the early 1950s, the *New York Times* published articles about school garden programs, writing that the New York Board of Education sponsored school garden programs, and provided supplies and a staff of teachers who give instruction in planting, fertilizing, and harvesting.[91] However, by the beginning of the 1960s, the *New York Times* stopped writing about school gardens, which suggests the weakening of the public's interest in school gardens.

[89] Clinton School PTA, Victory Garden Letter (Clinton, OH, 1943), available at http://www.ohiomemory.org/index.html.
[90] Google News Archives, available at http://news.google.com/archivesearch?hl=en&tab=wn.
[91] Edward Hausner, "Flowers, Carrots and Citizenship Are Cultivated in City by 33,576," *New York Times*, 11 Aug 1950, p. 21; "5,000 Children Put "Green Thumb" to Use," *New York Times*, 1 July 1952, p. 21.

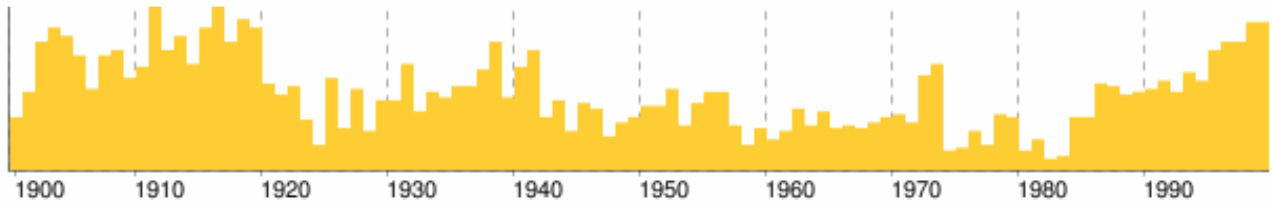

Fig 1. A bar graph illustrating the relative number of newspaper articles written on school gardens, from 1900 to the end of the 1990s. More articles were written at the turn of the 20th century compared to mid-century. The number of articles increases again at the turn of the 21st century; this trend is explained later in this thesis. Taken from Google News Archives.

To understand this decline, we need to consider the social, economic, and cultural dynamics and trends that shaped the post-war period and continue to characterize the present. One of the most significant developments was the dramatic growth of suburbia that was driven by the great demand for housing after the war. Historian Lizabeth Cohen, author of *A Consumers' Republic: The Politics of Mass Consumption in Postwar America*, calls the suburbs the "landscape of mass consumption" and argues that a

> home in the suburbanized Consumers' Republic became a mass consumer commodity to be appraised and traded up like a car rather than a longstanding emotional investment in a particular neighborhood, ethnic community….[92]

She further asserts, "residential suburbanization contributed to the emergence of a social landscape…where the mass of Americans shared less and less common physical space and public culture."[93]

Cohen's criticism of suburbia echoes that of John Keats, author of a satire on suburbs titled *The Crack in the Picture Window*. Keats wrote:

> a housing development cannot be called a community, for that word implies a balanced society of men, women and children wherein work and pleasure are found and the needs

[92] Lizabeth Cohen, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America* (NY: Vintage Books, 2003), p. 202.
[93] *Ibid*., pp. 254-5.

> of all the society's members are served. Housing developments…as a general rule lack recreational areas, churches, schools, or other cohesive influences.[94]

In his book, Keats traced the miserably stressful lives of John and Mary Drone who live in a suburb; towards the end, Keats exclaimed, "it is only too clear that we must put a stop to this nonsense [unrestricted housing developments]."[95]

At the same time, the development of suburbs facilitated the withering of urban communities. The exodus of middle-class, mostly white Americans, away from cities towards suburbs contributed to the decline in the social life of and communities in inner cities, where low-income and minority groups were left behind. For example, because many suburbanites worked in cities, cars and roads became necessities for commuting. Martin Melosi, professor of history at the University of Houston, argues that the construction of highways through existing neighborhoods often "disrupted, degraded, and in some cases destroyed" communities, displaced people, and undermined neighborhood attachments.[96] Melosi further asserts, "the use of the streets as social and recreational gathering places was threatened and indeed supplanted by the requirements of increasingly rapid and mounting vehicular traffic."[97]

The car-reliant culture has also helped change the lifestyles of children such that many stay indoors more often. Mary Rivkin, associate professor of education at the University of Maryland, College Park, describes several ways in which the increased use of cars has contributed to children's detachment from their surroundings.[98] Cars have taken over the streets that children once played on. Many children, instead of walking, are now driven to school by

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[94] John Keats, *The Crack in the Picture Window* (Cambridge, MA: Riverside Press, 1957), p. xvi.
[95] *Ibid.*, p. 178.
[96] Martin Melosi, "The Automobile Shapes the City," Automobile in American Life and Society Project (University of Michigan-Dearborn, ca. 2004), ¶ 23; available at http://www.autolife.umd.umich.edu/Environment/E_Casestudy/E_casestudy.htm.
[97] *Ibid.*, ¶ 19.
[98] Mary Rivkin, "The schoolyard habitat movement: what it is and why children need it," *Environmental Education*, 25 (1[1997]): 61-66.

parents. Parents often work in places away from their homes, which meant that they are not around to supervise their children playing in their neighborhoods after school.

The advent of television has helped keep children inside in several ways as well. First, children are spending more time in front of TVs and playing videogames instead of going outside to play. Richard Louv, in his *Last Child in the Woods*, explains another interesting, but troubling, effect of television. He argues that the disproportionate media coverage of crime and violence on the news has led parents to fear excessively the safety of their children.[99] Louv essentially argues that television has helped contribute to "nature-deficit disorder" among both children and adults. By this, he means the "human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses" and explains that this disorder can be "detected in individuals, families, and communities."[100]

The consumption of fast and/or processed foods is another trend that has grown with the rising use of cars and influence of television, particularly through advertisements of junk foods. In 1955, Ray Kroc opened the first McDonalds restaurant in Des Plaines, Chicago and other fast food chains soon followed suit. [101] They often emerged along highways, providing drivers with fixed, cheap, quick meals on the road practically anytime, anywhere. At the same time, cars allowed people to purchase processed, pre-packaged foods in bulk at supermarkets. Supermarkets in turn grew in size to accommodate the growing popularity and began offering

[99] Richard Louv, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (Chapel Hill, NC: Algonquin Books of Chapel Hill, 2005), p. 127.
[100] *Ibid*., p. 34.
[101] McDonalds Corporation, "McDonald's History – 1954 to 1955," available at http://mcdonalds.com/corp/about/mcd_history_pg1.html.

more parking space as well as brands of processed foods, including TV Dinners, which were successfully marketed by Swanson in 1954.[102]

As people consumed more processed foods starting in the 1950s, which historian Harvey Levenstein calls the "Golden Age of Processed Foods," interest in growing or cooking food waned.[103] Poet, author, and farmer Wendell Berry claims that people are eating more thoughtlessly, and in *The Unsettling of America: Culture & Agriculture*, argues that the modern household has:

> set itself increasingly aside from production and preparation and become more and more a place for the consumption of food produced and prepared elsewhere.[104]

This disconnection from the production and preparation of foods continues today. Many people are ignorant of where their food comes from and how it is produced. Most do not consider the connection between their consumption of fast foods and the damaging impacts of industrial agriculture on small farmers and on the environment. Small farmers have been losing out to large farmers because the government's stance on farming has been "Get big or get out" since the 1950s.[105] Consequently, farming communities and cultures have deteriorated. Ecological communities in soil and water have also been destroyed through the intensive use of synthetic fertilizers, the production of which releases greenhouse gases that cause climate change. For these reasons, Berry calls industrial agriculture "community-killing."[106]

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[102] Margaret Walsh, "Gender and the Automobile in the United States," Automobile in American Life and Society Project (University of Michigan-Dearborn, 2004), available at http://www.autolife.umd.umich.edu/Gender/Walsh/G_Overview.htm; Library of Congress, "Who "invented" the TV Dinner?", (2007), available at http://www.loc.gov/rr/scitech/mysteries/tvdinner.html.
[103] Harvey Levenstein, *Paradox of Plenty: A Social History of Eating in America* (Berkeley: University of California Press, 2003).
[104] Wendell Berry, *The Unsettling of America: Culture & Agriculture*, third ed. (San Francisco: Sierra Club Books, 1996), p. 51.
[105] *Ibid.*, p. 41.
[106] *Ibid.*

The increase in consumption of fast, processed foods and the rising car culture that contributed to the increasingly sedentary nature of people's lifestyles helped lay the foundation for another significant and worrying trend: the obesity epidemic. George Bray, former president of the International Association for the Study of Obesity, explained that the obesity epidemic, which began in the 1970s, coincides with the rapid rise in the use of high-fructose corn syrup (HFCS) at around the same time.[107] HFCS continues to be an ingredient in practically all processed foods today.[108]

Returning to the matter of the diminishing support of school gardens after World War II, we can now see that this was in the context of the growing national consumer culture trends. Suburban sprawl, a fast-paced culture dependent on cars and fast/processed foods, and the obesity epidemic have contributed to people's increasing lack of engagement with their communities, land, and food.

Reinforcement of the Decline of School Gardens: The Changes (and lack thereof) at Schools

In addition to the mass consumer culture trends, the changes (and lack thereof) at schools also reinforced the decline of school gardens and food education. The landscape of school grounds, the nature of food offered through the school lunch program, the attitudes of the USDA regarding food education and the lunch program, the introduction of a consumer-oriented education, and the lack of change in teaching strategies in the classroom have all helped prevent the youth from connecting actively with their environment and food.

[107] George Bray *et al.*, "Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity," *American Journal of Clinical Nutrition* 79 (2004): 537-543.
[108] Michael Pollan, *The Omnivore's Dilemma: A Natural History of Four Meals* (New York: The Penguin Press, 2006), p. 104.

One of the changes concerned the landscape of school grounds. Prior to the post-war period, school gardens were a part of playgrounds at many schools and were of "real value to city children," providing a "link to tie playgrounds to general education."[109] For instance, John Nolen, a prominent city planner and landscape architect during the early twentieth century, saw a school garden as being part of a playground:

> The outdoor units [of the school] will be a playground for boys and men, a playground for girls and women, a playground for small children, and space for school gardens.[110]

Moreover, Louise K. Miller argued that "there is really no excuse for…dreary and forlorn school yard."[111] She suggested constructing a shrub or herbaceous border all around the yard as a way to improve the appearance of school yards that takes up little playground space. Therefore, gardens and plants were recognized as important features of school grounds.

However, after World War II, urban schoolyards in particular became "barren expanses of asphalt and other paved surfaces."[112] English landscape architect and child welfare promoter Lady Allen of Hurtwood, who studied playgrounds throughout the world, argued, "Rarely is there grass or trees, or flowers, or animals or any beauty" and even claimed, "Children are increasingly condemned to live in a harsh, stark desert of hard surfacing."[113] Edward Cheskey, bird conservation planner with the Federation of Ontario Naturalists, explains some of the reasons for the dullness of school grounds:

> conventional perspective of school designers and administrators is that the land around the school should be designed and managed for surveillance of students, ease of maintenance, and team sports.[114]

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[109] Joseph Lee and Everett B. Mero, *American Playgrounds* (Manchester, NH: Ayer Publishing, 1972), p. 208.
[110] John Nolen, *City Planning: A Series of Papers Presenting the Essential Elements of a City Plan* (New York and London: D. Appleton and Company, 1916), p. 129.
[111] Louise K. Miller, *Children's Gardens for School and Home*, p. 115.
[112] Alexis Schulman and Catherine A. Peters, "GIS analysis of urban schoolyard landcover in three US cities," *Urban Ecosystems*, 11 (2008): 65-80; p. 66.
[113] Lady Allen of Hurtwood, *Planning for Play* (Cambridge, MA: MIT Press, 1968), p. 18.
[114] Edward Cheskey, "How Schoolyards Influence Behavior," in Tim Grant and Gail Littlejohn (eds.), *Greening School Grounds: Creating Habitats for Learning* (Toronto: New Society Publishers, 2001), p. 5.

Thus, the result has been the establishment of schoolyards where students are deprived of the opportunity to develop curiosity of or enjoy and appreciate their surroundings.[115] In fact, a recent study of elementary and middle schools in Baltimore, Boston, and Detroit showed that in all three cities, schoolyards are composed primarily of turf grass and impervious surface cover, the majority of which was asphalt, with little tree cover.[116] The average schoolyard in Boston, for example, was 60% asphalt.[117]

In addition to creating schoolyards that failed to stimulate and engage students, schools began to provide meals that prevented students from developing an appreciation for food. The provision of school lunches in schools became the USDA's responsibility under the Richard B. Russell National School Lunch Act of 1946.[118] That the Office of Education (named the Department of Education in 1980) was not involved in administering the lunch program is significant, given its efforts during World War II to make school lunches healthy and educational. For example, the Office of Education formed the Cooperating Committee on School Lunches in 1941, which I described earlier as recognizing the nutritional importance of school gardens on school lunches. Throughout World War II, the Office of Education published numerous booklets/pamphlets on these topics, including *Food for Thought – The School's Responsibility in Nutrition Education* (1941), *Making School Lunches Educational* (1944), and *School Lunch Management* (1944) to name a few.

[115] *Ibid*.; Mary Rivkin, "The schoolyard habitat movement."
[116] Alexis Schulman and Catherine A. Peters, "GIS analysis of urban schoolyard landcover."
[117] *Ibid*., p. 71.
[118] Gordon W. Gunderson, "The National School Lunch Program: Background and Development," (accessed April 3, 2006); available from http://www.fns.usda.gov/cnd/Lunch/AboutLunch/ProgramHistory_2.htm

For example, Joseph Hirsh, author of *Food for Thought*, argued, "Nutrition education should be a part of the total curriculum," and encouraged it in every classroom.[119] He recognized the interdisciplinary nature of nutrition education and suggested that teachers "analyze existing courses of study for appropriate opportunities to introduce nutrition in units of work adapted to various levels."[120] The term "nutritional education" as Hirsh uses it is what we would consider food education today. Although nutrition education implies a focus on learning about health and the nutritional values of various foods, Hirsh offered examples of ideas and lessons in different subjects including economics, history, and biology that teachers could use to teach students about food. Given the growing concerns about issues in food, health, environment, and education today, *Food for Thought* reads remarkably well even more than sixty years after its publication.

The US Office of Education also acknowledged the educational values of school lunches. For example, *School Lunch Management* suggested the formation of a faculty-pupil committee on school lunch that would help plan menus, maintain the garden, gather food from the garden, prepare the food, serve food, and decorate tables and lunchroom.[121] It also argued, "Every teacher through classroom activities can influence the learning that takes place in the lunchroom."[122] *Making School Lunches Educational* is another booklet that is highly relevant today. Its author, Ruth W. Gavian, provided detailed ideas for integrating food education into various subjects including home economics, business, agriculture, science, and English. Gavian's suggestions included: students experimenting with dishes using local foods and making specials for school lunch; computing the monthly profit and loss of the school lunches; learning to grow

[119] Joseph Hirsh, *Food for Thought: The School's Responsibility in Nutrition Education*, Education and National Defense Series, Pamphlet No. 22, US Office of Education (Washington: Government Printing Office, 1941), p. 27.
[120] *Ibid*., p. 11.
[121] US Office of Education, *School Lunch Management*, Nutrition Education Series, Pamphlet No. 3, US Office of Education (Washington, D.C.: Government Printing Office, 1944), p. 3.
[122] *Ibid.*

vegetables and preserve them for later use; learning about the chemistry and physiological functions of nutrients in foods and the biology of the soil; and writing articles and papers about issues in nutrition and the school lunch.[123] Gavian also noted the importance of providing students the opportunity to grow food in gardens, prepare it for school lunch, and taste samples of foods made by the cafeteria in "producing a favorable attitude toward an unaccustomed food."[124] The efforts delineated in this pamphlet are strikingly similar to current food education efforts, particularly those in Burlington, Vermont, which will be discussed later.

Although the actual extent to which these publications were used cannot be known, they clearly reflect the Office of Education's sincere efforts during the Second World War towards promoting food education and enabling students to connect with food intellectually and emotionally. In contrast, the US Department of Agriculture neither made an explicit connection between school gardens and school lunches nor formally recognized the educational value of school lunches. The USDA's connection with the school lunch program was acquiring agricultural surplus commodities from farmers and donating them to schools for lunch programs.[125]

Therefore, the fact that the USDA, and not the Office of Education (which I have described as pro-food-education), was given the primary responsibility of overseeing the school lunch program suggested that its instructional aspects were no longer prioritized by the federal government. In fact, this is reflected in the two main goals of the school lunch program as defined by Congress: fighting children's hunger and malnutrition, and encouraging consumption

[123] Ruth W. Gavian, *Making School Lunches Educational*, Nutrition Education Series, Pamphlet No. 2, US Office of Education (Washington: Government Printing Office, 1944).
[124] *Ibid*., p. 1, 8
[125] House Committee on Education and Labor, Subcommittee on Elementary, Secondary, and Vocational Education, *Child Nutrition Programs: Issues for the 103rd Congress* (Washington, D.C.: Government Printing Office, 1994), p. 29.

of domestic agricultural commodities.[126] The use of these commodities in the National School Lunch Program has prevented students from developing an appreciation for locally grown, fresh produce and has contributed to their lack of understanding of where their food comes from, how it is produced, and how it reaches their trays.

Moreover, statements made by the USDA concerning the recent beef recall in January 2008, following the release of a video showing the mistreatment of cattle at one of the meat packing companies that supplies beef for the school lunch program, are unsettling. In a testimony in March 2008 before the House Committee on Education and Labor, Kate Houston, Deputy Under Secretary of Food, Nutrition and Consumer Services (FNS) at the USDA, explained what the USDA has been doing in tracking down the beef. However, Houston dodged the issue altogether of why the mistreatment was allowed to occur in the first place; instead, she emphasized that parents and children should continue to have confidence in the safety of the food supply.

Houston then proceeded to praise the work of FNS, arguing:

> FNS has launched an aggressive initiative to improve the nutritional quality of its commodity program. Schools participating in the NSLP [National School Lunch Program] today have access to the widest choice of healthy commodity foods in history….We now offer schools more than 180 choices of quality products, including whole grains and low fat foods.[127]

However, the Physicians Committee for Responsible Medicine (PCRM), which has been evaluating annually the meals served in the school lunch program since 2001, is highly critical of this very commodity program:

> One of the most significant roadblocks to change is the USDA's commodity system. Each year, the USDA purchases hundreds of millions of pounds of pork, beef, and other animal products, primarily as an economic benefit to agricultural interests, and donates

[126] *Ibid*., p. 1.
[127] Kate J. Houston, Testimony of Kate J. Houston, Deputy Under Secretary Before the House Committee on Education and Labor, March 4, 2008, ¶ 35; available at http://www.fns.usda.gov/cga/Speeches/CT030408.html.

> them to the NSLP and other food assistance programs. Unfortunately, these "entitlement foods" are almost all unhealthful foods. This system makes it easy and inexpensive for food service directors to choose chicken nuggets, hot dogs, and other high-cholesterol, high-fat foods [over fresh fruits and vegetables that are more costly].[128]

In fact, in 2003, out of the nearly $1 billion that the USDA spent on NSLP food, about a quarter was for dairy products, over one half for meats and poultry, and only about 5% for fresh fruits and vegetables.[129] Walter Willett of Harvard's Public School of Health, has criticized, "[NSLP] foods tend to be at the bottom of the barrel in terms of healthy nutrition."[130] Therefore, Houston's statement is clearly unsubstantiated.

The USDA's partiality to the interests of industrial agriculture over those of children's health is further reflected in Houston's statement towards the end of her testimony:

> While we all recognize that providing nutritious meals in a healthy school nutrition environment is important, school children represent a particularly vulnerable population, and first and foremost, USDA, along with our partners at the Federal, State and local levels, has a responsibility to ensure school meals are safe.[131]

This implies that school foods are safe but not necessarily healthy and that the government is unwilling to spend more money to purchase foods that are both safe and healthy. However, why does the government have to separate these two issues? Why can't the government provide foods that are both safe and healthy? Why doesn't the government have the responsibility to help protect children from serious health problems, such as obesity? Why can't the government provide schools with more fresh produce that are grown by farmers who practice stewardship?

Essentially, the USDA's response to these questions is "Ultimately…this issue [improving school lunch] is most effectively addressed at the local level through the efforts of

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[128] PCRM, "School Lunch Report Card – August 2007," available at http://www.healthyschoollunches.org/reports/report2007_intro.html, p. 2.
[129] "Officials, Experts Grapple with School Lunch Program," CNN, 11 Dec 2003, available at http://www.cnn.com/2003/EDUCATION/12/11/school.lunch.ap/.
[130] *Ibid.*
[131] Kate Houston, "Testimony of Kate J. Houston," ¶ 36.

concerned parents."[132] Thus, in its FAQ section on the school lunch program, the USDA encourages parents to "bring concerns and suggestions to the attention of local officials," do something if they do not like what they see, and ask for cooperation.[133] These suggestions seem insincere, as if the federal government is distancing itself from the problems of the school lunch program and shoving the responsibility to the parents and schools. The government is acting in an aloof manner because ultimately, it is serving big agribusinesses that have the money and tremendous lobbying power to ensure that their interests are maintained. Consequently, many children continue to eat school meals that consist largely of meat and dairy, and are being deprived of the opportunity to appreciate and connect with nutritious, fresh, locally grown produce.

Another related educational post-war trend that has further reinforced people's disconnection from the products they consumed is consumer education. John Dewey had emphasized the importance of acquiring practical skills and knowing how to make things. In *Schools of To-Morrow*, Dewey and his daughter argued:

> It is a mistake to suppose that practical activities have only or even mainly a utilitarian value in the schoolroom. They are necessary if the pupil is to understand the facts which the teacher wishes him to learn; if his knowledge is to be real, not verbal.[134]

However, as consumer goods increased, there was increasing recognition of the importance of schools in teaching students the skills and knowledge of buying, while less attention was given to production-oriented education.[135] For example, a *New York Times* article from 1965, titled "Education: Now Schools Teach How to Buy," described a consumer education

[132] USDA FNS, "School Meals: FAQs," available at http://www.fns.usda.gov/cnd/About/faqs.htm.
[133] *Ibid.*
[134] John Dewey and Evelyn Dewey, *Schools of To-morrow*, p. 294.
[135] Hazel Kyrk, "Who Shall Educate the Consumer?", *Annals of the American Academy of Politics and Social Science*, 182 (1935): 41-49.

program that was introduced as part of the curriculum at a high school in Yonkers, New York.[136] The article also suggested consumer education activities that could be incorporated into different academic subjects. For example, in English classes, students could study propaganda techniques used in advertisements. Students could figure out the costs of certain bank loan offers in home economics, math, and business classes. Students could analyze the ingredients of various products in science classes. However, this article did not mention activities/lessons through which students could consider *where* the consumer products are coming from, *how* they are made, and *who* is making them. This suggests that the goal of consumer education was teaching students the science of consumption, not of production, even though knowing how products are made can greatly inform decisions made by consumers.

The emphasis on learning how to consume rather than produce has continued to prevail, particularly with respect to food. Many schools do not offer students the opportunity to learn to produce, harvest, prepare and/or serve food, or consider and question where food comes from and how it is produced and distributed. As described earlier, the Office of Education, which was promoted to Department status in 1980, had actively supported food education activities during World War II. Therefore, the fact that the Department of Education no longer explicitly supports or funds food education efforts further reflects the prevailing consumption-oriented culture largely disconnected from the processes of production.

While the government showed little support for food education efforts, it did invest heavily in science research, particularly in the physical sciences. Having relied greatly upon the techniques of physicists during World War II and recognizing their continued importance during the Cold War, the government provided far more funding for research in the physical sciences

[136] Fred M. Hechinger, "Education: Now Schools Teach How to Buy," *New York Times*, 15 Aug 1965, E7.

than in the life and agricultural sciences.[137] Atomic scientists were venerated by the American public, and "the obvious military utility of science during armed conflict…contributed to a faith that technological mastery could safeguard America through the Cold War."[138] The general optimism for and belief in science and technology during the post-war period is reflected in a book on science education written in 1969:

> Together, science and technology have speeded communications and transportation, have made food more abundant and diseases easier to control….In thousands of other ways as well, science and technology have combined to make the world a better place in which to live.[139]

The government, through the National Science Foundation, also funded over a dozen science curriculum-writing projects at universities.[140] For example, these included the *Science Curriculum Improvement Study* (SCIS) and *Science—A Process Approach* (SAPA). Funded by the National Science Foundation and initiated by the University of California, Berkeley in 1961, SCIS aimed to "produce a sequential, articulated program of elementary science." Its curriculum was designed to allow students to gain firsthand experiences for themselves and "explore natural phenomena either individually or in small groups."[141]

SAPA was sponsored by the Commission on Science Education of the American Association for the Advancement of Science. The Commission's objective was to develop a curriculum framework that provided "a maximum of pupil involvement" and was "based on the *processes of science*."[142] These processes were divided into two groups: *basic process skills* (e.g., observing, classifying, and measuring) and *integrated skills* (e.g., formulating hypotheses,

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[137] John L. Rudolph, *Scientists in the Classroom: The Cold War Reconstruction of American Science Education* (New York: Palgrave, 2002), p. 140.
[138] *Ibid.*, p. 37.
[139] Paul D. Hurd and James J. Gallagher, *New Directions in Elementary Teaching* (Belmont, CA: Wadsworth Publishing Company, 1969), p. 3.
[140] Bentley *et al.*, *Teaching Constructivist Science, K-8: Nurturing Natural Investigators in the Standards-Based Curriculum* (Thousand Oaks, CA: Corwin Press, 2007), p. 58.
[141] Hurd and Gallagher, *New Directions in Elementary Teaching*, p. 102.
[142] *Ibid*., p. 36; p. 35.

controlling variables, and interpreting data).[143] Teacher guides were designed to provide teachers with detailed outlines for each instructional unit.

Despite these and other efforts towards teaching science in innovative ways to improve science literacy among students, however, they did not come to fruition.[144] There were several reasons. First, the curricula were designed not by teachers but by people divorced from the actual reality of the schools, students, and teaching process, namely university scholars.[145] Moreover, the prepackaged curricula often specified exactly how the teachers should teach the lessons and even what the teacher should use and say, thereby preventing teachers from being flexible and creative.[146] Howard Gardner, educational psychologist at the Harvard Graduate School of Education, argues that the efforts of the science programs characterized "the euphoria…when educational planners felt that they could readily ameliorate the world's ills."[147]

Furthermore, these "teacher-proof curricular materials" were not actually used by many teachers.[148] In 1981, Allan Ornstein, then Professor of Education at the Loyola University of Chicago and current Professor of Administration and Instructional Leadership at St. John's University in New York, argued

> Reliance on the textbook and teacher-dominated activities, coupled with students being quiet, following directions, copying from the blackboard or workbook and memorizing information the teacher doles out still pervade American classrooms.[149]

Ornstein also cited the findings by people who had observed thousands of classrooms during the 1960s and 1970s, which included the reality that most teachers lectured most of the time, students were passive, and textbooks were the primary means of learning. Therefore, the

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[143] *Ibid*., p. 35.
[144] Allan C. Ornstein, "Curricular innovations and trends," *Peabody Journal of Education*, 59 (1[1981]): 46-53, p. 48.
[145] Michael W. Apple, *Education and Power* (New York: Routledge, 1995), p. 132.
[146] *Ibid.*, p. 132.
[147] Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 1983), p. 392.
[148] Apple, *Education and Power*, p. 136.
[149] Ornstein, "Curricular innovations and trends," p. 48.

curricular reforms in science ultimately neither enhanced science literacy among students nor engaged them in active, hands-on learning.

Environmental Education and Community Gardens: Attempts to Restore People's Connection to their surroundings

Given that the growing national consumer culture and the changes (and lack thereof) in schools contributed to children's increasing disconnection from their communities, land, and food, we can contextualize the declining support of school gardens after World War II. However, efforts towards restoring young people's connections to their natural environment and communities did exist.

For example, Julian Smith was a strong advocate for outdoor education and founded the Outdoor Education Project (1955-1970), which "helped integrate environmental study into the schools."[150] Smith argued that some of the greatest values of outdoor education include "increasing the powers of observation and deepening the perceptions of the natural environment and greater opportunities for adventure in learning through exploration."[151]

The federal government also began to recognize the value of outdoor environmental education. In 1970, the Office of Education sponsored a project concerning the research of school garden programs, which resulted in the publication of a paper titled "School Gardens and Farms – Aspects of Outdoor Education." Its author, Peggy Miller, a consultant working for the Michigan State Department of Education, provided a list of statements that reflect children's lack of active engagement with their environment:

[150] Clayne R. Jensen and Steve P. Guthrie, *Outdoor Recreation in America*, 6th ed. (Idaho: Human Kinetics Publishers, 2005), p. 283.
[151] Julian W. Smith, "Outdoor Education – An Overview," New Mexico State University, Educational Resources Information Center, Clearinghouse on Rural Education and Small Schools (1969), p. 4.

> Many children and youth are denied opportunities for meaningful physical work experiences either in the home, community or school….Children and youth are not provided experiences for the education of their hands and bodies….Learning principles such as learning by doing, using all the senses, real-life problem solving, learning in context, and concrete instead of abstract learning experiences are not practiced in many of our nation's educational institutions.[152]

Miller's assessment echoes that of Ornstein, who had noted that the majority of students remained passive in the classroom despite the curricular reforms in science education that were supposed to encourage active learning.

To encourage such active learning, Miller asserted, "Farm and garden programs should be integral parts of the curriculum for all elementary school children."[153] She recognized the values of school farm and garden programs, including their interdisciplinary nature, potential for enhancing community relationships, and provision of opportunities for students to "gain an 'education of the hands' as well as of the intellect and feelings."[154] This directly echoes Johann Pestalozzi's idea of harmoniously developing the intellectual, practical, and moral inner capacities.

The recognition of outdoor/environmental education programs was accompanied by the growth of community gardens particularly in the 1970s. Community gardens were collaborative expressions of grassroots activism to respond to the problems associated with the consumer culture, including urban decay and increasing consumer waste.[155] Christopher Boone, Associate Professor at the School of Human Evolution and Social Change at Arizona State University, and Ali Modarres, Professor of Geography and Urban Analysis at California State University, Los Angeles, describe the motives of the urban gardening efforts:

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[152] Peggy L. Miller, "School gardens and farms – Aspects of outdoor education," New Mexico State University, Educational Resources Information Center, Clearinghouse on Rural Education and Small Schools (1970), pp. 1-2.
[153] *Ibid.*, p. 13.
[154] *Ibid.*, p. 16.
[155] Lawson, *City Bountiful*, p. 218.

> Abandoned lots were converted to green spaces as a means of using unsightly properties in a fruitful way but also to build community in poor, crime-ridden neighborhoods. The growth of the environmental movement strengthened the idea of community gardens, allowing urbanites some contact with "nature"…. Increasingly detached from the food-making process, the draw for community gardeners was to observe and nurture the creation of food from seeds and deliver it to their own tables.[156]

The makes explicit the purpose of community gardens in connecting people to their food and communities.

In response to the growing popularity and recognition of community gardens, several gardening organizations were established at the national level. One was the National Gardening Association (NGA), established in 1973. Based in South Burlington, its goals are to "renew and sustain the essential connection between people, plants and the environment through gardening" and serve as a "bridge to connect people to gardening in five core fields: plant-based education, health and wellness, environmental stewardship, community development, and responsible home gardening."[157] In particular, NGA has been supporting school gardens since 1982 when it established the youth garden grants program. Grants are awarded to schools and community organizations that aim to use gardens to enhance the academic curriculum and raise awareness of both the environmental and social benefits of gardening.[158]

Six years after NGA was founded, the American Community Gardening Association (ACGA) was established to "facilitate an exchange of information among community garden organizers around the country."[159] It is a bi-national nonprofit organization and its mission is to "build community by increasing and enhancing community gardening and greening across the

[156] Christopher G. Boone and Ali Modarres, *City and Environment* (Philadelphia: Temple University Press, 2006), p. 92.
[157] NGA, "About NGA," available at http://assoc.garden.org/about/.
[158] NGA, "Grants for School and Youth Gardens," available at http://www.kidsgardening.com/grants.asp.
[159] Lawson, *City Bountiful*, p. 231.

United States and Canada."[160] The ACGA has held annual conferences since its inception, giving garden activists and organizations the opportunity to exchange information, form networks, and establish relationships.

The national recognition of the importance of gardening as a way to connect to our natural environment was the growth of several educational programs that sought to provide gardening experiences for young people. For example, in 1979, a non-profit organization called the Life Lab Science Program was developed in Santa Cruz, California. Life Lab was one of the first to acknowledge formally the potential of school gardens in facilitating environmental education. Life Lab "helps schools develop gardens where children can create "living laboratories" for the study of the natural world"; it has also "been a national leader in the development of hands-on, garden-centered science curricula and effective professional development programs."[161] Life Lab was proclaimed an exemplary science program by the National Science Teachers' Association in 1982, and in 1983, was named one of the twelve exemplary school programs in the nation by the National Science Foundation.[162]

Another educational program called Agriculture in the Classroom (AITC) was developed by the USDA in 1981.[163] It encourages students to consider the relationships between the food they eat and the environment in which the food is grown; AITC also helps "students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies."[164] Each state has its own AITC program and addresses agriculture education in different ways, whether through forming educational nonprofit

[160] ACGA, "Mission," available at http://communitygarden.org/about-acga/.
[161] Life Lab Science Program, "Overview," available at http://www.lifelab.org/index.php?page=about; "History," available at http://www.lifelab.org/index.php?page=history.
[162] Lawrence M. Fisher, "Schools Add Green Thumb to Science," *New York Times*, 13 Nov 1986, C10.
[163] Agriculture in the Classroom (AITC). "History," available at http://agclassroom.org/aitc/history.htm.
[164] *Ibid.*, "About AITC," available at http://agclassroom.org/aitc/index.htm.

organizations or working with colleges and universities.[165] The national AITC program facilitates the exchange of information and networking among the state programs.

The goals of organizations like the National Gardening Association, American Community Gardening Association, Life Lab, and the Agriculture in the Classroom in providing people the opportunity to connect with their environment were further reinforced by the National Environmental Education Act (NEEA) that Congress passed in 1990. The Act authorized the creation of an Office of Environmental Education within the Environmental Protection Agency.[166] It also authorized the establishment of an Environmental Education and Training Partnership (EETAP), which was created in 1995. Managed by the College of Natural Resources at the University of Wisconsin-Stevens Point, EETAP works to develop leadership and organizational capacity of state EE professionals and organizations to help them develop statewide EE programs.[167] Although barriers to the growth of such EE programs exist, including lack of time, money and staff, and the perception of EE as "fluff" and unrelated to standards-based education, EETAP has contributed to the development of comprehensive programs in some states through funding, training and networking opportunities, and resources.[168]

The Perspectives of Scholars and Educators on Learning and Engaging with the Environment

While interest in and recognition of gardening and environmental education continued to grow, a new theory about learning emerged in 1983 that has since been invoked by many school garden advocates to increase support for garden-based learning. This was the theory of multiple intelligences (MI), proposed by Howard Gardner, educational psychologist at the Harvard

[165] AITC, "History."
[166] National Environmental Education Act of 1990, section 4, available at www.epa.gov/enviroed/pdf/neea.pdf.
[167] Marcella Wells and Lynette Fleming, EETAP Capacity Building Evaluation – Final Project Report (2002), available at http://eetap.org/html/capacity_building_evaluation.php, p. 8.
[168] *Ibid.*

Graduate School of Education. Gardner introduces the theory in his *Frames of Mind* (1983), arguing,

> There is persuasive evidence for the existence of several *relatively autonomous* human intellectual competences… [or] "human intelligences."….[t]he conviction that there exist at least some intelligences…and that they can be fashioned and combined in a multiplicity of adaptive ways by individuals and cultures seems…increasingly difficult to deny.[169]

He defines an intelligence as "a set of skills of problem solving…and…the potential for *finding or creating problems*" that are important in certain cultural contexts.[170] Gardner identified seven different types of intelligences: linguistic, musical, logical-mathematical, spatial (artistic), bodily-kinesthetic, intra- and inter-personal intelligences. In his 1999 book, *Intelligence Reframed*, Gardner adds an eighth intelligence, the naturalist intelligence, or the capacity to recognize and classify specimens of the natural world and care for or interact with organisms and the natural environment.[171]

The significance of the multiple intelligences (MI) theory lies in its ability to justify the use of school gardens to facilitate education and learning. Gardner argues that the MI theory "makes its most important contribution to education" on the point that a "commitment to some common knowledge does not mean that everyone must study these things in the same way and be assessed in the same way."[172] In other words, the MI theory accepts that "no two people have exactly the same kinds of minds, since we each assemble our intelligences in unique configurations" and accommodates an "individually configured education" or a learner-centered education that aims to understand each student's background.[173] Gardner also asserts, "The theory stimulates teachers and students to be imaginative in selecting curricula, deciding how the

[169] Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 1983), pp. 8-9.
[170] *Ibid*., pp. 60-61.
[171] Gardner, *Intelligence Reframed.*
[172] *Ibid*., p. 152.
[173] *Ibid*., p. 150; p. 151.

curricula are to be taught or "delivered," and determining how student knowledge is to be demonstrated."[174]

In another 1999 book, *The Disciplined Mind*, Gardner elaborates on the ability of the MI theory to enhance understanding. He maintains that the MI theory "can become a powerful partner in effective teaching…by providing powerful points of entry [in introducing a topic of study to students] and multiple representations of the central or core ideas of the topic.[175] School gardens can therefore be seen as such a point of entry that can inspire a diversity of creative lessons and activities about the environmental, social, cultural, historical, scientific, and geographic aspects of food.

Just as Gardner's MI theory provides a potentially compelling and useful argument for implementing schools gardens, the work of David Sobel, educator and co-director of the Center for Place-Based Education at Antioch New England Graduate School, also reinforces the values of garden-based education. Sobel, in his 1996 book, *Beyond Ecophobia: Reclaiming the Heart in Nature Education*, is critical of the idea of teaching large, distant, abstract environmental issues such as rainforest deforestation to young children. He argues, "What's important is that children have an opportunity to bond with the natural world, to learn to love it, before being asked to heal its wounds."[176] He elaborates:

> …tragedies, which are big, complex problems beyond the geographical and conceptual scope of children, should not be considered prior to fourth grade [as subjects of study]….Asking young students to study ecological problems before they have developed the power of abstract thinking invites them to draw oversimplified conclusions.[177]

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[174] *Ibid*., p. 152.
[175] Howard Gardner, *The Disciplined Mind: What All Students Should Understand* (New York: Simon & Schuster, 1999), pp. 186-7.
[176] David Sobel, *Beyond Ecophobia: Reclaiming the Heart in Nature Education* (Great Barrington, MA: The Orion Society, 1996), p. 9.
[177] *Ibid*., p. 28.

In other words, teaching about environmental tragedies to children can lead them to fear or avoid the environment – or *ecophobia*. Instead, Sobel argues for place-based education programs that nurture *ecophilia* and remedy what Richard Louv calls the nature-deficit disorder that many suffer from. Learning though school gardens is therefore an example of place-based education in action.

Similarly, John Elder, Professor of English and Environmental Studies at Middlebury College, maintains the importance of environmental education programs that are place-based in approach. Elder identifies four distinct themes that characterize such programs: "attentiveness to students' home landscapes," "convergence of natural sciences and the arts," "time spent out of doors," and "human connections."[178] These characteristics ensure that children are involved in a "perpetual process of discovery, celebration, and community."[179] The place-based, ecophilia-cultivating approach towards environmental education that both Sobel and Elder embrace is one that can be used by building and maintaining gardens in school yards, which constitute one of the most immediate and local environments for students.

Invoking Gardner's MI theory and reflecting the idea of place-based education espoused by Sobel and Elder, the State Education and Environment Roundtable (SEER) proposed and justified its "Environment as an Integrating Context" (EIC) approach towards education. Formed in the 1990s, SEER was established as a "cooperative endeavor of educational agencies from 16 state departments of education."[180] It has worked to "enhance student achievement, improve K-

[178] John Elder, "Teaching at the Edge," in The Orion Society (ed.), *Stories in the Land: A Place-Based Environmental Education Anthology* (Great Barrington, MA: The Orion Society, 1998), pp. 13-4.
[179] *Ibid*., p. 15.
[180] Gerald A. Lieberman and Linda L. Hoody, *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning* (San Diego: State Education and Environment Roundtable, 1998).

12 instructional practices and help schools achieve their improvement goals by implementing the Environment as an Integrating Context (EIC) Model."[181]

A study identifying 40 successful existing EIC programs at schools across the US was conducted by Gerald Lieberman, Program Director of the State Education and Environment Roundtable, and Linda Hoody, professional development coordinator of the same. Lieberman and Hoody define EIC as designating a "pedagogy that employs surrounding natural and sociocultural environments as the context for learning."[182] Specifically, EIC:

> Breaks down traditional boundaries between disciplines, provides hands-on learning experiences, relies on team-teaching or cooperative planning, adapts to individual students and their unique skills and abilities, and develops knowledge, understanding and appreciation for the environment.[183]

These components of EIC – particularly its attention to each individual student's abilities – strongly echo the ideas of Howard Gardner.

Lieberman and Hoody report that fourteen of the study schools that conducted comparative analyses of student data (standardized test scores, GPAs, attitude, and attendance) between EIC and non-EIC students found that most EIC students did better on all accounts. Referring to Gardner's interpersonal intelligences, Lieberman and Hoody also note that the collaborative nature of EIC programs can specifically enhance this particular intelligence.[184]

The Connection between School Gardens and Food Education: The National Resurgence of School Gardens and Literature at the Turn of the Twenty-first Century

Although Gardner's MI theory and the idea of place-based education have been crucial in helping to justify the importance of school gardens, two events that took place in California in 1995 were essentially responsible for the resurgence of school gardens in the 1990s. One was the

[181] State Education and Environmental Roundtable Webpage, available at http://www.seer.org/.
[182] Lieberman and Hoody, *Closing the Achievement Gap*, p. 16.
[183] *Ibid.*
[184] *Ibid*., p. 75.

beginning of the construction of the Edible Schoolyard at the Martin Luther King Jr. Middle School in Berkeley, and the other, the initiation of the "Garden in Every School" program by Delaine Eastin, the former State Superintendent of Public Instruction.

The idea for the Edible Schoolyard, a one-acre school garden at King Middle School, was first conceived by Alice Waters in 1995. Waters, owner of Chez Panisse – a restaurant renowned for its use of local, fresh produce and ingredients – met with Neil Smith, then principal of King Middle School, to discuss her idea of building an edible school garden on a vacant, asphalt-covered site.[185] She wanted to "create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program…and involves students in all aspects of farming the garden as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land."[186] This has been the mission of the Edible Schoolyard since its inception.

Construction began in 1995, and gardeners, landscape architects, artisans, and general volunteers were recruited to facilitate the process. Efforts towards integrating the Edible Schoolyard into the curriculum began during the 1995-96 school year, when the Center for Ecoliteracy awarded a curriculum development to allow teachers to develop lesson plans that reinforce and build on students' experiences at the garden. Feeling the desire to raise awareness about the Edible Schoolyard on a large level, Waters wrote a long letter to the president and the vice president, with a copy to the first lady, on December 9, 1995:

> Dear Mr. President and Mr. Vice President: Our project, the Edible Schoolyard, plans to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program….Help us nourish our children by bringing them back around the table, where we can pass on our most humane values. Help us create a demand for sustainable agriculture….promote it as part of the school

[185] The Edible Schoolyard, "History," available at http://www.edibleschoolyard.org/history.html.
[186] *Ibid*., "Mission," available at http://www.edibleschoolyard.org/mission.html.

> curriculum…demonstrate it with organic gardens on the grounds of the White House and Vice Presidential Mansion….[187]

Bill and Hillary Clinton and Al Gore all wrote back, showing support for Alice's efforts, although they did not offer to work towards providing funding for the Edible Schoolyard or for other school gardens. To assure funding for the Edible Schoolyard project and other similar projects in the future, Waters founded the Chez Panisse Foundation in 1996.[188] The details of the daily operation of the program and the factors that have made the Edible Schoolyard Project successful will be discussed later.

During the same time that the construction of the Edible Schoolyard was under way, Eastin declared her "Garden in Every School" vision and argued the importance of gardens in creating "opportunities for our children to discover fresh food, make healthier food choices, and become better nourished."[189] She recognized the interdisciplinary nature of gardens and asserted,

> Young people can experience deeper understandings of natural systems and become better stewards of the Earth by designing, cultivating, and harvesting school gardens with their own hands. School garden projects nurture community spirit, common purpose, and cultural appreciation by building bridges among students, school staff, families, local businesses, and organizations.[190]

Eastin has also argued, "A garden in every school is even more essential to make our standards come alive. We must not lose the creativity, problem solving, and sheer love of learning that comes from hands-on, experiential learning."[191]

Towards achieving the "Garden in Every School" vision, California has passed a series of bills. For example, Assembly Bill 1014, which called for the establishment of the Instructional

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[187] Thomas McNamee, *Alice Waters and Chez Panisse: The Romantic, Impractical, Often Eccentric, Ultimately Brilliant Making of a Food Revolution* (New York: The Penguin Press, 2007), pp. 268-9.
[188] Chez Panisse Foundation, "About Us," available at http://chezpanissefoundation.org/about.html.
[189] California Department of Education, "A Garden in Every School: Vision," available at www.cde.ca.gov/ls/nu/he/documents/gardenvision.pdf.
[190] *Ibid*., ¶ 3-4.
[191] Janice L. Agee and Sheila Bruton (eds.), *A Child's Garden of Standards: Linking School Gardens to California Education Standards* (California Department of Education, 2002), p. v, available at www.cde.ca.gov/re/pn/fd/documents/childsgarden.pdf.

School Gardens Program in the California Department of Education (CDE), was passed in the California state legislature and approved by the governor in 1999.[192] This program "awards grants to schools, school districts, county offices of education, and other local agencies to establish school site gardens and incorporate agricultural, nutrition and integrated waste management concepts into classroom instruction."[193] The goals of the program include: "promoting nutrition education and motivating students to make healthy food choices," "promoting waste management concepts," and "fostering a better understanding and appreciation of where food comes from, how it gets from farm to table, and the important role of agriculture in the state, national, and global economies."[194] Furthermore, in 2002, Assembly Bill 1634 appropriated $200,000 for awarding grants for at least seventy school district instructional gardens and for researching and developing curricula for school garden programs.[195] The Assembly Bill 1535 of 2006 authorized the CDE to award $15 million for grants to promote, develop and sustain instructional school gardens.[196] The state's commitment towards supporting school gardens is clear.

California, particularly Berkeley, has also led the nation in the development of academic curricula for school gardens and in the efforts towards implementing food education into schools. In 1995, the Center for Ecoliteracy (CEL), a public foundation dedicated to educating young people about sustainable living, was founded in Berkeley by Zenobia Barlow, Peter Buckley, and Fritjof Capra.[197] In particular, the Center has been supporting the Edible Schoolyard as a project that nurtures ecoliteracy, which includes the ability to appreciate the natural environment and see

[192] California Department of Education (CDE), "A Healthy Nutrition Environment: Linking Education, Activity, and Food through School Gardens: Program Overview" (2007), available at www.cde.ca.gov/ls/nu/he/garden.asp.
[193] CDE, "Scope of Work for the California Department of Education's School Instructional Gardens Program. Board Meeting, April 18-19," p. 1, available at http://www.ciwmb.ca.gov/agendas/mtgdocs/2000/04/00003598.DOC.
[194] *Ibid.*
[195] California Assembly Bill 1634, available at http://www2a.cdc.gov/phlp/docs/obesity/caab1634.pdf.
[196] CDE, "Program Overview," p. 2.
[197] Center for Ecoliteracy, "Our Mission," available at http://ecoliteracy.org/about/index.html.

the many interconnections within the environment that help sustain life. CEL's contribution to the Edible Schoolyard has been "providing tools, ideas, and support for combining hands-on experience in the natural world with curricular innovation."[198] CEL also funds many other school garden programs in the region. In addition, in 2004, CEL produced the Rethinking School Lunch Guide, which provides a systemic overview of school lunch, offering innovative approaches, ideas, and solutions for creating a lunch program that teaches students the values of eating locally grown, fresh, healthy foods. The guide specifically mentions the significance of integrating school gardens into the academic curriculum.

I had an opportunity to interview Zenobia Barlow in summer 2007. She shared her thoughts on school gardens and food literacy: "Food is a powerful lens for teaching children basic understanding of life's processes….[and can be used] to understand health, culture and the environment."[199] She further elaborated on the concept of food literacy, or the ability to question and understand "how food is grown, how it reaches the table, the implications of food for health, the implications of food on the environment."[200] She maintained that food literacy has large implications on not only our health, but also the health of communities and the planet. Demonstrating her belief in the value of school gardens and food education, Barlow argued that she would like to see school gardens becoming a part of the curriculum, and that "making education more vivid and life-affirming and engaged w/ living things" is crucial.[201]

In addition to the city-level efforts of Berkeley, the state of California has also been active in creating curricular resources on school gardens and food education. In 2002, California developed a guide titled *A Child's Garden of Standards: Linking School Gardens to California*

[198] *Ibid.*
[199] Zenobia Barlow, personal communication (interview), 6 Aug 2007.
[200] *Ibid.*
[201] *Ibid.*

Education Standards, Grades Two Through Six to demonstrate how garden-based education can address the state's academic content standards. Then, in 2006, the California School Garden Network (CSGN) was established. Its mission has been to "create, sustain, and increase awareness for school gardens in the state of California school gardens to enhance academic achievement, a healthy lifestyle, environmental stewardship, and community and social development."[202] CSGN provides ideas for curricula and lessons as well as papers and articles discussing the benefits of garden-based learning. Its extensive website at www.csgn.org serves as a resource center primarily for schools in California but also those in other states.

California has clearly done a lot to support and encourage the integration of garden-based learning and food education into its schools. However, this is not to say that California has been the only one. School garden projects and food education initiatives are sprouting across the nation. Jim Flint, executive director of the Friends of Burlington Gardens, has visited numerous school gardens across the country and explains that school gardens are increasingly being integrated into the school curricula and are used to encourage students to eat fresh produce and connect to their natural environment and the food they eat.[203] School gardens are also offering the opportunity for students and community members to interact, connect, and engage with one another actively.[204] A noteworthy example of such community networking through school gardens is occurring in Burlington, Vermont. A more detailed discussion of Burlington's work will follow.

Efforts to develop formal curricular resources on garden-based learning and food education are occurring across the US as well. For example, the work of Teachers College at

[202] CSGN, *Gardens for Learning: Creating and Sustaining Your School Garden* (CSGN, 2006), p. 4, available at www.csgn.org.
[203] Jim Flint, workshop at the 28th American Community Gardening Association, 10 Aug 2007.
[204] *Ibid.*

Columbia University is exemplary. Isobel Contento, professor in nutrition education, and Angela Calabrese Barton, former professor of science education at Teachers College and current professor in teacher education at Michigan State University, began developing an inquiry-based nutrition and science education curriculum called Linking Food and the Environment (LiFE) in 1997.[205] LiFE is currently funded through its third Science Education Partnership Award (SEPA) grant from the National Institute of Health.[206] SEPA is awarded to projects designed to improve science and health literacy particularly among K-12 students.[207]

Specifically, Teachers College has developed four modules on food, health and the environment, targeted for upper elementary and middle school students. Three of the modules have potential connections with school gardens; they are titled "Growing Food," "Farming to Table & Beyond," and "Food & Health." Through these modules, LiFE's vision is "to promote scientific habits of mind through thoughtful inquiry-based activities that study food, food systems, and environmental and personal health."[208] The National Gardening Association has praised the LiFE modules as a "thought-provoking, action-changing…curriculum that encourages student investigations of science topics via…food in a way that busts myths and open students' eyes."[209] These modules have been pilot-tested in schools in cities across the US, including New York City, St. Louis, Philadelphia, Austin, and Hayward, California.[210] Although Teachers College has found that LiFE increases understanding of food systems among students

[205] Sarah Pounders, "LiFE's origins," (2007), available at http://www.kidsgardening.com/Dig/digdetail.taf?Type=Art&id=2166.
[206] Pam Koch, "Feeding Our Kids the Right Food…and Inspiring Them to Eat it," (Berkeley: Center for Ecoliteracy, [2007]), available at http://www.ecoliteracy.org/publications/rsl/pam_koch.html.
[207] Science Education Partnership Award, "About the SEPA Program," available at http://www.ncrrsepa.org/.
[208] LiFE, "Mission & Goals," available at http://www.tc.columbia.edu/life/mission.html.
[209] Sarah Pounders, "Pursuing Food Systems Inquiry," (Burlington: KidsGardening, 2007), ¶ 1, available at http://www.kidsgardening.com/Dig/digdetail.taf?Type=Art&id=2167.
[210] Teachers College – Columbia University, "Press Room: Linking Food & the Environment (LiFE)," 22 Mar 2005, available at http://www.tc.edu/news/article.htm?id=5007.

at all of the schools, more studies should be conducted by external, impartial evaluators to determine the effects of LiFE.

Each module has a driving question that provides a thematic framework for the lessons, all of which incorporate one to all five phases of the QuESTA (Questioning, Experimenting, Searching, Theorizing, and Applying) learning cycle.[211] Table 1 lists the driving question for each module and topics covered in each module. The last two columns provide my ideas of how school gardens can be used in teaching the module and how each module can facilitate interactions between students and the larger local community.

Although the LiFE modules are exemplary for encouraging students to think scientifically about the food they eat and the food system, the modules could be further enhanced by giving students the opportunity to engage with community members and make connections between what they learn at school and the issues that their local community faces. The recent partnership established between Teachers College and the Center for Ecoliteracy is promising in this respect, since the latter emphasizes the importance of cooperating with community members and organizations in implementing food education into schools. Specifically, Teachers College and CEL have developed a joint program called Rethinking Food, Health & the Environment: Making Learning Connections. Its purposes are to link CEL's Rethinking School Lunch planning framework with the LiFE modules and "offer resources for innovation in school food services…and connecting schools with farms, their communities and the environment."[212] Ultimately, the long-term goal of the partnership is to equip students with the ability to make food and lifestyle choices that "promote personal, community, and environmental health."[213]

[211] LiFE, "Framing Process: QuESTA Learning Cycle," available at http://www.tc.columbia.edu/life/questa.html.
[212] CEL, "Rethinking Food, Health and the Environment: Making Learning Connections," (2007), available at http://www.ecoliteracy.org/seminars/rfhe-pdinstitute.html.
[213] Koch, "Feeding Our Kids the Right Food."

Table 1. Chart of the LiFE Modules.

Module	Driving question	What students do	Connection with school gardens	Connection with community
Growing Food	How does nature provide us with food?	Students learn about the relationship between agriculture and nature and explore how nature provides food. In particular, students explore the structure and function of plants and ecological interactions. Students are introduced to the concept of a food system.	Study the ecological relationships among organisms in the garden. Learn about the structure and function of plants grown in the garden. Learn about decomposition and composting by making composting bins and/or worm bins.	Learn about and visit community gardens, local farms; talk to local farmers and gardeners; learn about the issues that local farmers are facing; invite gardeners to come out to the school garden.
Farm to Table & Beyond	What is the system that gets food from farm to table and how does this system affect the environment?	Students learn about the food system, or the farm-to-table processes from production through consumption and waste. In particular, they learn about the environmental effects of the food system.	Trace the garden-to-table processes of the foods grown in the garden. Discuss the benefits of growing foods in gardens, of locally grown foods. Introduce the concept of sustainable agriculture.	Learn about and visit local farms; learn about the food system in the context of the local farm.
Food & Health	How does food provide our bodies with what we need?	Students learn about what food does in the body, how body systems work, and what to do to keep healthy. They also prepare healthy foods.	Cook healthy dishes using produce harvested from the garden.	Invite community members, local farmers, gardeners to a harvest festival. Send letters to officials explaining how growing produce in gardens can help reduce the incidence of diet-related diseases.

Another leader in the development of curricular material on garden-based learning has been Cornell University. In 2001, Marianne Krasny, professor of natural resources at Cornell University, received a grant from the National Science Foundation's Informal Science Education program to develop an inquiry-based, intergenerational program called Garden Mosaics.[214] Krasny, who serves as principal investigator of Garden Mosaics, began the project with the conviction that community gardens could be used as educational science laboratories.[215] The mission of Garden Mosaics is "connecting youth and elders…to investigate the mosaic of plants,

[214] NSF, "Science, Education and Community: Organically Grown," (2005), available at http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=104544.
[215] Keith Tidball, workshop at the 28th American Community Gardening Association, 10 Aug 2007.

people, and cultures in gardens to learn about science and to act together to enhance their community."[216] Specifically, it seeks to "create a set of resources and activities that combine science learning, intergenerational mentoring, cultural understanding, and community action [or civic learning]."[217]

The Garden Mosaics program involves the youth interviewing gardeners, learning about gardens in their communities, and initiating and conducting service-learning projects or action projects that contribute to the enhancement of their communities. The Garden Mosaics website (www.gardenmosaics.cornell.edu) also continually updates "Science Pages," which are information and drawing sheets that enable students to learn more about biodiversity, soils, specific crops and plants. In addition, Garden Mosaics is currently being adapted to each state's standards in science.[218]

Thus, through Garden Mosaics, the youth learn science while also engaging with their surrounding communities. It has been praised by both the USDA and the EPA. The USDA recommends, "Educators seeking innovative ways to prompt farmers, ranchers, and other groups to adopt more sustainable production approaches might consider the participatory model [Garden Mosaics]."[219] EPA sees a particularly important connection between its Aging Initiative that seeks to protect the environmental health of older persons and the intergenerational aspect of Garden Mosaics: "The program [Garden Mosaics] provides a model for balancing the knowledge of older adults and scientists in a youth community education and action program. Through interviewing older gardeners, youth learn about plants, planting practices, and cultures in the

[216] Garden Mosaics, "Mission," available at http://www.gardenmosaics.cornell.edu/pgs/aboutus/aboutus1.htm.
[217] *Ibid*., "Overview," available at http://www.gardenmosaics.cornell.edu/pgs/aboutus/aboutus2.htm.
[218] Tidball, 28th ACGA Conference.
[219] USDA, Cooperative State Research, Education, and Extension Service, "Garden Mosaics Project" (2007), available at http://www.csrees.usda.gov/nea/family/in_focus/urban_if_mosaics.html.

urban community and other gardens."[220] Like with the LiFE series, a more rigorous, longitudinal study of the impacts of Garden Mosaics on students would be constructive in encouraging more schools to implement the program.

Several noteworthy resources on food education for younger children that encourage interdisciplinary learning exist as well. One is a short book titled *Seedfolks*, written by Paul Fleischman in 1997. Consisting of a series of short stories, each told by a different character living in a low-income Cleveland neighborhood, *Seedfolks* describes how a vacant, trash-filled lot transforms into an uplifting community garden that brings people of different ethnicities and cultures together.[221] Through the garden, the characters develop relationships with one another despite language barriers. Numerous lesson plans, activities, and webquests featuring the book are now available. For example, the National Gardening Association provides examples of extension activities involving science (learning about plants' needs), history (learning about the various countries and cultures of the characters in the book), language arts/drama (reading aloud the vignettes and impersonating the character), and service learning (engaging in a project that beautifies the community and brings people together).[222]

Another exemplary source for third through eighth grade teachers is titled *Seeds of Change: Learning from the Garden*, written by Judy Mannes and Marsha Rehns in 2001. The National Gardening Association sells the book through its website. It describes *Seeds of Change* as a "garden-based science program with a social studies spin" that offers classroom, gardening,

[220] US EPA, "Aging Initiative: Examples of Intergenerational Programs," (2008), available at http://www.epa.gov/aging/ia/examples.htm.
[221] Paul Fleischman, *Seedfolks* (New York: Harper Trophy, 1994).
[222] NGA, "Kids Garden News: *Seedfolks*," (2005), available at http://www.kidsgardening.com/2005.kids.garden.news/nov/pg3.html.

and cooking activities through which students learn about the historical origins of foods and field-to-table processes.[223] Christianbook.com also sells this book, and extols it:

> [*Seeds of Change* is] an exceptional interdisciplinary unit study that stands apart from the myriad of mass produced workbooks available. Blending anthropology, social studies, history, government and culture with gardening, this one-of-a-kind learning experience presents hands-on activities with endless opportunities for cross-curricular studies.[224]

The several sample activities contained in the book, available through Christianbook.com, provide students the opportunity to learn about the historical, social and cultural aspects of food, which are often not taught through school gardens. In fact, NGA's 2007 survey of grant winners found that while 90% of school gardens are used to teach science, only 23% are used to teach history, and less than 40% to teach social studies and cultural issues.[225] Therefore, using *Seeds of Change* can help diversify the instructional use of school gardens.

Similarly, *Healthy Foods from Healthy Soils* (2003), written by Elizabeth Patten and Kathy Lyons, is noteworthy for its creative, interdisciplinary approach. Like *Seeds of Change*, *Healthy Foods from Healthy Soils* is carried by the National Gardening Association, but the latter appears to be better known and is recognized by prominent organizations I have described previously including the California School Garden Network, Life Lab program, and Agriculture in the Classroom (AITC). For example, AITC praises Patten and Lyons' work:

> This down-to-earth guide offers 45 experimental activities that explore nutrition, agriculture, and recycling while helping children reflect on their daily food choices. These fun, engaging activities are culturally sensitive, designed for urban and rural learning environments, keyed to the Benchmarks for Science Literacy and loaded with links to children's literature and other resources.[226]

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[223] NGA, "Gardening with Kids Store: *Seeds of Change: Learning From the Garden*," available at http://www.kidsgardeningstore.com/11-4128.html.
[224] Christianbook.com, "Product Description: *Seeds of Change: Learning from the Garden*," (2008), available at http://www.christianbook.com/Christian/Books/product?item_no=95406&kw=95406&en=froogle&p=1013824.
[225] NGA, "Evaluation Summary: 2007 NGA Grant Winners" (2008), available at http://www.kidsgardening.com/grants/2007-evaluation-summary.asp.
[226] AITC, "*Healthy Foods from Healthy Soils*: A Hands-On Resource for Educators," AITC National Resource Directory, available at http://www.nyaged.org/aitc/documents/gardenbooklist.doc.

The sample lessons of *Healthy Foods from Healthy Soils* that the California School Garden Network makes available all seek to provide students with an understanding of the various processes of a food system. One of them involves learning about food preservation and making dried fruits while another involves learning about food distribution and calculating food miles.

The national recognition of the significance of school gardens and food education projects has further contributed to their growth. For example, Slow Food USA is a nationwide, non-profit organization with chapters throughout the nation that is "dedicated to supporting and celebrating the food traditions of North America."[227] Founded in 2000 as a national branch of Slow Food International, Slow Food USA provides mini-grants to schools seeking to implement garden-to-table projects that are "based on the three building blocks of pleasure, tradition, and sustainability," and that aim to "create a direct connection between children and their food source, emphasizing the pleasures of taste and the table."[228]

Similarly, in recent years, the National Gardening Association (NGA) and the American Community Gardening Association (ACGA) have played an important role in supporting school gardens. In 2005, the NGA began the Adopt-a-School-Garden program, in which donors adopt and support school gardens.[229] NGA provides help by identifying how a particular school garden can meet certain educational objectives. Part of its website is devoted exclusively to youth gardens (www.kidsgardening.com), where resources, classroom success stories, ideas for lessons, and reviews of curricular material are offered.

At the same time, the American Community Gardening Association also recognizes the importance of school gardens, particularly through its annual conferences that bring together

[227] Slow Food USA, "About Us," available at http://www.slowfoodusa.org/about/index.html.
[228] *Ibid.*
[229] NGA, "Adopt a School Garden Programs," available at http://assoc.garden.org/ag/.

people engaged in all aspects of gardening from the US, Canada, and abroad.[230] In summer 2007, I attended the 28th annual ACGA conference that was held in Boston, and attended several workshops on school gardens. Through these workshops, I learned about the important factors for sustaining school gardens and the Garden Mosaics program discussed previously. I also gained some ideas for using school gardens to facilitate food education as well as general education. In addition, through the field trips arranged by the ACGA, I was able to visit several school gardens in Cambridge and Somerville. Many of the conference participants were involved in school gardens as well. I left the ACGA conference sensing directly the national scale of the school garden movement and feeling hopeful about its prospects.

These widespread national efforts towards promoting and sustaining school gardens and developing relevant curricular resources were likely important in leading the federal government to include a section on access to local foods and gardens in the Child Nutrition and WIC Reauthorization Act of 2004. Specifically, the act states:

> The Secretary [of the USDA] *may* provide assistance, through competitive matching grants and technical assistance, to schools and nonprofit entities for projects that improve access to local foods in schools…through farm-to-cafeteria activities, including school gardens.[231]

It is important to note, however, that the act does not require the USDA Secretary to provide funding. Perhaps this explains why I have been unable to find information about government spending for school gardens and improving schools' access to local foods.

However, a promising amendment to the Richard B. Russell National School Lunch Act, written by Vermont senator Bernie Sanders (I) and included in the version of the Farm Bill passed by the Senate on December 14, 2007, is pending. Specifically the amendment states:

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[230] ACGA, "Annual Conference," available at http://www.communitygarden.org/learn/conference.php.
[231] Child Nutrition and WIC Reauthorization Act of 2004, Public Law 108–265, 108th Congress, section 122 i, 1, A, emphasis added; available at http://www.fns.usda.gov/cnd/Governance/Legislation/Historical/PL_108-265.pdf.

> The Secretary shall carry out a pilot program under which the Secretary shall provide to nonprofit organizations or public entities in not more than 5 States grants to develop and run…community gardens at eligible schools in the States that would (i) be planted, cared for, and harvested by students at the eligible schools; and (ii) teach the students participating in the community gardens about agriculture, sound farming practices, and diet.[232]

The amendment authorizes the appropriation of $10,000,000 for this pilot program. Whether this amendment will remain in the final version of the Farm Bill, however, has yet to be determined. Currently, the Farm Bill Conference Committee is working on merging the Senate's version of the Farm Bill with the House of Representatives' version.[233] Although this amendment would mark an important step, the government can and should do more. All students, regardless of where they go to school, should have access to healthy foods and to locally grown, fresh foods when available. Ultimately, this access should not be grant-based because grants are, by definition, competitive and therefore not available for every school.

The Beginning of a "Delicious Revolution": Alice Waters and the Edible Schoolyard

Despite the relatively mild support for school gardens and food education by the government, however, the widespread promotion of these endeavors among the non-government organizations and institutions at the local, state, and national levels is hopeful. To ensure the sustainability of these efforts, the benefits of garden-based learning and food education on students need to be demonstrated clearly. However, the positive impacts of food education and school gardens on students have been noted only anecdotally for the most part. Emily Ozer, assistant professor of community health and human development at the UC Berkeley School of Public Health, argues that "more research using rigorous evaluation designs and sufficiently

[232] US Senate Committee on Agriculture, Nutrition & Forestry, "The Food & Energy Security Act of 2007: Floor-passed version," available at http://agriculture.senate.gov.
[233] Bruce I. Knight, "Agricultural Outlook 2008," US Department of Agriculture, Animal and Plant Health Inspection Service, 16 March 2008, available at http://www.aphis.usda.gov/newsroom/speeches/content/2008/03/tx_swcattle_sec_final_3_16_08.shtml.

large samples are needed to test the effects of school garden programs."[234] She also suggests issues and questions that merit closer study, including:

> the factors—on the level of the individual, family, school, and community—that might mediate or moderate [the potential benefits of gardens], how short-term changes in knowledge and attitude relates to longer-term changes in social, academic and health domains, and implementation factors that contribute to the sustainability of effective school garden programs.[235]

Ozer further offers important questions:

> Who benefits the most from school garden programs and why? Is more intensive participation associated with stronger effects? Are programs with multiple components (e.g., cooking classes or farm visits in addition to the garden) more effective? How do schools and families reinforce program learning to promote long-term effects? How do the approaches used to elicit buy-in from teachers, administrators, parents, and students relate to the long-term sustainability of the program?[236]

Answers to these questions could help school garden programs gain an edge in receiving funds from donors. They could also be ultimately critical in convincing politicians to develop policies that make explicit appropriations for school gardens and food education programs.

One of the few comprehensive studies on the impacts of garden-based learning focused specifically on the work of Berkeley's Edible Schoolyard. The study, which began in October 2001 and ended in June 2002, was conducted by J. Michael Murphy, Ed.D., and Erin Schweers, Ed.M., both from Harvard Medical School and the Massachusetts General Hospital. As the Edible Schoolyard is one of the most well known school gardens in the US and continues to inspire other schools to build gardens, we need to understand its accomplishments. Before delving into the study, however, it is important to understand in more detail the philosophy of Alice Waters and the ways in which the Edible Schoolyard is integrated into the curriculum.

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[234] Emily J. Ozer, "The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development," *Health Education & Behavior*, 34 (6[2007]): 846-863, p. 850.
[235] *Ibid.*, p. 860.
[236] *Ibid.*

When I visited the Edible Schoolyard in August 2007, one of the first things I noticed was a large sign besides the entrance of the kitchen that read, "The Philosophy of Alice Waters," and included a list of her concise principles. These included: eat seasonally; eat locally and sustainably; shop at farmers' markets; plan a garden; conserve, compost and recycle; cook simply, engaging all your senses; set the table with care and respect; eat together; food is precious; and cook together. The goal of the Edible Schoolyard, therefore, is to inculcate these principles and values into the students at King. Although I was unable to meet Waters in person during my visit, I had the pleasure of conducting a phone interview with her in September 2007 for 30 minutes and getting a sense of her powerful passion for food education. She argued:

> I just think there should be a core curriculum [of food education] in every school on the planet…manifesting itself…in whatever culture it's in….I see this absolutely as indispensable…for every single child….My goal for this year is to put these words into the next president's mouth: "We want to make public education #1 priority in this country, we want to rebuild the schools, we want to refund them, and we want to make edible education a requirement for every child. We don't want ANY child left behind. We want to begin in kindergarten and all the way through college…. And we want to buy our food from people."….We don't have time for…halfway solutions. We really need to…engage people in something that *tastes* good and *feels* good on all levels.[237]

Waters' passionate dedication towards food education and her idea for the Edible Schoolyard inspired the Center for Ecoliteracy to play an active role in supporting the project from its inception. The CEL developed the Food Systems Project (now called Rethinking School Lunch) in order to teach students about sustainable patterns of living and has been "supporting instructional garden classrooms," and "developing food systems-based curriculum."[238] The CEL continues to be critical in helping to shape the educational framework for the Edible Schoolyard.

At the same time, the Edible Schoolyard staff members are essential to maintaining the daily operations of the Edible Schoolyard, which involves coordinating gardening and cooking

[237] Alice Waters, interview, 17 September 2007.
[238] Food Systems Project, (2003), available at http://www.foodsystems.org/pages/working.html.

activities for all 900+ students at King Middle School. All students spend part of the school year in the garden and kitchen and prepare for and/or build upon their gardening and cooking experiences in the classroom. Students go to the garden with their science teachers and go to the kitchen classroom with their humanities and/or electives teachers.[239] Students spend 90 minutes at a time in the garden and kitchen classroom.

The kitchen is another important classroom setting. It is "an experiential learning classroom that focuses on the relationship between food and life," where "culture, history, language, ecology, biology and other classroom-related subject areas are integrated into the preparation of food from the garden."[240] As I walked into the kitchen classroom during my visit, I was impressed by its beautiful design and sensed a comfortable, homey atmosphere conducive to learning, cooking, and eating. Each class "begins with a brief presentation by the chef teacher, during which the day's recipe, ingredients, and preparation method are introduced."[241] The students then use the harvest from the garden to prepare dishes while also carrying out the kitchen scrap into the garden compost pile.

Compost, of course, is an important resource that sustains the garden and its diverse array of seasonal produce, herbs, vines, berries, flowers, and fruit trees. The one-acre garden is also equipped with a tool shed, seed propagation table, a worm bin, picnic tables, a pizza oven, and a chicken coop. Marsha Guerrero, who oversees the Edible Schoolyard program, warmly emphasized in her interview with me how much the students love the chickens:

> They are completely in love with the chickens. They're fascinated by them, they love the eggs. They turn into children. Even the biggest and the oldest and the toughest turn into children when they get around the chickens.[242]

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[239] Edible Schoolyard, "A Day in the Garden," available at http://www.edibleschoolyard.org/gar_aday.html.
[240] *Ibid.*, "Kitchen Overview," available at http://www.edibleschoolyard.org/kitchen.html.
[241] *Ibid.*, "A Day in the Kitchen," available at http://www.edibleschoolyard.org/kit_aday.html.
[242] Marsha Guerrero, interview, 6 Aug 2007.

The garden therefore provides an important opportunity for students to connect with their natural environment and engage all of their senses that are often not stimulated in the indoor classroom.

Each gardening class begins in the garden begins in the ramada, an open, circular shade structure located in the center of the garden, where the entire class gathers. The garden teacher discusses what needs to be done that day and provides a reflective question for the students to think about while working in the garden. then, students break up into 4 or 5 groups and each completes a task, which can include "mulching, weeding, compost turning, bed preparation, harvesting food for the kitchen, vermicomposting, planting, seed starting, transplanting, landscape jobs, and garden crafts."[243] Twenty minutes before the end of the period, the garden teacher rings a bell, which signals the beginning of clean up. At the end, students return to the ramada and discuss their thoughts on the question of the day at the beginning of class.

In both the kitchen and garden, students have an opportunity to interact with community members who volunteer and work with them. Kelsey Siegel, former garden teacher, told me in his interview with me that the annual plant sales, particularly of heirloom tomatoes, are bringing community members together as well.[244] These plant sales resulted through the efforts of preserving seeds, which is a concept that students learn about. Siegel explained that about fifty varieties of tomatoes were sold in the 2006 plant sales.

The Edible Schoolyard is also reaching out to and training other school garden and kitchen educators in the Berkeley Unified School District as well as those across the country. Marsha Guerrero, program coordinator for the Edible Schoolyard, explained, "we are growing

[243] Edible Schoolyard, "A Day in the Garden."
[244] Kelsey Siegel, Interview, 6 Aug 2007.

little edible schoolyards everywhere and establishing affiliate relationships with projects that are new or well-established."[245]

It is clear from the scale and details of the program that committed staff members are working diligently to make it function. Both Guerrero and Siegel passionately talked about their work in their interviews with me and emphasized the importance of students understanding the life cycle of food and what goes into producing the food. Guerrero also revealed her love for food, explaining that food is "just so central [to me] in every single way – I love the way it looks, I love the way it smells, I love to touch it, I love to work with it."[246] It is no wonder that she is charged with the task of overseeing the Edible Schoolyard project and promoting food education efforts, both within the Berkeley Unified School District and across the US.

Given the resources and energy poured into initiating and sustaining the Edible Schoolyard, it is easy to understand the desire of the Center for Ecoliteracy to have external, impartial researchers evaluate the actual impacts of the Edible Schoolyard, particularly on students' understanding of food systems and ecology. Thus, the CEL asked Murphy and Schweers from Harvard Medical School and Massachusetts General Hospital to conduct a formal study.[247] The goal of the study was to determine whether the CEL's Food Systems (FS)-based approach was having a measurable impact on students.

Specifically, Murphy and Schweers conducted a longitudinal study of two groups of 105 sixth graders at two schools whereby one group was exposed to the FS-based approach (King Middle School's Edible Schoolyard) and the other was not. They hypothesized that over the course of a school year, students at King would show improved knowledge of ecology and food

[245] Guerrero, interview.
[246] *Ibid.*
[247] J. Michael Murphy and Erin Schweers, Evaluation of a Food Systems-based Approach to Fostering Ecological Literacy: Final Report, Massachusetts General Hospital and Harvard Medical School (2003), available upon request from the Center for Ecoliteracy.

systems, increased concern for and willingness to care for living things, improved cooperation and better social skills, increased attendance and achievement at school, and improved eating habits, compared to students in the control school.

To test these hypotheses, Murphy and Schweers conducted surveys and interviews of students, their parents, and teachers, and collected individual and school-wide school record data. To assess the students' ecoliteracy, the sixth graders (52 from King and 53 from the control) were interviewed both at the beginning of the year in October 2001 and at the end of the year in June 2002. The Ecoliteracy Assessment Interviews (EAI) consisted of six sections. The first section asked students to identify real fruits and vegetables (i.e., not pictures). The second section tested students' understanding of the food pyramid. The third section tested students' understanding of seed-to-table concepts by asking students to arrange photographs of various stages of the garden and plants in order. The fourth section asked students to identify the pictures of a watershed, soil ecosystem and food web. The fifth section consisted of open-ended questions testing students' understanding of why the region they live in is called the Bay Area and of the general concepts of ecology and sustainable agriculture. In the final section, students were given a dilemma that involved environmental issues and asked to explain what they would do; the idea behind this was to use the students' explanation as a proxy for environmental action. A scoring system was established as a means of assessment. In addition to the EAI, teachers at King were asked to rate their students in terms of their growth (e.g., improvement in cooperation, behavior, and social skills) or learning (e.g., increased knowledge of food systems) since the start of the school year, using categories much improved, improved, or not improved.

To get another look at the changes in students' behaviors and attitudes, students and parents from both schools were asked to complete a standardized self-report behavior checklist

called the Pediatric Symptom Checklist (PSC) at the beginning and end of the school year. The list consists of behavioral problems; therefore, the lower the score, the better. To assess changes in students' achievement, each student's official transcript for the year prior to the study was collected to provide the baseline grades against which to compare the grades at the end of the school year. To test the hypothesis for improved eating habits over the course of the school year, a standardized nutrition assessment protocol, called the 24-hour food recall protocol, was used.

Murphy and Schweers found that at the beginning of the school year, there were no statistically significant differences between the two groups of students in terms of their ecoliteracy, PSC scores, and eating habits. The differences in the mean overall GPA, however, were statistically significant at $p < 0.05$: the mean overall GPA among students at King was 3.2 compared to 2.9 among students at the control school.

However, by the end of the year, the scores for garden cycles (one of the components of the EAI) at King were significantly higher than the scores at the control ($p < 0.001$). The mean overall GPAs earned by students at King were also significantly higher than the GPAs earned by students at the control school ($p < 0.01$). Furthermore, the overall PSC scores were significantly higher in the control group at $p < 0.01$. The results of teacher evaluations of individual students at King revealed that teachers rated 75% of their students as having increased their concern for ecosystems and food systems. The results of the 24-hour food recall were inconsistent with the expectations, in that students at the control school slightly increased the number of servings of fruits and vegetables consumed while the number of servings of the same decreased slightly among students at King; however, these changes were not statistically significant.

These results support the hypotheses that King students would show improved ecological knowledge, social skills, and academic performance. The results therefore demonstrate the

benefits of garden-based learning. However, important questions and issues concerning the Edible Schoolyard remain unexplored. For example, future studies could focus on assessing the impact of the Edible Schoolyard on students' sense of connection to their community. Although the Ecoliteracy Assessment Interview included a section asking students to explain the reason for why the Bay Area is called that, this does not truly test students' understanding of their community. Instead, students could be asked to explain whether their experiences at school have led them to go to farmers' markets or other community events, or describe their experiences of working with community members at the Edible Schoolyard. Community members who volunteer at the Edible Schoolyard, could in turn, be interviewed about their experiences of working with the students and their observations of changes in students' attitudes and behaviors. Because student-volunteer interactions are crucial particularly in the garden, assessing formally the benefits of such interactions and engagement is important.

Another area of research could be the impact of the classroom-kitchen-garden triad that the Edible Schoolyard emphasizes. What are the benefits of integrating students' experiences in these three settings? What effect would missing one component have? *Observing* students in the classroom, kitchen, and the Edible Schoolyard itself, which was not done in the Murphy and Schweers study, will be useful in answering these questions.

In addition, it is important to note that since the completion of this study, many positive changes have occurred with respect to the school lunch program. Specifically, Ann Cooper – former Executive Chef and Director of Wellness and Nutrition at The Ross School in East Hampton, New York – was hired in 2005 by the Berkeley Unified School District (BUSD) to become its director of nutrition services.[248] Through Cooper's efforts, the BUSD has begun purchasing local, regional and organic foods whenever possible as well as foods from small,

[248] Ann Cooper, "About Chef Ann," available at http://www.lunchlessons.org/html_v2/about.html.

local companies; salad bars are available at every school in BUSD and fresh fruits and vegetables are offered daily.[249] Given these changes, a study assessing how they are influencing students' eating habits and reinforcing the work of the Edible Schoolyard could be critical in establishing a formal relationship between improvement in students' eating habits and their experiences in the classroom, garden, kitchen *and* cafeteria.

The findings of these future research studies could lead to additional innovative ideas for nurturing food literacy among students that can then be tested in school gardens across the country. Such an active interchange between research studies and the application of the research-inspired ideas in school gardens is critical in ensuring the sustainability of school garden programs and in cultivating food-literate citizens.

On the Opposite Coast: the Burlington School Food Project in Burlington, Vermont

Another food education program that is exemplary in its demonstration of the power of community networks and relationships is the Burlington School Food Project (BSFP) in Burlington, Vermont. Not deterred by its relatively short growing season, Burlington initiated the project in 2003 as a "citywide collaborative…to address the integration of local foods into school meals…among school-aged children in Burlington."[250] During 2003-06, BSFP was funded by a three-year grant from the USDA. Although BSFP is no longer funded by the USDA, the project is still in full force. Its objectives are to increase student awareness and engagement in the local food system; increase student consumption of healthy, local foods; and facilitate relationship-

[249] Ann Cooper, "The Top 20 BUSD Nutrition Services Changes Accomplishments for Healthy Students," available at http://www.lunchlessons.org/html_v2/BUSD.html.
[250] Michele C. Schmidt *et al.*, *The Burlington School Food Project: Final Evaluation Report* (Center for Rural Studies, University of Vermont, 2006), p. 6, available at http://crs.uvm.edu/evaluation/index.htm.

building, networking, and collaboration among Burlington's food, health, and education-oriented organizations.[251]

To achieve these goals, BSFP has formed partnerships with number of organizations. One is Vermont Food Education Every Day (FEED), which itself is a collaborative initiative of three non-profit organizations: Shelburne Farms, Food Works, and the Northeast Organic Farming Association of Vermont (NOFA-VT). Developed in 1999, FEED "works with schools and communities to raise awareness about healthy food, the role of Vermont farms and farmers, and good nutrition," acts "as a catalyst for rebuilding healthy food systems," and cultivates "links between the classrooms, cafeterias, local farms, and communities."[252] FEED is also working towards integrating fresh, locally grown foods into the school lunch program so that food and farm learning can be extended into the cafeteria.

The three non-profits that comprise FEED are also themselves dedicated to food education in slightly different ways. Shelburne Farms was founded as an educational non-profit in 1972.[253] In an effort to cultivate a conservation ethic among the youth, Shelburne Farms offers one-day field trips for grades pre K through 8 that are linked to Vermont's Framework of Standards and Learning Opportunities.[254] Professional development workshops on farm education and place-based education are offered during the summer for educators at the elementary and middle school levels.[255]

Food Works, founded in 1981, also embraces food education and sees it as a tool to help low-income families. Specifically, Food Works seeks "to address the root causes of childhood

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[251] *Ibid.*
[252] Vermont Food Education Every Day (VT FEED), "About Us," available at http://www.vtfeed.org/aboutus/index.html.
[253] Shelburne Farms, "About Shelburne Farms," available at http://www.shelburnefarms.org/about/index.shtm.
[254] *Ibid.*, "Education Programs: Field Trips," available at http://www.shelburnefarms.org/educationprograms/fieldtrips.shtm.
[255] *Ibid.*, "Education Programs: Professional Development," available at http://www.shelburnefarms.org/educationprograms/professional.shtm

hunger by returning students and their communities back to the land through hands-on food and gardening education opportunities."[256] Its Gardens for Learning Summer Day Camp provides at-risk children with hands-on skills in growing, cooking, and nutrition for eating fresh, local foods. Good Food, Good Medicine is a food and nutrition education network that teaches low-income families about seasonal, hands-on cooking, gardening and nutrition.[257]

NOFA-VT, the third member of FEED, is a "non-profit association of farmer, gardeners and consumers working to promote an economically viable and ecologically sound Vermont food system for the benefit of current and future generations."[258] While the contribution of Shelburne Farms and Food Works to FEED is through the development of food education activities, the contribution by NOFA-VT is its efforts towards incorporating locally grown foods into the school lunch program. Specifically, NOFA-VT connects school kitchen managers with local farmers, helps farmers make connections with schools, trains food service personnel about how to use fresh and local foods, and teaches school staff how to introduce new foods to students.[259]

Another Burlington School Food Project (BSFP) partner is the Intervale Center, which is dedicated to sustainable agriculture. Its mission is to "develop farm- and land-based enterprises that generate economic and social opportunity while protecting natural resources" by growing viable farms, preserving productive agricultural land, and increasing access to local, organic foods.[260] Its role in the BSFP is in selling fresh produce to Burlington's schools and providing a site for field trips.

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[256] Food Works at the Two River Center, "About Us," available at http://www.tworiverscenter.org/about.shtml.
[257] *Ibid*., "Programs: Food, Garden & Nutrition Education," available at http://www.tworiverscenter.org/foodandgarden.shtml.
[258] Northeast Organic Farming Association of Vermont (NOFA-VT), available at http://www.nofavt.org.
[259] *Ibid*., "Our Programs: Vermont Food Education Every Day," available at http://www.nofavt.org/programs/vermont-food-education-every-day.
[260] Intervale Center Homepage, available at http://www.intervale.org/index.shtml.

The University of Vermont is also active in BSFP through its Center for Rural Studies under the Department of Community Development and Applied Economics at the College of Agriculture and Life Sciences.[261] The Department provides academic service-learning opportunities for students to work on local school food initiatives. The Department of Nutrition and Food Sciences also contributes to BSFP by offering expertise to the Burlington Food Council.[262]

Although not formal BSFP partners, both the Friends of Burlington Gardens and the Vermont Community Garden Network have been supporting food education efforts through community gardens, including school gardens. Friends of Burlington Gardens, a non-profit organization that was founded in 2002, is dedicated to increasing access to community gardens so that the public can enjoy the benefits of gardening including health and social interactions.[263] In addition, the Friends of Burlington Gardens established the Vermont Community Garden Network in 2005 to facilitate networking among community gardens, including school gardens, within Vermont.[264]

The collaborative efforts of all of these different organizations towards achieving the goals of BSFP are facilitated by members of the Burlington Food Council and the School Food Committees. In 2003, the City of Burlington's Community and Economic Development Office formed the Burlington Food Council to build food knowledge and experience among students, improve the access of students and their families to healthy foods, and establish local food systems.[265] The Council consists of BSFP staff, farmers, parents, Burlington School District

[261] Schmidt *et al., BSFP Final Evaluation Report,* p. 17.
[262] *Ibid.*
[263] Friends of Burlington Gardens, "Our Mission," available at http://www.burlingtongardens.org/Vision.htm.
[264] Flint, 28th ACGA Conference.
[265] Schmidt *et al., BSFP Final Evaluation Report.*

employees, students, researchers, and health and nutrition experts. The formation of this Council by the city government reflects its dedication towards food education.

The School Food Committees have also facilitated the coordination of efforts among the different BSFP partners. Consisting of teachers, parents, and Food Service staff, each school's food Committee seeks "to increase student consumption of fresh and local foods and to facilitate Food Service to become a part of the educational framework."[266] The diversity of membership of both the Food Council and Food Committees assures the consideration of multiple perspectives on the issue of food education.

In order to assess the work of BSFP and the extent to which the Food Council has facilitated the achievement of its goals, the Center for Rural Studies at the University of Vermont wrote an evaluation report in 2006. Interviews and surveys of the different groups of people, including students, teachers, Food Council members, and BSFP partners, were conducted by the Center (which were the primary means of data collection) of the people and organizations involved with BSFP illuminate some of the factors that have made BSFP successful.

One of the major goals of BSFP is to increase student awareness and engagement in the local food system. Towards this, BSFP has begun to integrate Food, Farm & Nutrition Education (FFN) into the school curriculum through field trips, classroom activities and school gardens. Burlington teachers who were interviewed emphasized the importance of professional development workshops organized by the BSFP partners, including FEED, Shelburne Farms, and the Intervale Center. Teachers reported that FFN lessons have enabled students to gain practical skills, hands-on experiences and knowledge about healthy nutrition, food, farming, and meal preparation.[267] Teachers also noted that their students reflect positively on their field trips to

[266] *Ibid*., p. 77.
[267] *Ibid*., p. 25.

local farms, and that many talk about having visited farmers' markets with their families and greeting farmers they met at school. Moreover, 40% of parents surveyed in a 2006 Vermonter Poll reported that their child has shared information on FFN with their families.[268] This suggests that students' learning experiences through FFN at school are having a positive impact on their lives outside of school, which is a promising sign of students ultimately making decisions based on what they learn through FFN.

In addition, BSFP has initiated taste test activities at the Edmunds Elementary and Middle Schools as a way to enhance students' visceral understanding of foods and integrate locally grown foods into the school lunch program. Specifically, students work with the food service staff in preparing tasting samples that incorporate locally grown ingredients or produce. During lunch, taste test stations are set up where other students try the samples and provide feedback. Teachers, members of the Food Committee, and the Burlington School District (BSD) Food Service Director Doug Davis attest that taste tests have allowed students to participate actively in the process of cooking food and begin to understand what it takes to prepare food. Teachers commented that taste tests successfully involved students in school lunch change, began to empower students, and have led them to acquire a broad spectrum of skills and thinking regarding food preparation, recipe development, healthy eating and nutrition, and mathematics.[269]

The success of the taste tests with respect to the integration of local foods into the lunch program is reflected in the significant increase in the school district's purchase of locally grown produce. For example, the dollar value of produce purchased by the BSD directly from local farms increased from 0 in 2003 to $4636 in 2006 and the amount of local produce purchased

[268] *Ibid.*, p. 66.
[269] *Ibid.*, p. 50.

between 2003-06 tripled.[270] Specifically, over 1,000 pounds of local tomatoes, 600 pounds of local zucchini, and 400 pounds of local basil were used in school meals in 2006.[271] Other local seasonal produce, including kale, chard, carrots, and strawberries, were used as well.

BSFP's achievements thus far with respect to integrating food education and introducing local produce into the school meals have been facilitated by the Burlington Food Council, which continues to bring together BSFP partners and coordinates efforts. Schmidt *et al.* (2006) found that "most council members noted that the greatest success of the Food Council has been bringing people together to network and examine FFN issues from a community perspective, creating and strengthening local partnerships, increasing communication among partners, and providing a forum on a regular basis to discuss FFN issues."[272] Council members also reported that the regular meetings provide "an opportunity to publicize and raise awareness about the work of the organizations they represent" to one another.[273]

Volunteers have also been crucial in assisting with BSFP activities. For example, parents and others from the community lead tours at the Intervale Farm and help conduct the taste tests at school. Professional volunteers, including local composting educators and chefs, provide hands-on lessons for students in the classroom and cafeteria kitchen.[274] Teachers who were interviewed emphasized the importance of volunteers in enhancing BSFP and in allowing students to learn about their community through interactions with community members.

At the same time, the efforts of the volunteers reflect the larger community's commitment towards achieving the goals of BSFP and a widespread belief in the value of BSFP.

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[270] *Ibid.*, p. 30.
[271] Susan H. Stafford, "Burlington School Food Project: A recipe for school and community partnership," (The Center for Public Education, 2007), available at http://www.centerforpubliceducation.org/site/c.kjJXJ5MPIwE/b.3506591/k.446D/Burlington_School_Food_Project_A_recipe_for_school_and_community_partnership.htm.
[272] Schmidt *et al.*, BSFP Final Evaluation Report, p. 73.
[273] *Ibid.*, p. 74.
[274] *Ibid.*, p. 28.

In fact, donors including Ben & Jerry's have made contributions totaling over $100,000 in funding BSFP ever since the USDA grant ended in 2006.[275] In addition, the members of the Burlington Food Council were able to convince the state of Vermont to pass a legislature bill in 2006 that offers mini-grants to expand food education efforts and increase the use of local foods in cafeterias.[276] These mini-grants can also be used to provide professional development for teachers, train food service staff on how to purchase and prepare Vermont products in school meal programs, and train farmers on how to sell products to schools.[277]

The immense level of networking and coordination among the different community entities in Burlington, all working towards achieving the goals of integrating food education and local foods into schools, is exceptional. In order to establish formally the benefits of such concerted efforts, a formal longitudinal study should be conducted to document the actual changes in students' knowledge of food education and appreciation towards local foods. Such a study could also explore the other broader benefits of food education, such as improvement in attendance, attitude, behavior, eating habits, and academic performance. The results of a study like this could prove important in garnering more support for food education in Burlington's schools and establishing it as a permanent component of the academic curriculum.

Both Berkeley's Edible Schoolyard and Burlington's School Food Project are outstanding examples of programs that demonstrate a powerful commitment towards equipping students with food literacy. Several critical factors for their achievements thus far include the active involvement of community members and volunteers, the explicit support and funding by their respective state governments, and a committed group of people who are involved in the daily operation and logistics of the programs. These suggest the importance of seeking support and

[275] Stafford, "Recipe for school and community partnership."
[276] *Ibid.*
[277] Schmidt *et al.*, BSFP Final Evaluation Report, p. 64.

help beyond the immediate school community. At the same time, however, there are important differences between the two programs.

First, while every student spends a part of each year at the Edible Schoolyard garden and kitchen, students in Burlington are not necessarily exposed to food education since it is not a formal part of the curriculum yet. An important reason for why food education has become a permanent part of the curriculum at King Middle School is the Center for Ecoliteracy's explicit support for the development of food education curricula. Moreover, the Center itself has formed a partnership with Teachers College at Columbia University, thereby reflecting further its commitment towards making food education sustainable and meaningful. On the other hand, the Burlington School Food Project currently has no such equivalent. Another important difference is that the Edible Schoolyard secures its funding through the Chez Panisse Foundation, whose primary purpose is to support the program. The program also gets a lot of attention because of its connection with celebrity Alice Waters. In contrast, the Burlington School Food Project relies on the support of a number of small organizations and donors.

These differences suggest that Berkeley's Edible Schoolyard is unique and is likely not easily replicable across the country. On the other hand, Burlington's project may be more realistic and feasible for schools considering implementing food education. Specifically, in the context of Oberlin, forming partnerships among the local and regional organizations working towards educating students about food would not be impossible.

The Prospects of Fostering Food Literacy through School Gardens in Oberlin

In addition to Berkeley, California and Burlington, Vermont, efforts towards promoting food education and garden-based learning are sprouting across the US, particularly in cities.

Given this, what are the prospects of school gardens in fostering food literacy among K-12 students in Oberlin? This is a relevant question, since every school in Oberlin, except Langston Middle School, now has a garden. Moreover, integrating food education into the curricula and serving nutritious school meals that feature local foods can have significant positive impacts on the daily lives of students, especially considering the demographics of the Oberlin School District. Over half of the students in grades K-2 and 6-8, and nearly half of the students in grades 3-5 and 9-12, are eligible for free or reduced price meals (Oberlin City Schools, 2007).[278] Given that the majority of these students from low-income families eat the school lunch and that some eat the school breakfast as well, educating them about issues concerning food and serving nutritious meals can contribute greatly to their health and well-being.

To get a sense of the teachers' willingness, interest, and experiences in teaching about issues concerning food and the environment, and in using school gardens as outdoor classrooms, I conducted surveys of teachers at Eastwood, Prospect, Langston, and the high school in March 2008. Table 2 gives the response rate of teachers at each school. The high response rate among high school teachers was due to the opportunity that I had in attending one of their morning meetings and administering the surveys at that time. I attended a teachers' meeting at Langston as well, but not all teachers were present. I was unable to arrange a time that I could meet with the Eastwood and Prospect teachers and therefore had no choice but to leave the surveys with the secretary. I spoke briefly about the purpose of the surveys and the idea of food literacy before I had the high school and middle school teachers complete the surveys. I prepared a written

[278] The specific percentages of students eligible for free or reduced price meals for the grade levels are as follows. Eastwood Elementary School (K-2): 54.1% (46.6% eligible for free lunch, 7.5% for reduced price); Prospect Elementary School (3-5): 42.6% (36% free, 6.6% reduced price); Langston Middle School (6-8): 55.1% (45.4% free, 9.7% reduced); and Oberlin High School (9-12): 48.8% (31.8% free, 7.0% reduced price). Percentages are taken from Oberlin City Schools, "Information on the school breakfast and lunch programs" (Dec 2007), available upon request from Oberlin's Board of Education Office.

version of my speech for the elementary school teachers. (See Appendix A for the introductory statement and survey, and Appendix B for results.) Only the results for Langston and OHS teachers are shown, since the response rates among Eastwood and Prospect teachers were too low to see any definite trends (Table 2).

Table 2. Response rate of teachers by school.

School	Response Rate
Oberlin High School	22/24 (92%)
Langston Middle School	11/25 (46%)
Prospect Elementary School	7/17 (41%)
Eastwood Elementary School	4/19 (21%)

There was a high level of support for the incorporation of local foods into the school lunch program among an overwhelming majority of teachers across all schools; many gave a rating of 10 on a scale of 0-10, 0 being not at all supportive, and 10 being very supportive. In general, most teachers showed a moderate level of support for school gardens, and some were enthusiastic about the potential of school gardens. At the high school, the support for school gardens was highest among math teachers, whose average rating was 8.7 while the rating was lowest among social studies teachers who gave an average of 5. However, there was high variability in rating among English (range 4-7), social studies (3-8), and science (2-8) teachers.

In response to the question that asked for a curricular connection between the garden and the subject that the teachers teach, two of the three math teachers gave concrete examples. One gave an example of plotting temperature data of the garden and making regressional models while another suggested comparing rainfall versus the weight of produce harvested. These teachers saw the potential application of math in the garden; therefore, their ratings for school gardens were accordingly high. In contrast, none of the three social studies teachers was able to see the application of social studies in the garden. Accordingly, their support for school gardens

was relatively low. Thus, these results suggest the importance of teachers seeing the possible ways in which their subject material can be applied by students in the garden.

The primary concerns that teachers had about using school gardens included the lack of training or knowledge, resources, and time, as well as the *perceived* lack of connection to Ohio's state standards of education. With respect to this perception among teachers of the irrelevance of school gardens to the standards they have to address, it is important to allow teachers to see that in fact, there *are* connections. Moreover, many of the standards for the core subjects are quite broad. Therefore, teachers can meet these standards by using gardens and/or a food-education approach. (See Appendix C for tables that indicate my ideas about the ways in which specific standards in the core subjects can be addressed through garden-based or food education activities.)

Admittedly, the lack of knowledge, resources, and time are real and challenging issues. However, they are not necessarily impossible to overcome. For example, workshops on garden-based learning could provide teachers with ideas and examples of activities that use or involve the garden while addressing state standards. Through such workshops, teachers can begin to see that garden-based lessons do not need to be additional or supplemental.

Moreover, these workshops on school gardens and food education would also be a good investment for the (IB) program that the Oberlin school district is preparing to implement. The IB program emphasizes multicultural understanding and interdisciplinary learning.[279] Gardens can facilitate multicultural understanding if students grow herbs, spices, and other foods grown in different countries and learn about the associated histories and cultural values. Gardens can also promote interdisciplinary learning.

[279] International Baccalaureate Organization (IBO), "How does IB Define "International Education"?", available at http://www.ibo.org/programmes/slideb.cfm.

The IB program also promotes inquiry-based learning and transdisciplinary skills. Inquiry involves exploring and wondering, questioning, hypothesizing, researching, experimenting, collecting data, and evaluating; transdisciplinary skills include the ability to communicate effectively, cooperate, and think across and beyond traditional academic subjects.[280] School gardens offer a setting where students can engage in inquiry and practice these transdisciplinary skills. For example, students can explore the biology and ecology of the garden while also learning to cooperate with their classmates in maintaining the garden and share the fun of cooking with the food that they harvest. Therefore, because food education would only complement and reinforce the IB program, investing in workshops on garden-based learning and resources on food education would be a worthwhile endeavor.

Another crucial investment that would guarantee the sustainability of the school gardens is establishing a permanent, paid position to manage the gardens. Both Sarah Pounders, educational specialist who spoke at the ACGA conference workshop on school gardens, and Kelsey Siegel, former garden teacher at the Edible Schoolyard, emphasized the importance of having such a position (Pounders, 2007; Siegel, 2007).

It is also important to note the availability of resources within Oberlin. One obvious resource is the College, and a partnership could be formed between the college and school district towards equipping K-12 students with food literacy. Specifically, college students, particularly those who are members of the Ohio Public Interest Research Group (OPIRG) and/or the Oberlin Student Cooperative Association (OSCA) could collaborate with teachers in developing food education activities. Both OSCA and OPIRG have shown explicit support of local foods; OPIRG has sponsored the annual local foods festival, which began in 2005, and OSCA buys food from local farmers. For example, the week leading up to the annual local foods

[280] *Ibid.*

festival in October could be designated as the "Food Education Week," during which OPIRG, OSCA and other students (for example, Bonner scholars, or those who volunteer regularly at the George Jones Farm, or environmental studies majors) go to the schools and do garden- or food-based activities.

Other non-college sources are available as well. One is the George Jones Farm in Oberlin. The Jones Farm practices sustainable agriculture and is managed by the New Agrarian Center, a non-profit organization whose mission is to contribute towards the development of a sustainable food system in northeast Ohio.[281] A learning garden is currently being designed and constructed at the Jones Farm.[282] Therefore, the development of food education curricula by teachers will allow students to benefit fully from the learning garden. Other potential resources include the Black River Café and the Oberlin Market, both of which are showing commitment towards the use of sustainably grown foods.

The formation of partnerships and the coordination of efforts among these different groups within and around Oberlin *could* happen if there is a long-term commitment by the larger Oberlin community. Perhaps, Burlington's project could become a model that Oberlin can follow.

Contextualizing Food Education and School Gardens

Throughout this thesis, I have argued the importance of food education and specifically focused on the role that school gardens can play in facilitating food literacy and in connecting the youth to their food and environment. However, it is worth taking a few steps back and considering some broad, but important, questions, such as: What is the purpose of schools? What and how should we teach? What kind of experiences and knowledge do we want our students to have?

[281] New Agrarian Center Homepage, available at http://www.gotthenac.org.
[282] Evelyn Bryant, personal communication, spring 2008.

In answering these questions, we must first keep in mind the large and overwhelming issues that the world is currently facing. A few of these include climate change, childhood obesity, and poverty or social inequities. One of the root causes underlying all of these is our mass consumer culture. In large part, climate change is the reflection of our enormous use of energy and resources that our consumer culture demands. Obesity is essentially a result of our love of convenient, processed fast foods, which Michael Pollan calls "food*like* products" (Pollan, 2008, p. 14, emphasis added). Our consumption of such food*like* things indicates our lack of understanding of the social, environmental, and economic impacts of what we eat and our lack of appreciation for the cultural, traditional values associated with food.

Meanwhile, social inequities are arguably driven by our Wal-Mart mentality or the continuous desire for cheap goods including food. Thus, for example, we are devaluing the skills and work involved in growing real food sustainably and instead encouraging the mechanization and expansion of industrial agriculture that fails to internalize negative externalities. Moreover, social inequities are reflected in the current achievement gap that exists between well-to-do students and students from low-income communities. For example, only "50% of kids growing up in low-income communities across the US graduate from high school" and "those that do read at an 8th grade level on average."[283]

Therefore, in the context of these issues, the answers to the questions posed at the beginning of this section start to emerge. Specifically, schools should be providing educational experiences and knowledge for students so that they can learn to make environmentally, physically, and healthy choices that can help address the issues of climate change, obesity and poverty. One way in which schools can essentially address these problems simultaneously – or "solve for pattern" as farmer, writer, and poet Wendell Berry put it – is through implementing

[283] Teach for America Homepage, available at www.teachforamerica.org.

food education into the curricula through school gardens and integrating locally grown foods into the lunch programs. Through these two endeavors, students have the opportunity to connect to food and the environment, learn about their community and interact with community members, and begin to appreciate fresh, healthy locally grown foods. To ensure that such food education experiences have a positive impact on the choices that students make, they need to be able to apply what they learn. One way to do this is to engage the youth in real issues that affect their local communities through service learning projects.

Integrating food education and gardens into schools is just one of many possible approaches towards addressing today's most complex, complicated issues. However, I believe that providing children the opportunity to learn to eat appreciatively and thoughtfully (EAT) will be critical in developing food-literate citizens who will be able to make decisions that help address or alleviate the daunting problems that afflict our world today.

I will end by telling about a heartwarming glimpse of hope that I felt in Oberlin last fall. For the past two years, I have been teaching students – mainly a class of fourth graders at Prospect Elementary School – about food, using a mix of historical, cultural, geographic, environmental, and scientific aspects of food. I have usually taught five lessons per semester, and the final lesson has always involved the kids making a full, healthy meal from scratch using as many local ingredients as possible.

Last fall, the kids made kale vegetable soup, deviled eggs, baked sweet potatoes, swiss chard dip, and carrot bread. The boys were particularly excited about the soup, chopping vegetables excitedly and sniffing the soup as it simmered in the pot. Soon, we started eating, and to my surprise, the kids were enjoying the soup. What made my day and delighted me to no end was when I heard one boy say, "This soup hits the spot!" That was when I realized, first-hand,

that changing young people's eating habits *is* possible if we begin to provide them with the opportunity to cook and engage in other activities that foster food literacy. This gives me hope for the prospects of food education in addressing the challenges that we face today.

Appendix A: Teacher Survey

Introductory statement:

Hi everyone. Thank you very much for letting me be here today. I'm Lina Yamashita and I'm a senior at Oberlin College, majoring in biology and environmental studies. I'm here today to ask you to complete a short survey for my honors project in environmental studies. As you may already now, there is a garden at every school in Oberlin except Langston. For my honors project, I'm investigating the possibility of incorporating the gardens into the academic curricula at Oberlin's schools in order to foster the students' ecological literacy and food literacy. *Ecological literacy* means the ability to appreciate and connect to the natural environment, recognize the significance and complexity of environmental issues, and "green" our consumption of energy and resources – in other words, reduce, reuse, and recycle what we consume and buy environmentally friendly goods. *Food literacy* is the ability to understand where food comes from and how it is produced, and appreciate the traditions and values associated with food.

Both types of literacy – ecological literacy and food literacy – are important because our highly consumptive culture and our love of convenient fast foods have led to many of our environmental issues today as well as health problems such as obesity, and to the profound disconnection from our environment and the food that we eat. What could be a better place to address and attempt to solve these issues than K-12 schools? Specifically, I feel that by growing vegetables and fruits in the school gardens, students can attain ecological literacy and food literacy. Through my research, I have read about the benefits of school gardens on students, including better academic performance, attitudes and behaviors, and attendance.

In addition, school gardens lend themselves to interdisciplinary activities that combine and address academic content standards across multiple subjects and electives. For example, in science classes, students can investigate the chemical and biological components of soil and study the biology and ecology of the organisms that live in the garden. In math classes, students could chart the sun and shade patterns in the garden, measure the area and perimeter of the garden, or tabulate data on temperatures and rainfall. In language arts or English classes, students can write poetry using the garden as an inspiration or write essays or stories about their experiences of growing, harvesting, and eating the food they grew in the garden. In social studies classes, students can try growing different types of foods that are grown and eaten in other countries and cultures or study about the local foods movement that emphasizes the environmental, social, economic, and health benefits of eating local foods or food that we grow on our own. Students can plant native herbs in the garden, explore the medicinal value of plants, learn about the nutritional benefits of the foods growing in the school garden, or cook with the garden harvest in health or consumer science classes. Students in PE classes could do garden work that requires a lot of physical activity such as carrying heavy equipment or loads of soil and compost. Students can draw, paint, sculpt, or write songs and lyrics using the garden as an inspiration. So, clearly, school gardens can inspire lots of different activities in all grade levels. This is why I think that Oberlin's students would learn a lot through the school gardens.

The purpose of the survey that I will be passing out in a moment is to get a sense of your experience, interest, and willingness in using a school garden as an outside classroom or educational resource to teach your students about issues related to the environment and food. I also want to hear from you any ideas that you might have about incorporating the garden into your lesson plans and/or any obstacles that you can think of that may prevent you from using the garden in your curriculum. Before I hand out the surveys, do you have any questions?

Please fill out the survey completely and when you finish, please put it in this envelope. If you have any questions, please let me know. Thank you again for your time.

Survey

Background

Name _____ Grade level ____ No. of years teaching this grade level _____

Area of teaching (if applicable) _____ No. of years teaching this subject _____

Total no. of years as a teacher ____ No. of years teaching in Oberlin ____ Do you live in Oberlin? YES NO

If yes, how long have you lived in Oberlin? ____ If no, where do you live? _____

For the following questions, please rate yourself on a scale of 0-10, 0 being not at all, and 10, very much. Please also briefly explain your rating.

1. How much do you know about current issues relating to the food and environment? Please list a few of the issues.
0 1 2 3 4 5 6 7 8 9 10

2. To what extent does being environmentally friendly factor into your daily life?
0 1 2 3 4 5 6 7 8 9 10

3. How much do you think your students know or are aware of current food and environmental issues?
0 1 2 3 4 5 6 7 8 9 10

4. How frequently do you address issues or topics relating to the food and environment when you teach?
0 1 2 3 4 5 6 7 8 9 10

5. Please answer this question only if your rating for the previous question (#4) was from 6 through 10. How engaged or receptive are your students when you teach about issues or topics concerning food or the environment?
0 1 2 3 4 5 6 7 8 9 10

6. To what extent do you think the school is demonstrating environmental friendliness?
0 1 2 3 4 5 6 7 8 9 10

7. How much access do you have to resources that provide ideas for teaching about issues or topics concerning food and the environment? Please list several resources if you can think of them.
0 1 2 3 4 5 6 7 8 9 10

8. Please answer this question only if your rating to the previous question (#7) was from 0 to 5. If you had more access to resources about teaching these issues/topics, would you incorporate them in your teaching? Please specify the factors that are currently preventing you from accessing these resources (e.g. lack of time, money, interest).
0 1 2 3 4 5 6 7 8 9 10

9. How supportive or enthusiastic are you about using the garden as an outdoor classroom to teach your lessons? Please also list any concerns that you may have.
0 1 2 3 4 5 6 7 8 9 10

10. How supportive are you about incorporating more fresh produce from local farms into the school lunch program?
0 1 2 3 4 5 6 7 8 9 10

For the following questions, please give a short explanation.

11. What are the three ideas or concepts that you teach that you want your students to fully understand by the end of the year? Please also explain why these three. NOTE: these need not be environment-related.

12. Describe one lesson or activity that you can think of that incorporates the school garden while also addressing at least one academic content standard for the subject(s) you teach. If you cannot think of a specific activity or lesson, what potential connections do you see between the subject(s) you teach and the school garden?

Appendix B: Results by School[284]

Oberlin High School

	# yrs teach-ing	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	**Q11.** important concepts teacher wants to convey	**Q12.** potential connections (my thoughts are indicated in italics)
Math	5	8	5	3	2		2	2	2	10	10	linear equations; improved number sense; working with tables, graphs and equations	plot temp and/or sun up/sun down data; making regression models
	6	8	8	2	2		5	1	6	8	6	linear growth; using data to make predictions; non-linear growth	rainfall vs. weight of produce harvested; volume at beginning of growth season vs. volume at peak
	9	4	8	3	0		3	7		8	10	problem solving (bases for most math and logical learning); time mgmt; organization	
AVG for math	**6.7**	**6.7**	**7.0**	**2.7**	**1.3**		**3.3**	**3.3**	**4.0**	**8.7**	**8.7**		
Science	18	8	9	3	8	8	5	8		8	8	learning about recycling (landfills, energy); population issues (rise of middle class --> demand more resources); species loss (diversity, aesthetics)	soil testing, pH, crop cycling
	8	4	7	2	5		1	3	4	2	4	working diligently; thinking critically; knowing material tested on OGTs	learning about biomes, ecosystems
	11	8	8	3	5		5	6		4	10	global warming	learning about biomes, earth cycles, ecosystems
AVG for science	**12.3**	**6.7**	**8.0**	**2.7**	**6.0**		**3.7**	**5.7**	**4.0**	**4.7**	**7.3**		
SS	2	5	4	3	4		1	1	5	4	10	how people are affected by their govt.; what it means to be a productive/active citizen; why it's important to get involved in community	*learning about community gardens - people who start them are community leaders; learning about food policies and their effects on us, farmers, environment; learning about local foods movement, sustainable agriculture - responsible citizens, stewardship*
	5	3	3	2	1		6	2	2	8	7		
	24	4	4	1	2		5	2	5	3	7		
AVG for SS	**10.3**	**4.0**	**3.7**	**2.0**	**2.3**		**4.0**	**1.7**	**4.0**	**5.0**	**8.0**		

[284] Note: Results for surveys of teachers at Prospect and Eastwood Elementary Schools are not included because response rate was too low.

	# yrs teaching	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	**Q11.** important concepts teacher wants to convey	**Q12.** potential connections
LA/ English	6	5	4	4	3		4	4	4	4	8	research; life-long reading; analytical writing	non-fiction reading directions about how to plant garden
	30	7	6	5	4		5	2	6	7	10	how to structure and detail a paper; how to make connections among pieces of lit; how to recognize and use literary devices effectively	story or poem-writing using garden as inspiration - creating metaphors, similes, personification; currently using types of rain but can see garden opening up new possibilities
	1	7	5.5	3.5	3.5		2	7	7	6	10	research skills; distinguishing btwn good and bad internet sources; take readings and apply to life, different situation	nature through Emerson and Thoreau with Transcendentalism
AVG for LA	**12.3**	**6.3**	**5.2**	**4.2**	**3.5**		**3.7**	**4.3**	**5.7**	**5.7**	**9.3**		
Foreign Lang.	15	2	2	3	0		3	3	1	0	10	speak, read, write a foreign language	*food grown in garden can be used in French cooking - coordinate with Donna - students would get a better sense of culture, manners*
	2.5	2	3	1	0		2	1	9	8	10		
Music	32	4	7	4	4		8	3	8	5	9	life skills: seeking help, seeking answers	
	29	3	8	1	2		2	3	7	3	10		healthy living → less time being sick, better for musicians for breathing
Art	27	10	5	5	1		3	3	6	6	10	techniques; realization of art's role in society	use garden for drawing and watercolor, both using direct observation
AVG for Arts	**29.3**	**5.7**	**6.7**	**3.3**	**2.3**		**4.3**	**3.0**	**7.0**	**4.7**	**9.7**		
Sp Ed.	**31**	**8**	**6**	**6**	**6**		**6**	**8**		**10**	**10**	better writing skills; more vocab; stronger basic math skills; improved social skills	teaching responsibility to follow through w/ a long-term project like gardening
PE	10	7	7	2	6.5	7.5	5	7	7	7	10		
Family Consu-mer Science (FCS)	**10**	**9**	**9**	**5**	**7**	**5.5**	**4**	**10**		**10**	**10**	importance of buying local food; how to cook it and enjoy healthy food; ecological footprint and effect on global society	nutritional benefits of fresh, local food vs. processed food; env'tal effect of present food distribution process
Library	30	4	8	3	4		7	8		9	10		locating and accessing info on food and envt issues
Overall AVG	**14.8**	**5.7**	**6.0**	**3.1**	**3.3**	**7.0**	**4.0**	**4.3**	**5.3**	**6.2**	**9.0**		

Langston Middle School

	# yrs teach-ing subj.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	**Q11.** important concepts teachers want to convey	**Q12.** potential connections
Math	1	5	7	4	6	6	5	5		8	9		
Science	1	8	7	4	2		5	2	8	8	9	thinking critically about ideas that impact students' lives; analytical, evaluative skills	cell unit in biology
	5	8	8	3	5		4	5	6	9	10		asexual vs. sexual reproduction; photosynthesis; nitrogen cycle
	20	4	6	1	2		2	1	10	8	10	humans can have positive effect on environment; each of us has responsibilities to the environment	6th grade unit on environment
AVG for science	**8.67**	**6.7**	**7.0**	**2.7**	**3.0**		**3.7**	**2.7**	**8.0**	**8.3**	**9.7**		
SS	2	2	5	5	0		5	0		5	10	map skills and geography; time lines; charts and graphs	studying about local foods movement; growing foods from different countries and learning about their cultures
	21	6	4	3	7	4	4	7			10		
	5	5	6	5	3		6	5	8	6	7	WWII; imports/exports; geographical regions	victory gardens during WWII; food we import/export; why crops grow in specific climates
Lang Arts (LA)	1	5	1	4	1		3	10		3	10	becoming an excellent test taker; reading fluency; critical thinking and questioning skills	write poetry about garden experience
AVG for LA/SS	**7.3**	**4.5**	**4**	**4.3**	**2.8**		**4.5**	**5.5**	**8**	**4.7**	**9.3**		
Sp Ed.	5	5	1	3	5		7	5	8	6	7		early settlers living off the land and compare/contrast to today's lifestyles
	28	8	10	2	4		5	5	5	8	10	money (counting coins); reading time; learning sight words	study of food and food groups; school garden would really fit; also could have an IB connection
PE	2	1	1	0	0		4	3		0	7		
Overall AVG	**8.3**	**5.2**	**5.1**	**3.1**	**3.2**	**5.0**	**4.6**	**4.4**	**7.5**	**6.1**	**9.0**		

Appendix C: Connections between standards and garden-based activities and/or food education

The following charts are not meant to be exhaustive; rather, they aim to demonstrate some of the ways in which food education can address the standards and grade-level indicators for the core subjects: social studies, science, English Language Arts and mathematics. The last column in the charts indicate my ideas of the ways in which a benchmark or indicator for a particular standard could be addressed through food education or garden activities.

Many activities for grades K-5 directly use the garden. Although activities/lesson for grades 6 and above do not directly use the garden, the garden can serve as an entry way in introducing particular topics of study. As I felt that the standards in social studies and science have the most direct connection with food education and school gardens, I focus on these two subjects more.

Social Studies

Grades K-2			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
History	Chronology	A. Place events in correct order on a timeline.	– Arrange the gardening tasks in the order in which they should occur.
		C. Compare daily life in the past and present….	– learn that we can preserve many different foods in different ways, which wasn't possible in the past; preserve tomatoes harvested from the garden. – Compare what people grow/eat now with what people grew/ate in the past
People in Societies	Cultures	A. Identify practices and products of diverse cultures	– Grow vegetables and spices from different countries in the garden – Cook with these foods
	Diffusion	B. Identify ways that different cultures within the US and world have shaped our national heritage.	– Study different holidays that are celebrated in the US and the associated foods – Study the cultural and historical origins of popular American foods
Geography	Creation	A. Identify location of OH, US, continents and oceans on maps, globes. 2nd grade: 2. Construct map that includes title and key.	– Map out where our foods come from. – Make a map of Oberlin indicating where the various "food institutions" (e.g., farms, supermarkets, restaurants) are
	Places and Regions	B. Identify physical and human features of places. 1st grade: 6. Compare areas within local community.	– Study Oberlin for its physical and human features – e.g., farms
	Human Environmental Action	C. Explain how environmental processes influence human activity and ways humans depend on and adapt to env't. 1st grade: 2a. Describe human adaptations to variations in physical env't including food. 2nd grade: 5. Compare how land is used in urban, suburban, and rural env'ts.	– Learn about farming, agriculture – one of the most significant ways humans have altered their env't; learn about history of agriculture; visit the Jones Farm and learn how land is used there
Economics	Scarcity and Resource Allocation	A. Explain how the scarcity of resources requires people to make choices to satisfy their wants. 2nd grade: 1. Explain how resources can be used in various ways.	– Learn about the many different uses of corn, soybeans, rice
	Production, Distribution & Consumption	B. Distinguish between goods and services and explain how people can be both buyers and sellers of goods and services. 1st grade: 2. Describe the ways people produce, consume, and exchange goods and services in their community.	– Learn about this in the context of the food system. Farmers sell their produce, but they also buy seeds, farming equipment, other necessities – Study of Oberlin in terms of production, consumption, exchange of goods
	Markets	C. Explain ways that people may obtain goods and services.	– Set up a pretend farmers' market in class and give students an allowance with

		1st grade: 3. Explain ways that people may obtain goods and services that they do not produce including the use of money and barter. 2nd grade: 5. Recognize that money is a generally accepted medium of exchange for goods and services.	fake paper money/bills – tie in with math. – Before money, some countries used rice, cacao beans, salt/spices as the media of exchange.
Government	Rules & Laws	C. Explain the purposes of rules in different settings and the results of adherence to or violation of the rules.	– Rules in behavior and action at farmers' markets, community gardens, supermarkets, farms
Citizenship Rights & Responsibilities	Participation	A. Describe results of cooperation in group settings and demonstrate the necessary skills.	– Cooperation and teamwork in maintaining the garden, growing food, working, harvesting, cooking
	Rights & Responsibilities	B. Demonstrate personal accountability, including making choices and taking responsibility for personal actions	
Social Studies Skills & Methods	Obtaining Information	A. Obtain information from oral, visual, print and electronic sources.	– Listen to a farmer and/or gardener speak; look at pictures of foods from around the nation and world; read about farms;
	Thinking & Organizing	B. Predict outcomes based on factual information or reasoning	– Sequence of tasks in a garden: seed planting, watering, transplanting…
	Communicating Information	C. Communicate information orally, visually, or in writing	– Write about experiences at the garden and/or farm; draw pictures

Grades 3-5

Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
History	Chronology	A. Construct timelines to demonstrate an understanding of units of time and chronological order. 4th grade: 1. Construct timelines…to show the order of significant events in OH history.	– Make a timeline of when different groups of people came to the US and what they brought in terms of food – Grow the vegetables and/or make foods that these groups of people brought – Make a timeline demonstrating the food history and culture of OH.
	Settlement	B. Describe the cultural patterns that are evident in N. America today as a result of explorations, colonization and conflict. 4th grade: 2. Describe the earliest settlements in OH including those of prehistoric peoples. 5th grade: 4. Describe the lasting effects of Spanish, French and English colonization in N. America including cultural patterns evident today such as…food	– What kind of foods did the Native Americans grow and eat? Learn about the Three Sisters (corn, squash, beans) and grow these in the garden. Why were these grown together? (can be tied to biology) Use produce to cook a few dishes. – Learn about the Columbian Exchange: Old World and New World
People & Societies	Cultures	A. Compare practices and products of N. American cultural groups. 3rd grade: 1d. Compare some of the cultural practices and products of various groups of people who have lived in the	– Go to Cleveland's West Side Market – all kinds of int'l, ethnic foods sold there – Grow various spices and/or vegetables in the garden that are used by different ethnic groups in the US.

		local community including food.	– What kinds of foods/crops do the different N. American cultural groups grow? – Learn about the Amish culture and their way of farming; eat some foods produced by the Amish like cheese, milk
Geography	Location	A. Use map elements or coordinates to locate. 4th grade: 1. Use a linear scale to measure the distance between places on a map. 2. Use cardinal and intermediate directions to describe the relative location of places. 3. Describe the locations of OH relative to other states and countries. 5th grade: 2b. Use maps to identify location of the 50 states of the US	– Identify/locate farms in Lorain County and map them – How far away are these farms from Oberlin? – Create a map of Oberlin and locate all the school gardens and community gardens in town. – Where does our food come from? Find out what foods the different states grow. What does OH grow? How far do certain foods that we eat travel?
	Places & Regions	B. Identify the physical and human characteristics of places and regions in N. America. 4th grade: 6. Identify…agricultural…regions in OH	– Where are these agricultural regions relative to Oberlin? What do they grow? Introduction to commodity crops like corn and soybeans
	Human Environmental Interaction	C. Identify and explain ways people have affected the physical env't of N. America and analyze the positive and negative consequences. 4th grade: 9c, d. Identify ways that people have affected the physical env't of OH including…building farms, towns, and transportation systems; using fertilizers, herbicides and pesticides	– AGRICULTURE – learn what kinds of environmental impacts agriculture has; learn about how farms are built and organized – Visit the Jones Farm and identify the ways in which it is being sustainable – How has the garden affected the physical environment?
	Movement	D. Analyze ways that transportation and communication relate to patterns of settlement and economic activity.	– How and why is transportation an important part of the food system? (link with mapping activity) – Transporting locally grown foods (in garden, Jones farm, other nearby farms) vs. transporting foods produced in distant places
Economics	Markets	C. Explain how competition affects producers and consumers in a market economy and why specialization facilitates trade. 3rd grade: 6. Explain how the local community is an example of a market. 7. Identify examples of economic competition in the local community. 5th grade: 4. Explain how regions in North America become independent when they specialize in what they produce best and then trade with other regions inside and outside of North America to increase the amount and variety of goods and services available.	– Study how farmers' markets work – farmers specialize in growing certain produce or making certain artisanal foods – Study the nature of competition between restaurants in Oberlin – fast food vs. sit-down, between individual restaurants – this is a good introduction to the food system. – Learn what regions produce what foods, what foods the country as a whole imports from other countries; where are the foods at the supermarket (e.g., IGA) coming from?

Government	Role of Government	A. Identify the responsibilities of the branches of the US government and explain why they are necessary. 5th grade: 1. Explain major responsibilities of each of the three branches of the US government.	– Introduce the US Department of Agriculture as part of the executive branch – secretary appointed by the President; learn about USDA's roles, agencies
Citizenship & Responsibilities	Participation	A. Explain how citizens take part in civic life in order to promote the common good. 3rd grade: 1. Describe how people help to make the community a better place in which to live. 2. Demonstrate effective citizenship traits	– Learn about how community gardens enhance communities; learn about the Xion Church Community Garden in Oberlin and the City Fresh program – Students can demonstrate citizenship traits through gardening – cooperation, sharing
Social Studies Skills & Methods	Obtaining Information	A. Obtain information from a variety of primary and secondary sources. B. Use a variety of sources to organize information and draw inferences. C. Communicate social studies information using graphs or tables	– Same as with K-2 – Organize in a table format what regions of the US and what countries produce what crops/foods. **NOTE: SS skills & methods can be used in activities/lessons in other subjects**
Grades 6-8			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
People in Societies	Cultures	A. Compare cultural practices, products, and perspectives of past civilizations in order to understand commonality and diversity of cultures 6th grade: 1. Compare cultural practices and products of societies studied including class structure, gender roles, beliefs, customs and traditions	– This benchmark can be addressed through a study of cultural foods. Questions that could be asked include: what were the gender roles with respect to food production and preparation? What are the values associated with the various cultural foods?
Geography	Location	A. Identify on a map the location of major physical and human features of each continent.	– Address these indicators through a study of the food system. What changes have occurred with respect to food transportation and technologies? How has communication, rapid exchange of information affected agriculture? – In what ways are we modifying the environment through our garden? What are the effects of the garden?
	Places & Regions	B. Define and identify regions using human and physical characteristics 6th grade: 3a. Explain the distribution patterns of economic activities and how changes in technology, transportation, communication and resources affect those patterns including: agriculture. 7th grade: 3. Describe changes in the physical and human characteristics of regions that occur over time and identify the consequences of such changes.	
	Human Environmental Action	C. Explain how the environment influences the way people live in different places and the consequences of modifying the environment. 6th grade: 7c. Describe ways humans depend on and modify the environment and the positive and negative consequences of the modifications	

		including agriculture.	
Economics	Markets	B. Explain why trade occurs and how historical patterns of trade have contributed to global interdependence.	– Address this benchmark through the study of trading of foods, commodities. Could also investigate the consequences of global interdependence of food supplies.
Social Studies Skills & Methods	Obtaining Information	A. Analyze different perspectives on a topic obtained from a variety of sources.	– Students can do debates, presentations, projects, research on various topics concerning food: community gardens, school gardens, farmers' markets, sustainable agriculture, community-supported agriculture
	Communicating Information	C. Present a position and support it with evidence and citation of sources.	
	Problem Solving	D. Work effectively in a group.	
Grades 9-10			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Geography	Human Environmental Action	B. Analyze geographic changes brought about by human activity using appropriate ways and other geographical data.	– How has agriculture changed the geography of the region? – William Cronon's *Changes in the Land* would be a good reading.
Economics	Markets, Government & the Economy		– Can study about food policies, Farm Bill – these effectively illustrate the connection among markets, government/politics and economy
Social Studies Skills & Methods	Thinking and Organizing	A. Evaluate the reliability and credibility of sources.	– Similar, but more involved, activities as those listed for grades 6-8; e.g. students can write essays, reports on food topics of their choice.
	Communicating Information	B. Use data and evidence to support or refute a thesis.	
Grades 11-12			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
People in Societies	Cultures	A. Analyze how issues may be viewed differently by various cultural groups.	– Learn about the Amish perspectives regarding farming, agriculture, food, lifestyle; visit Amish farm; taste foods made by the Amish
	Diffusion	C. Explain the role of diverse cultural institutions in shaping American society.	– Community gardens can be considered a cultural institution particularly if they are built to establish closer relationships among people of the same ethnicity.
Geography	Places & Regions	A. Explain how the character and meaning of a place reflect a society's economics, politics, social values, ideology and culture. B. Explain the consequences of geographic and environmental changes resulting from government policies and human modifications to the physical environment 12^{th} grade: 2. Describe the intended and unintended effects of human modifications to the physical environment and weigh the costs and benefits of alternative approaches to addressing environmental concerns (e.g., alternative sources of	– Learn about the intended and unintended effects of industrial agriculture on natural environment, small farmers, farming communities; learn about Concentrated Animal Feeding Operations (CAFOs) and the consequences of these – What kind of social, cultural values do urban gardens, community gardens reflect? – What are the effects of growing corn for biofuels?

		energy, mass transportation systems, or farmland and wetland preservation)	
Economics	Government and Economy	D. Analyze the role of fiscal and regulatory policies in a mixed economy. 12th grade: 6. Analyze economic policy decisions made by the government that have resulted in intended and unintended consequences.	– Learn about government subsidies for commodities; the relationship between commodities and school lunch program – Learn about the Farm Bill – Learn about the power of agribusinesses – money, politics, lobbying power
Social Studies Skills & Methods	Obtaining Information	A. Obtain and evaluate information from public records and other resources related to a public policy issue.	– Similar to grades 9-10
	Thinking and Organizing	B. Critique data and information to determine adequacy of support for conclusions	
	Communicating Information	C. Develop a research project that identifies the various perspectives on an issue and explain a resolution of that issue.	
	Problem Solving	D. Work in groups to analyze an issue and make decisions	
Ohio State Board of Education: "Effective social studies education necessitates an interdisciplinary approach because inquiry into any real-world matter related to citizenship is holistic and multidisciplinary in nature….A prominent goal of social studies education is the development of a well-rounded synthesis of content and skills that students need for quality decision-making and active social participation."[285] They also argue that social studies can be integrated with content and skills from other disciplines. Thus, the Board *does* encourage interdisciplinary learning.			

[285] Ohio Department of Education, Ohio Academic Content Standards for K-12 Social Studies, p. 297, available at http://www.ode.state.oh.us/.

Science

Grades K-2			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Earth and Space Sciences	Processes that Shape Earth	B. Explain that living things cause changes on Earth. Kindergarten: 2. Explore that animals and plants cause changes to their surroundings. 1st grade: 3. Explain that all organisms cause changes in the environment where they live; changes can be very or slightly noticeable, fast or slow.	– Visit the Jones Farm and learn about what chickens do there; observe changes in the garden and record them.
	Earth Systems	D. Describe what resources are and recognize some are limited but can be extended through recycling or decreased use 1st grade: 1. Identify that resources are things that we get from the living and non-living environment. 2. Explain that the supply of many resources is limited but the supply can be extended through careful use, decreasing use, reusing, recycling.	– Learn about composting and compost at school – composting food to recreate a new resource: soil.
Life Sciences	Characteristics & Structure of Life	A. Discover that there are living things, non-living things, and pretend things, and describe the basic needs of organisms. Kindergarten: 1. Explore differences between living and non-living things. 1st and 2nd grades: 1. Explain / explore that organisms have basic needs including air, water, food, living space and shelter. 1st grade: 2. Explain that food comes from sources other than grocery stores. 3. Explore that animals have body parts that help to seek, find, and take in food when they're hungry. 2nd grade: 2. Identify that there are many distinct environments that support different kinds of organisms. 9. Compare Ohio plants during the different seasons by describing changes in their appearance.	– Grow and harvest food in the garden. – Explore the living and non-living things in a garden, farm. – What vegetables can be harvested during what seasons; learn about seasonality of fresh produce – What kind of environments does the Jones Farm have? What organisms live in these different environments? – Explain the functions of the various organisms at the farm, in the garden. – Describe how a strawbale building is constructed.
	Diversity & Interdependence of Life	B. Explain how organisms function and interact with their physical environment. Kindergarten: 6. Investigate the habitats of many different kinds of local plants and animals and some of the ways in which animals depend on plants and each other in our community. 1st grade: 4. Investigate that animals eat plants and/or other animals for food and	– Learn about this in the context of the food system. Farmers sell their produce, but they also buy seeds, farming equipment, other necessities – Study of Oberlin in terms of production, consumption, exchange of goods

		may also use plants or other animals for shelter and nesting. 2nd grade: 5. Explain that food is a basic need of plants and animals and is important because it is a source of energy.	
	Heredity	C. Describe the similarities and differences that exist among individuals of the same kind of plants and animals. K and 2nd grade: 4. investigate variations that exist among individuals of the same kind of plant or animal.	– Learn about the different varieties of foods grown locally – Grow different varieties of tomatoes – like heirloom tomatoes – in the garden.
Physical Sciences	Nature of Matter	A. …Recognize ways an object may change. 1st grade: 3. Explore and observe that things can be done to materials to change their properties – heating, freezing, mixing, cutting, wetting, dissolving…	– Recognize that food is matter; learn about the changes that various foods go through when we cook or preserve; rotting…Use produce from garden.
Science & Technology	Understanding technology	A. Explain why people, when building or making something, need to determine what it will be made of, how it will affect other people and the environment. 1st grade: 4. Explore ways people use energy to cook their food.	– Make solar cookers using pizza boxes or other materials and then use them to cook something from the garden.
	Abilities to do Technological Design	B. Explain that to construct something requires planning, communication, problem solving and tools. 1st grade: 6. Investigate that tools are used to help make things and some things cannot be made without tools.	– Learn the purpose of various gardening tools and learn to use them.
Scientific Inquiry	Doing Scientific Inquiry	A. Ask a testable question. K-2: 1. Ask "what if," "what happens when," "how can we," "how do you know" questions. 2. Explore these student-generated questions.	– Conduct simple experiments in the garden. Compare plants growing in different soils, locations. How do different plants fare in different conditions?
		B. Design and conduct a simple investigation to explore a question. K: 4. Use the five senses to make observations about the natural world. K-2: Use appropriate tools and instruments – rulers, timers, thermometers….	
		C. Gather and communicate information from careful observations and simple investigations through a variety of methods. K-2: Use oral, written, pictorial representation to communicate work. 2nd grade:. 5. Use evidence to develop explanations of scientific investigations. 6. Recognize that explanations are generated in response to observations, events and phenomena.	

Scientific Ways of Knowing	Nature of Science	A. Recognize that there are different ways to carry out scientific investigations. Realize that investigations can be repeated under the same conditions with similar results and may have different explanations.	– Listen to a farmer and/or gardener speak; look at pictures of foods from around the nation and world; read about farms;
	Ethical Practices	B. Recognize the importance of respect for all living things.	– Learn to respect the garden space.
Grades 3-5			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Earth & Space Sciences	Earth Systems	C. Describe Earth's resources including rocks, soil, water, air, animals, and plants, and the ways in which they can be conserved. 3rd grade: 4. Observe and describe the composition of soil. 5. Investigate the properties of soil. 6. Investigate that soils are often found in layers and can be different from place to place.	– Take soil samples from Jones Farm, garden; compare.
		5th grade: 5. Explain how the supply of many non-renewable resources is limited and can be extended through the 3 R's but cannot be extended indefinitely.	– Recognize that growing food in the garden saves fossil fuels by avoiding long-distance transport.
Life Sciences	Heredity	A. Differentiate between life cycles of different plants and animals. 4th grade: 1. Compare life cycles of different plants. 5. Describe how organisms interact with one another in various ways (e.g., animals as pollinators).	
	Diversity & Interdependence of Life	B. Analyze plant and animal structures and functions and describe the flow of energy through a system that all organisms use to survive. 3rd grade: 2. Relate animal structures to their specific survival functions. 4th grade: 2. Relate plant structures to their specific functions. 3. Classify common plants according to their characteristics (root, stem, leaf, flower, seed).	– What parts of plants do we eat? – Categorize the vegetables grown in the farm, garden.
		5th grade: 1. Describe role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis. 2. Explain how almost all kinds of animals' food can be traced back to plants. 3. Trace the organization of simple food chains and webs.	– Identify the producers and heterotrophs in the garden, farm. – Draw a food chain or web of the garden.

		C. Compare changes in an organism's ecosystem that affect its survival. 5th grade: 6. Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental.	– Take farming / growing food as an example. What are some environmentally irresponsible agricultural practices? What is the Jones Farm doing?
Science & Technology	Understanding Technology	A. Describe how technology affects human life. 4th grade: 1. Explain how technology from different areas (including transportation, agriculture) has improved human lives. 5th grade: 1. Investigate positive and negative impacts of human activity and technology on the environment.	– Linking Food and the Environment (LiFE) modules could be used here. – Consider the food system and all the technologies, transportation involved in it.
Scientific Inquiry	Doing Scientific Inquiry	A. Use appropriate instruments safely to observe, measure and collect data when conducting a scientific investigation. Same as with K-2.	– Data collection from and/or experiments using the garden….investigate the growth of plants under diferent conditions.
		B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions. 3rd grade: 3. Read, create and interpret simple tables and graphs. 5. Record and organize observations. 4th grade: 2. Analyze a series of events and/or simple daily or seasonal cycles, describe patterns, and infer the next likely occurrence. 4. Explain the importance of keeping conditions the same in an experiment. 5. Describe how comparisons may not be fair when some conditions are not kept the same between experiments. 5th grade: 4. Identify one or two variables in a simple experiment.	
Scientific Ways of Knowing	Nature of Science	A. Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained. B. Describe different types of investigations and use results and data to provide evidence to support explanations and conclusions. C. Explain the importance of keeping and not changing records of observations and investigations that are accurate and understandable.	– Learn these skills by conducting experiments in the garden.
Grades 6-8			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Life Sciences	Characteristics & Structure of Life	A. Explain that the basic functions of organisms are carried out in cells; the combinations of these cells make up	– Study the plant structures of plants grown in the garden.

		multicellular organisms that have a variety of body plans and internal structures.	
	Diversity & Interdependence of Life	C. Explain how energy entering ecosystem as sunlight supports the life of organisms through photosynthesis and the transfer of energy from the interactions of organisms and the environment. e. 3rd grade: 2. Relate animal structures to their specific survival functions. 4th grade: 2. Relate plant structures to their specific functions. 3. Classify common plants according to their characteristics (root, stem, leaf, flower, seed).	– Study how organisms in the garden interact with one another and with the abiotic environment.
Physical Sciences	Nature of Energy	C. Describe renewable and nonrenewable sources of energy and the management of these resources.	– Ethanol from corn; biodiesel; learn the costs and benefits.
Science & Technology	Understanding Technology	A. Give examples of how technological advances, influenced by scientific knowledge, affect quality of life. 7th grade: 2. Describe how decisions to develop and use technology often put environmental and economic concerns in direct competition with each other. 3. Recognize that science can only answer some questions and technology can only solve some human problems.	– Learn about industrial agriculture and its environmental consequences. – Learn about food science – read excerpts of Michael Pollan's *Omnivore's Dilemma*, Eric Schlosser's *Fast Food Nation*. – Learn about the "greening" of our food system.
Scientific Inquiry	Doing Scientific Inquiry	A. Explain that there are different sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools.	– Learn these concepts first-hand through collecting data from and/or conducting experiments with the garden.
Scientific Ways of Knowing		A. Use skills of scientific inquiry processes. B. Explain importance of reproducibility and reduction of bias in scientific methods. C. Give examples of how thinking scientifically is helpful in daily life.	
Grades 9-10			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Life Sciences	Diversity & Interdependence of Life	D. Explain the flow of energy and cycling of matter through biological and ecological systems. E. Explain how evolutionary relationships contribute to an understanding of the unity and diversity of life. F. Explain structure and function of ecosystems and relate how ecosystems change over time.	– Use the garden as an example or entry way to introduce other larger ecosystems like the wetlands at the Jones Farm – Learn about the domestication of crops such as rice and corn – how and why did it occur? What characteristics were people looking for? – Learn about industrial agriculture and its environmental consequences.

		G. Describe how human activities can impact status of natural systems. 10th grade: 19. Illustrate how the uses of resources at local, state, regional, national, and global levels have affected the quality of life (e.g., energy production and sustainable vs. nonsustainable agriculture).	
	Historical Perspectives & Scientific Revolutions	J. Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of life sciences. 10th grade: 28. Analyze and investigate emerging scientific issues (e.g., genetically modified food)	– Learn about genetic engineering, Green Revolution in agriculture, Monsanto
Science & Technology	Understanding Technology	A. Explain that science and technology are interdependent. 10th grade: 2. Describe examples of scientific advances and emerging technologies and how they may impact society.	– Explore some of the technologies with respect to food – benefits? Costs?
Scientific Inquiry	Doing Scientific Inquiry	A. Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate, and communicate the results of these investigations.	– Experiments at the garden or farm.
Scientific Ways of Knowing	Science & Society	D. Recognize that scientific literacy is part of being a knowledgeable citizen.	
Grades 11-12			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Earth & Space Sciences	Earth Systems	C. Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. 11th grade: 9. Explain the effects of…human activity on climate (e.g., climate change, global warming). 13. Explain how human behavior affects the basic processes of natural ecosystems and quality of atmosphere. 14. Conclude that Earth has finite resources and explain that humans deplete some resources faster than they can be renewed. Observe and describe the composition of soil.	– Study the relationships among food, climate change, and agriculture. – Learn about Oberlin College's efforts towards encouraging students to eat in ways that reduce their impact on climate change.
	Historical Perspectives & Scientific Revolutions	D. Summarize the historical development of scientific theories and ideas and describe emerging issues in the study of Earth & Space Sciences. 11th grade: 16. Describe advances in Earth and space science that have important long-lasting effects on science and society (e.g., global warming).	– What have we learned about climate change over the years? – What is the history of food science and food technologies? – What is the argument for using corn as an energy resource?

Life Sciences	Characteristics & Structure of Life	A. Explain how processes at the cellular level affect functions and characteristics of an organism. 11th grade: 2. Recognize that chemical bonds of food molecules contain energy. 12th grade: 3. Explain that…plants capture energy by absorbing light and using it to form strong covalent chemical bonds between carbon-containing molecules.	– Learn about metabolism…what happens when we eat food?
		B. Explain how humans are connected to and impact natural systems. 11th grade: 4. Examine the contributing factors of human population growth that impact natural systems 5. Investigate the impact on the structure and stability of ecosystems due to changes in their biotic and abiotic components as a result of human activity.	– Study the reasons for the Green Revolution (e.g., population growth, demand). – How have ecosystems changed in response to industrial agriculture?
	Evolutionary Theory	D. Relate how biotic and abiotic global changes have occurred in the past and will continue to do so in the future.	– What are some of the predicted impacts of climate change on agriculture? (e.g., northward shift of crop ranges)
	Diversity & Interdependence of Life	E. Explain the interconnectedness of the components of a natural system. 11-12 grades: Predict the biotic and abiotic changes in ecosystems when disturbed. F. Explain how human choices today will affect the quality and quantity of life on earth. 11th grade: 11. Investigate issues of environmental quality at local, national and global levels such as…resource use…overconsumption, capacity of technology to solve problems, poverty, role of economy…	– Research the effects of industrial agriculture – what causes these effects? What can we do to prevent negative impacts or alleviate them?
Science & Technology	Understanding Technology	A. Predict how human choices today will determine quality and quantity of life on Earth. 11th grade: 2. Predict how decisions regarding implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment and/or humans. 5th grade: 6. Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental.	– What are some green technologies – high- and low-tech – with respect to agriculture, growing food?
Scientific Inquiry	Scientific Ways of Knowing	The indicators in this section are all used when doing research, conducting experiments and collecting and interpreting data – apply these skills in conducting research about sustainable agriculture, for example.	
	Science & Society	C. Explain how societal issues and considerations affect progress of science and technology.	– Topics: genetic engineering, food science

The Ohio State Board of Education suggests that children could "grow plants, watch them complete the cycle by planting the seed themselves, and harvest from the plants they grow."[286] They also suggest the investigation of the science of food production from material of the lunch tray to the content of the food on the tray.[287]

[286] Ohio Department of Education, Ohio Academic Content Standards for K-12 Science, p. 262.
[287] *Ibid.*, p. 286.

English Language Arts

Grades K-2			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Reading	Acquisition of Vocabulary	D. Know the meaning of specialized vocabulary.	– Learn cooking, garden terminology.
	Reading Process	C. Draw conclusions from the information in the text.	– Read a picture book on how a particular food is made (e.g., bread) or how bees pollinate flowers, to give specific examples.
	Reading Applications: Informational Text	C. Identify the central ideas and supporting details of informational text.	–
	Reading Applications: Literary Text	B. Use supporting details to identify and describe the main ideas, characters and setting. E. Identify the theme.	– Read a story that revolves around making or eating food.
Writing	Writing Processes	A. Generate ideas for written compositions.	– Write about experiences at the garden/farm, memorable eating experiences, favorite foods.
	Writing Applications	A. Compose writings that convey a clear message and include well-chosen details.	
Research Skills		A. Generate questions for investigation and gather information from a variety of sources. B. Retell important details and findings.	– After visiting the farm or spending the day at a garden, reflect on observations, come up with questions.
Oral and Visual Communication		B. Connect prior experiences…to those of a speaker. C. Follow multi-step directions.	– Learn to follow directions about maintaining the garden.
Grades 3-4			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Writing	Writing Processes	Building on K-2. E. Use revision strategies to improve coherence of ideas, clarity of sentence structure. F. Use a variety of resources and reference materials to select more effective vocabulary when editing.	– Use these skills when writing about experiences at the farm/garden.
	Writing Applications	D. Write informational reports that include facts, details and examples that illustrate an important idea	– Write about the experiments conducted at the garden.
	Writing Conventions	A. Write legibly. B. Spell grade-appropriate words correctly. C. Use conventions of punctuation and capitalization. D. Use grammatical structures.	– Apply these skills when writing about experiences at farm/garden.

Research		A. Identify a topic of study, construct questions and determine appropriate sources for gathering information. B. Select and summarize important information and sort key findings into categories about a topic.	– Topic/question: where do foods come from? What are their historical and cultural origins? – gardening, cooking, field trip experiences can all form bases of many pieces of writing – whether essays, narratives, poems, plays…
Oral and Visual Communication		E. Organize presentations to provide a beginning, middle and ending and include concrete details.	– Learn to follow directions about maintaining the garden.
Grades 4-7			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Reading	Acquisition of Vocabulary	A. Use context clues and text structures to determine meaning of new vocabulary. F. Use multiple resources to enhance comprehension of vocabulary.	– These can all be used or applied by reading books on various aspects of food – history, culture, geography, relationship to the environment, science. The books can be fictional and nonfictional.
	Reading Process	A. Determine the purpose for reading and use a range of reading comprehension strategies to better understand the text. C. Make meaning though asking and responding to a variety of questions related to the text.	
	Reading Applications: Literary Text	E. Demonstrate comprehension by inferring themes, patterns and symbols. G. Explain how figurative language expresses ideas and mood.	
Grades 5-7			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Writing	Writing Processes	Same as 3-4.	
	Writing Applications	A. Use narrative strategies to develop characters, plot and setting and to maintain a consistent point of view. E. Use persuasive strategies, including establishing a clear position in support of a proposition or proposal with organized and relevant evidence.	– Write a short fictional story revolving around food. – Write an essay arguing for sustainable agriculture or against industrial agriculture, for example.
Students in the upper grades build on all of these skills and can continue to hone their reading and writing skills. They can write essays or papers about topics related to food issues that interest them.			
The Ohio State Board of Education: "It is important that teachers, curriculum leaders, and administrators see English LA standards not as isolated skills but as the bases for integrated instruction across content areas. Acquiring knowledge through inquiry, asking questions and seeking answers through research are embedded in English / LA standards."[288]			

[288] *Ibid*., Ohio Academic Content Standards for K-12 English Language Arts, p. 274.

Mathematics

Grades K-2			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Number, Number Sense & Operations		D. Determine the value of a collection of coins and dollar bills. E. Make change using coins for values up to $1.	– Set up a make-believe farmers' market in the classroom and give students small allowances.
Measurement		B. Select appropriate units for length. D. Apply measurement techniques to measure length, volume	– Map out where foods come from and measure distance. – Use measuring techniques when cooking or baking.
Patterns, Functions & Algebra		G. Describe and compare qualitative and quantitative changes.	– Observe both types of changes at the garden or farm.
Mathematical Processes		I. Communicate mathematical thinking by using everyday language and appropriate mathematical language.	– Express weather data and growth data in the form of graphs and/or tables.
Grades 3-4			
Standard	**Grouping**	**Benchmarks and Specific Grade-Level Indicators**	**Examples of garden-based activities and/or food education lessons**
Number, Number Sense & Operations		F. Count money and make change using both coins and paper bills. G. Model and use commutative and associative properties for addition and multiplication. K. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division of whole numbers	– Set up a make-believe farmers' market in the classroom and give students small allowances.
Measurement		Same as K-2.	– Map out where foods come from and measure distance. – Use measuring techniques when cooking or baking.
Patterns, Functions & Algebra		G. Describe how a change in one variable affects the value of a related variable – as one increases the other decreases or increases for example.	– Apply this skill when thinking about and analyzing experiments conducted in the garden.
Data Analysis & Probability		A. Gather and organize data from survey and classroom experiments, including data collected over a period of time. C. Construct charts, tables and graphs to represent data. E. Describe data using mode, median, and range.	– Apply these skills when thinking about and analyzing experiments conducted in the garden.
Mathematical		D. Use mathematical strategies to solve	

Processes		problems that relate to other curriculum areas and the world.	
Ohio State Board of Education: "Students in the classroom need opportunities to recognize and draw upon the connections between and among topic studied. Teachers can facilitate this process by engaging students in multi-layered problem-solving situations that cross disciplines and engage students' interests."[289]			

[289] *Ibid.*, Ohio Academic Content Standards for K-12 Mathematics, p. 198.

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