AN EXPLORATION OF CHILDREN’S GARDENS:
REPORTED BENEFITS, RECOMMENDED ELEMENTS, AND
PREFERRED VISITOR AUTONOMY

DISSERTATION

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By

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ABSTRACT

The number of children’s gardens in the U.S. is growing, but discourse in the field lacks progression. The purpose of this study was to synthesize the existing body of knowledge concerning the benefits from experiences in children’s gardens and the recommended garden elements included in them, to elicit responses from various children’s garden stakeholders in conceptualizing a children’s garden, what they thought were essential elements, and their preferences for autonomy of garden visitors.

A questionnaire was constructed concerning stakeholder role; age of respondents; conceptualizations of children’s gardens; importance assigned to 72 children’s garden elements; and preferences for level of children’s garden visitor autonomy, based on four distinct age groups. Respondents were attendees of the 2005 American Horticultural Society’s Children & Youth Garden Symposium, and stakeholders of five botanical gardens in the U.S. The total number of completed surveys received was 120. Descriptive and inferential statistics were used to analyze and interpret the data from this convenience sample. Major findings included:

- Meta-synthesis of the literature: outlined the history of children’s gardening and current trends; delineated reported benefits to children from plant-based learning; revealed four approaches to the design of children’s gardens discerned by the researcher; and created a list of cited children’s garden elements.
• Representative quotes constituted a glimpse into stakeholder conceptualizations of what is a children’s garden. A children’s garden typology was offered by the researcher.

• Responses for garden elements were reported by percentage distribution, means and standard deviations. 61 children’s garden elements received responses indicating relative importance, twelve received responses indicating that the element was very important to essential. Plants, water source for plants/people, trees, paths, and water feature(s) received highest mean values. Assigned importance to elements based upon stakeholder role revealed 19; visitors assigned high importance to comfort and interactive elements. A cluster analysis revealed five clusters.

• Significant differences between stakeholders in their preferred levels of visitor autonomy emerged based on age and origin of respondents, but not based on stakeholder role.

Summary of the research findings, discussion of the literature, implications, research and practice recommendations, and closing perspective were offered.
Dedicated to all of the concerned people in my life who continued to ask me about my doctoral research despite receiving grimaces and mumbling from me in return.

Thank you!
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PUBLICATIONS


**FIELDS OF STUDY**

Major Field: Natural Resources
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CHAPTER 1
INTRODUCTION

If you are thinking a year ahead, plant a seed.
If you are thinking a decade ahead, plant a tree.
If you are thinking a century ahead, educate the people.
- Chinese poem

Background

During the keynote presentation of the 2003 annual Children & Youth Garden Symposium hosted by the American Horticultural Society (AHS) at George Washington’s River Farm in Alexandria, VA, Jane L. Taylor reiterated her enthusiastic call to action for advocates of children’s gardens and plant-based learning that she offered ten years earlier as the keynote speaker at the first symposium in 1993. A question and answer period followed her inspiring talk, when a young woman asked her how many children’s gardens there are in the United States. “It depends on how you define it,” she replied. “Nobody has really defined what a children’s garden is” (Taylor, 2003). As the symposium coordinator, I monitored the program closely and was instantly struck by Taylor’s reply. She was right. What constitutes a children’s garden? Pondering this question led to other related questions: What are the essential elements in a children’s garden? Do different stakeholders view the design of children’s gardens in distinctly different ways?
April of 2004 saw the inauguration of the Partnership for Plant Based Learning with a Congress held at AHS’ River Farm. Over 55 experts in numerous disciplines from all over the country were in attendance, with several well-known speakers such as Eric Jolly and Delaine Eastin sharing their thoughts. Delaine Eastin asserted that this movement will improve academic standards, children’s health and nutrition. It will improve national economics and natural resource management. She went on to say that learning is experimental, hands-on, and alive; not rote memorization. “Most countries in the world understand this...It’s about taking them ‘out there’, not sitting them in a chair. Kids love plants” (Eastin, 2004). Despite a universal agreement between Congress attendees on the benefits to children and families arising from gardening and plant-based learning, small groups tasked with forming a working definition of plant-based learning had a difficult time reaching consensus. After numerous iterations with all in attendance, a final definition of plant-based learning eluded us and continues to be a work in progress. However, the following three definitions were considered the best:

- Plant based education is a systems approach to learning using the natural world as a laboratory,
- Plant based education is an experiential approach to integrated learning using plants as the medium (vehicle), and
- Plant based education is an approach to integrated learning using relevant experiences with plants (as a foundation for strengthening communities and connecting people with the natural world). (Partnership for Plant Based Learning, 2005).
The explication of the more broad-based construct of plant-based learning has yet to be realized. Likewise, the more focused definition of a children’s garden has yet to be offered either.

Also noted at the Congress was the fact that children’s garden advocates instinctively, intuitively, and experientially know the benefits to children and families arising from gardening and plant-based learning, but have little research to back up their claims. There was a call for more research to be conducted so that teachers who wish to establish an outdoor learning environment can point to studies that illuminate the benefits, botanical garden directors can rely on research in their efforts to establish children’s gardens, and school administrators have ammunition accessible in defending a plant-based curriculum. The research that was shared at the Congress by Dan Desmond of California and others was quickly snatched up by eager attendees looking for confirmation of what they already felt from their own experiences. This led to another question for this research: how does the existing body of literature inform practitioners in the field about the benefits to children from experiences in outdoor learning environments, and more specifically, the benefits to children from gardening?

In July, 2004, the annual AHS Children & Youth Garden Symposium was held in collaboration with Cornell University in Ithaca, NY. Dr. Roger Hart, giving a keynote address, eloquently detailed the virtues of wild areas in which children can and should explore, learn, and appreciate. These native or wild areas can be large undeveloped tracts of land or small areas incorporated into a more formally designed garden. Dr. Hart also described the role of professional play workers, who facilitate, but do not prescribe, the active participation of children and youth in natural areas (Hart, 2004).
the subsequent keynote presentation at the 2005 AHS Symposium, Sharon Lovejoy echoed Roger Hart’s call for open-ended exploration of nature. She noted that American children in 1981 had, on average, 100 minutes per week of unstructured play and discovery compared to 50 minutes in 2005. “They [children] need dream time. They need wild places and un-designed areas: a spot for the wild things.” (Lovejoy, 2005). The anecdotal evidence in the field and my own experiences led me to ponder whether this point of view concerning free-flowing open-ended experiences for children in gardens and natural settings is shared by the majority of practitioners. Based upon experts in the environmental education literature, the greater autonomy afforded children in exploring and discovering within un-designed areas of a garden or natural setting cannot be equated with unlimited visitor/learner freedom. Harold Hungerford dispelled this equation as a popularly-held myth. Many competent, humane educators employing a humanistic approach manage rather structured programs and activities (Hungerford, 1975). This led to another question concerning the views of various stakeholders of children’s gardens: what are stakeholder preferences regarding the level of autonomy that should be afforded visitors?

Need for Research

During a benchmark 1990 symposium dedicated to the role of horticulture in human well-being and social development, Diane Relf outlined the importance of conducting research in the area of people-plant connections and the lack of research focused on horticultural activities. She noted the debate as to whether the information gained from people-plant research is self-evident enough as to be redundant and not
worth gathering, but went on to list a number of studies validating the utility and value of such research. She called on researchers in horticulture departments, botanical gardens/arboreta, plant and soil scientists to include social scientists and researchers in the humanities in an interdisciplinary method of investigation. The public is interested in this type of research, but the onus is on the researcher to effectively communicate the findings. Educating the public on the value of people-plant interaction is intrinsic to justification of conducting the research. “One of the areas of human culture most neglected by social science and the humanities is the garden.” (Relf, 1992, p. 204). In a subsequent 1994 symposium, there was a clarion call for research in the area of people-plant relationships with a focus on methodologies and mechanisms by which research can proceed and a research agenda proposed (Flagler & Poincelot, 1994).

The keynote address of the 2002 Children & Youth Garden Symposium hosted by the American Horticultural Society (AHS) in San Francisco was given by Delaine Eastin, then Supervisor of Instruction for the state of California and originator of the ‘Garden in Every School’ initiative. She made an impassioned plea for more research in the area of gardening for children and its subsequent benefits. She called on those involved with children’s gardens and gardening to conduct research in order to validate what most educators and horticulturists know instinctively: that gardening is an ideal interdisciplinary method for children to connect with the natural world, understand their place in the web of life, and appreciate the role of plants in their everyday lives. She also emphasized the critical role that published research plays for practitioners in advocating for the creation of children’s gardens and outdoor environments, best practices in
conducting educational activities in a garden setting, and the sustainability of established outdoor learning environments (Eastin, 2002).

**Statement of the Problem**

Through conversations with experts and fellow members of AHS’ national advisory panel convened at various symposia and conferences, there has been agreement on the lack of a formal or operational definition of children’s gardens, children’s gardening, or plant-based learning. The paucity of research in the field has been noted time and time again. While a number of authors have strongly recommended what they feel are the best elements to include in a children’s garden, there has been a lack of research to pinpoint exactly which elements that children’s garden stakeholders specifically target as essential. Similarly, a consensus on the preferences of stakeholders concerning the autonomy of visitors in accessing and utilizing the children’s garden features continues to remain elusive. Discourse between and among children’s garden stakeholders remains mainly circular in nature, highlighting the vital need for exploring a number of concepts and constructs in the field. What makes this need even more timely is that despite a current trend by public gardens around the U.S. to establish a children’s garden as one of, if not the most featured, highlighted experiences for visitors, many public garden staff and designers of children’s gardens seem to lack a cohesive child-centered strategy within the gardens’ design processes (Mattern, 1999; Taylor, 2003).

*Most people who care about child development know nothing about design, and most people who design know nothing about child development* (Hart, in Shell, 1994, p.81).
There is a tendency on the part of educators, horticulturists, and others in the children’s garden arena to “bash” the designers of many children’s gardens. Criticisms abound concerning the lack of interactivity or the inappropriateness of plants and materials used, for example. These criticisms, while sometimes valid, do very little in furthering the dialogue between children’s garden stakeholders that is imperative for creating the best outdoor learning environments possible for children and youth. As a landscape designer with 25 years of experience, including the design of several small children’s gardens, I can sympathize with the designers who are tasked with accomplishing what may seem to be the impossible. They are often required to decipher what the garden educator wants for effective programming to occur, work within parameters set by the anxious garden director who has to deal with innumerable issues, thoroughly understand the developmental stages and physical, emotional, and safety concerns of the visitors (infants, children, youth, adults, older adults, the physically impaired, etc.), and account for the present and future maintenance issues for the children’s garden horticulturist – all while addressing the challenges of the site, budget, and timeline. The donors of the organization building the children’s garden can sometimes exert tremendous pressure on the process of design, down to the smallest detail. In addition, each children’s garden originator has a distinct mission, vision, and organizational culture that can and mainly should be reflected in the garden design.

On the other hand, I can sympathize with each of the other identified stakeholders as well. I have maintained children’s gardens as the horticulturist, conducted educational programs in the garden as the educator, frequently visited children’s gardens – with and without my own child, and served as a children’s gardening administrator. The fact that
there are a number of stakeholders, or players, in the creation and operation of children’s gardens necessitates a working understanding of each perspective. It is my assertion that there is a continued disconnect between stakeholders about what is a children’s garden, what are the benefits to children from experiences in a garden, what are the essential elements, and what are the existing perceptions about the appropriate level of autonomy of garden visitors.

**Purpose of Study**

The fundamental purpose of this study was to review and synthesize the existing body of knowledge concerning the benefits to children from experiences in children’s gardens and the recommended elements that should be included in children’s gardens. Secondly, the purpose of this research was to elicit the responses of various children’s garden stakeholders - i.e., children’s garden educators, directors/administrators, designers, visitors, and horticulturists – in regards to how they conceptualize a children’s garden, what they think are the essential elements or features of a children’s garden, and their preferences concerning the autonomy of garden visitors. This research was meant to explore basic constructs and issues within the area of children’s gardens, highlight existing research, and underscore respondent differences or similarities that emerged from this study. In order to move the field forward into progressive discourse between and among children’s garden stakeholders, a fundamental exploration of key constructs and issues was viewed by this researcher as paramount.
Research Questions and Objectives

The following research questions were addressed in this study:

1. What is known about benefits to children from children’s garden experiences and/or plant-based learning?
2. What is a children’s garden?
3. What are the essential elements/features that a children’s garden should contain?
4. What are the current preferences between and among children’s garden stakeholders concerning the level of autonomy that garden visitors should be afforded in accessing and utilizing the garden?

The research objectives for answering the above questions were as follows:

1. Using a meta-synthesis of the literature, outline the body of knowledge concerning benefits to children and youth from children’s garden experiences and/or plant-based learning,
2. Using a qualitative approach, initially explore the construct of children’s garden,
3. Using a 7-point Likert-type scale, describe the essential elements of a children’s garden selected from a list of elements/features that emerged from a meta-synthesis of the literature, and
4. Using a visual analog scale, describe the current preferences of children’s gardens stakeholders concerning the level of autonomy that should be afforded garden visitors - specifically in terms of free, open-ended exploration of the garden vs. programmed garden experiences.
Significance of Study

Given all of the multi-layered benefits to children (and adults) from experiences with nature and activities within a garden setting outlined in Chapter 2 of this study, it behooved this researcher and all who are interested in the future directions that our educational efforts may take, to explore and at least try to understand the positive attributes inherent within plant-based learning (Davis, 1998; Janick, 1992; Lewis, 1996; Suzuki, 1998). On a primary level, it was imperative to begin to comprehend and describe, in all their richness, the concepts and constructs related to children’s gardens in order to move the discourse forward and attempt to theorize best practices in creating and utilizing these environments. On a secondary level, the current trend in the public garden domain to establish and maintain children’s gardens as one of the primary areas to be experienced by visitors within the public garden’s boundaries called for a timely, vigorous exchange of ideas within the discipline (American Horticultural Society, 2005; Eastin, 2002; Mattern, 1999; Taylor, 1994). Understanding the perspectives of each of the stakeholders about what a children’s garden entails both physically and experientially is crucial (Partnership for Plant Based Learning, 2005; Taylor, 2003).

Contribution to Theory

This research was seen as a logical first step in moving the discussion between and among children’s garden stakeholders toward a progressive, academic discourse – all represented in an intelligent conversation about definitions, benefits to children and youth, recommended garden elements, the process of design, educational programming in the garden, and other vital issues in the field.
**Contribution to Practice**

In terms of practical application, the movement toward a progressive, academic discourse summarized above was viewed as an intended catalyst to constructive changes in the way children’s gardens are conceived, established and maintained. If nothing else, this research was intended to get children’s garden stakeholders contemplating the field’s fundamental issues so that all can have a working dialogue for productive discussion about theories and practices within the discipline.

**Definition of Terms**

It has been duly noted in this chapter that a definition of the construct of children’s garden has yet to be accomplished. Similarly, a definition of plant-based learning has thus far not been explicated. As this research was exploratory and descriptive in nature, well-defined variables were neither available nor appropriate. Themes around what a children’s garden is may emerge from the data collected from respondents; however, a definition was not offered a priori. I offered constitutive and operational definitions for the following key terms found throughout the study: children’s garden stakeholder, children’s garden element/feature, and visitor autonomy.

**Children’s Garden Stakeholder**

The constitutive definition of stakeholder was given as one who has a share or an interest, as in an enterprise; any party that has an interest in an organization ([www.dictionary.com](http://www.dictionary.com), 2005). In this research, the organization that people have an interest in is a children’s garden. The list of children’s garden stakeholders offered previously in this chapter - children’s garden educators, directors/administrators,
designers, visitors, and horticulturists - served as the operational definition of the term in this research. Generation of this definition came from the researcher’s years of working in the field, identifying the main stakeholders of a children’s garden experientially (Newman & McNeil, 1998). It must be noted that an individual could possibly serve as more than one children’s garden stakeholder by fulfilling several roles. It is possible for someone to design the garden, maintain it as the horticulturist, and offer programming as the educator; however, the occurrence of this multiple role situation has been fairly uncommon in my experience and most stakeholders identify with one primary role.

Children’s Garden Element/Feature

Various dictionaries gave the constitutive definition of element as a fundamental, essential, or irreducible constituent of a composite entity; a fundamental or essential part of the whole; a constituent part - with synonyms of component, ingredient, and factor (www.dictionary.com, 2005). Feature was defined as a prominent or distinctive aspect, quality, or characteristic; an especially prominent characteristic. The terms element and feature were used interchangeably throughout this research to mean a discrete part of the children’s garden as a whole. The literature tended to refer to an element in a more specific manner, such as speaking of a constructed item. The term feature in the literature tended to refer more broadly to a part of the garden, and was often preceded by an adjective such as water, as in water feature. The list of children’s garden elements/features from which respondents were asked to indicate importance served as the operational definition of children’s garden element/feature. As mentioned in Chapter 2, I condensed the list for increased ease of responding. For example, Zinnia and Petunia were subsumed under ‘annual flowers’. 
Visitor Autonomy

The constitutive definition of visitor autonomy required a combination of *visitor*- someone who visits – and *autonomy*- the quality or state of being independent, free, and self-directing. In this research, visitor autonomy constituted the level of being independent, free, and self-directing for someone who visits a children’s garden. The operationalization of this term necessitated the conceptualization of a continuum of autonomy. The question on the research instrument using a visual analog scale to collect data asked the respondent to visualize and indicate, on a scaled line, their preferred level of autonomy. The level of least amount of autonomy was indicated by completely programmed activity for a children’s garden visitor. The level of most autonomy was indicated by completely un-programmed activity for a children’s garden visitor. The remaining points of comparison on the continuum indicated blends of programmed and un-programmed activity for visitors.

Limitations and Delimitations of the Study

A distinction between limitations and delimitations was made here to highlight what was not within the realm of possibility for my research - limitations - and what was a deliberate narrowing of the frame of study - delimitations.

Limitations

As this research focused on children’s gardens in North America, the study sample did not include children’s garden stakeholders outside of North America (other than one or two attendees of the AHS Children & Youth Garden Symposium). Also, not
every stakeholder of every children’s garden in North America was accessible for this research study.

The review of the literature included works published only up to the summer of 2005. The survey of children’s garden stakeholders was conducted within a short time frame in the summer of 2005. Results of data collected reflected the thoughts, feelings, descriptions, and preferences from children’s garden stakeholders at that period of time.

Delimitations

The delimitations, or deliberate narrowing of the frame of the study, were mainly concerned with sampling. Accessibility was certainly one way that the population was delimited. I had access and permission to sample all of the attendees of the 13th annual AHS Children & Youth Garden Symposium. Similarly, I had contact information for and varying amounts of past personal interactions with the directors of the five children’s gardens chosen. However, as noted in Chapter 3, the guiding criteria for selecting children’s gardens to sample were: 1) possession of a children’s garden (or proposed children’s garden) within their boundaries, if not the entire garden; 2) variation in length of establishment of the children’s garden; 3) accessibility to each of the stakeholders of that children’s garden; 4) regional diversity; and 5) differing garden designers. The five well-known children’s gardens were chosen purposively to collect data from the roles [stakeholders] specified in this study and to compare and contrast with data collected from the AHS Symposium attendees. The sampling rationale was detailed in Chapter 3.

Qualitative data garnered from the research question “What is a children’s garden?” were collected for future exploration of this construct. To adequately address this research question, it was the determination of this researcher that a modified Delphi
technique would best be employed. Due to the lengthy process of iteration that is inherent in that methodology, the thorough exploration of the construct of children’s garden was left for future research endeavors. The main purpose of the inclusion of this research question was to generate thought on the part of respondents as to their individual conceptualizations of what a children’s garden is, and to initiate a dialogue between and among children’s garden stakeholders made aware of this research study. I look forward to plumbing the depths of this part of the research in time to come.

Assumptions

There were a number of assumptions that I, as the researcher, was compelled to identify and detail. First, I had to report about the critical thinking I engaged in as the researcher, the instrument, as a vital part of reflexivity in my research. Secondly, it behooved me to outline the reflection I employed throughout the entire process of this research study in regards to how the research was done, why, and how it could have been improved (Denzin & Lincoln, 2000; Wellington, 2000).

Reflexivity required an explicit recognition of the fact that I, as the social researcher, and the research act itself were part and parcel of the social world under investigation (Hammersley & Atkinson, 1983). Without becoming what Wellington (2000) called “…an excessively long, confessional, autobiographical account which includes unnecessary details” (p. 43), the following is offered as a brief description of my values, ideas, knowledge, motivation, and prejudices as they relate to this research study. At the time of this research, I was a 46-year-old, white, male Doctoral Candidate in the School of Natural Resources at The Ohio State University. I previously outlined my
professional experience in the arena of children’s gardens in this chapter and the various roles in which I have performed my duties. Through my work with children and youth, experts and advocates in children’s gardens, I adopted a positive attitude toward those experiences. An important assumption to mention is that my belief that there is definitely a place for education in a garden setting. Intuitively, I feel there are many benefits to children and adults through plant-based learning and I would not have explicated those benefits in Chapter 2 without this belief. One could argue that I should have addressed all of the costs or negative outcomes of plant-based learning in my meta-synthesis of the literature. The fact remains that I would not have chosen this research topic if I felt and thought that plant-based learning was detrimental to people. Another assumption is that the survey respondents were of like-mind in terms of children’s gardens being beneficial, and not harmful, to children and youth. Many respondents were working in the children’s garden field or were visitors to a children’s garden and I did not purposively sample children’s garden opponents, if many exist. Another point worth mentioning was the fact that I was viewed as an ‘insider’ in children’s gardening circles and thus may have had an effect on how data was collected and the data themselves. I assert that this allowed me greater access and facilitated the collection of valid data (Mertens, 2005). One last assumption - acquired by me mainly from past experiences - is that different children’s garden stakeholders, acting within different roles, have different perceptions of what a children’s garden is and should be. The survey instrument developed in this research study mirrored this assumption.
Summary

This chapter outlined the background of the research, and researcher, as an initial foray into the subject area. The need for research in children’s gardens and plant-based learning was described, as well as the statement of the research problem, purpose of the study, research questions and objectives, significance of the study, definition of terms, limitations and delimitations of the study, and research assumptions. Chapter 2 was a review and meta-synthesis of the literature, while Chapter 3 explicated various paradigmatic and methodological issues and actions for this research.
CHAPTER 2
REVIEW OF THE LITERATURE

He is happiest who hath power
To gather wisdom from a flower.
-Mary Howitt, 1847

The following review of the literature regarding children’s gardens incorporated works from history, philosophy, education, natural resources, health and nutrition, horticulture, art, design, and popular culture. The review first detailed the history of children’s gardening from ancient times to the current state of affairs explored in this research study. The numerous benefits ascribed to children from interacting and learning in garden settings were outlined, with an emphasis on the garden as an integrated context for the holistic development of children into adulthood. The approaches taken by numerous authors in describing the process of design for a children’s garden were examined, proffering research conducted in this area and synthesizing the essential elements recommended into a cited list.

History of Children’s Gardening

The study of gardening originated many years before Christ, when the great Persian king, Cyrus, laid out gardens in which the sons of noblemen were instructed in horticulture (Miller, 1904). During the early part of the sixteenth century, botanical
gardens were established in almost every important city with a university in Italy. Educators soon realized their importance. John Amos Comenius declared, “A school garden should be connected with every school where children can have the opportunities for leisurely gazing upon trees, flowers, and herbs, and are taught to enjoy them” (Miller, 1904; Subramaniam, 2002). In the seventeenth century, Jean Jacques Rousseau emphasized the importance of nature and school gardens in education. Later, Basedow included school gardens among educational agencies; Salzmann wrote that school gardens were laid out to instruct; and Johann Pestalozzi taught his wards through field and garden. In the nineteenth century, the Austro-Hungarian court decreed that a school garden was to be established, where practical, at every rural school. School gardens flourished throughout Europe, especially in Switzerland, France, Germany, Belgium, and Scandinavia (Hayzlett, 2004; Miller, 1904). Highly influenced by Rousseau and Pestalozzi, Friedrich Froebel established the first kindergartens in Germany with a very structured curriculum that emphasized a love for and study of nature. Not only were kindergarten children introduced to the natural environment, but each child was given a designated plot to grow a garden (Evergreen, 2000; Wellhousen, 2002). By 1905, Europe had more than 100,000 school gardens (Shair, 1999).

Throughout the first half of the [20th] century, children’s public and community gardens in the United States served primarily one of two purposes: either to be a utilitarian feature from which to learn, produce, and/or labor; or to be a whimsical place for children to play, grow, and/or discover. The latter half of the twentieth century saw the emphasis shift to learning, using the garden to teach science, nutrition, and environmental education through hands-on activities (Shair, 1999, p. 11).

The first school garden in America was established by H. L. Clapp at Boston’s Putnam School in 1891. Early in the twentieth century, children’s gardening was an
essential part of the Progressive era’s programs in America, and continued in importance through vocational instruction and the growing of food during the first and second world wars. Home and school garden associations promoting children’s gardening were well-established in cities like Boston, New York, and Cleveland, and spread as far as Puerto Rico and Honolulu. Even corporations, such as the National Cash Register Co. of Dayton, Ohio, established children’s gardens (Coffey, 2001a; Hayden-Smith, 2004; Meehan, 1994; Miller, 1904; Shair, 1999). The first children’s garden inaugurated at a major botanical garden in the world was at Brooklyn Botanic Garden in 1914 by Ellen Eddy Shaw (Eberbach, 1988; Stone, in Pesch, 1984). Children’s gardening was supported by a number of 20th century educators and social leaders - John Dewey’s educational progressivism, Maria Montessori’s education of the senses and moral development and appreciation of nature through gardening, Mahatma Gandhi’s belief that natural and rural environments are important educative contexts, and Patty Hill’s support of gardening in her traditional approach to teaching young children (Subramaniam, 2002; Wellhousen, 2002). Numerous children’s and youth programs for gardening were either established or broadened during WWI with the backing and encouragement of the federal government in the U.S. (Hayden-Smith, 2004; Meehan, 1994). Nevertheless, children’s gardens and outdoor school environments waned after WWI and their brief resurgence in the form of victory gardens during WWII was short-lived. Playgrounds and athletic fields replaced garden plots and schools became more focused on technology (Meehan, 1994; Subramaniam, 2002). It wasn’t until the increasingly alarming by-products of industrialization in America were broadly recognized that the burgeoning
environmentally conscious counterculture attracted new advocates for children’s gardens in the 1970’s and 80’s (Shair, 1999).

Current Trends

Urbanization and industrialization have taken natural habitats away from children. In urban and suburban areas, the outdoors is dominated by cars and other vehicles, limiting the range of exploration available to children. Cars, along with crime and hazardous litter, make playing outdoors risky in some neighborhoods. Small yards and little green space means less land for play. Outdoor play may also be restricted by lack of adult supervision because parents are working. Television, video games and the computer keep children occupied indoors (Cheskey, 2001b; Louv, 2005; Orr, 2002; Patterson, 1999; Rivkin, 1997; Walker, 1999).

Too many children today have stopped moving. In industrialized countries and in affluent, middle-class communities across the world, children are spending too much time indoors with television, computers, and video games, rather than exercising their bodies in outdoor, free-play activity. In the United States, where these trends are the most advanced, childhood obesity has become a major health issue...The negative consequences for children’s health are dramatic (Moore & Wong, 1997, pp 89-90).

In the formal education arena, a landmark British study in the mid to late 80’s called Learning Through Landscapes was the first systematic investigation of school ground naturalization. Based upon hundreds of observations of school grounds being naturalized, researchers found a wide range of positive outcomes for the children attending the schools, the most important of which was the effect of the hidden curriculum conveyed by the school environment (Billmore et al., 1999; Evergreen, 2000; Lucas, 1994, 1995). In 1995, Delaine Eastin, former Superintendent of Instruction for the state of California, initiated a ‘garden in every school’ initiative and there have been
significant strides forward in creating outdoor learning environments for children in schools (Shair, 1999).

At the 1992 annual meeting of the American Association of Botanical Gardens and Arboreta (AABGA), Jane L. Taylor inspired staff and directors of botanical gardens and arboreta around the U.S. to establish interactive children’s gardens. As the co-founder and first curator of the 4-H Children’s Garden at Michigan State University, Taylor collaborated with Dr. Alice Whiren in conducting educational research used in designing the garden, making plants the central feature and relevant to children’s everyday lives. In addition, the garden was designed with physiological and developmental appropriateness for very young children into early adolescence. In its opening year, the 4-H Children’s Garden received more than 10,000 visitors per week (Taylor, 1994). Visitation now averages about 250,000 per year, with many visitors returning several times a week. Taylor observed, “Children’s gardens draw visitors, giving you the opportunity to educate – the whole purpose of many institutions” (Mattern, 1999). In a similar fashion, the Children’s Garden at Longwood Gardens was designed with a behavioral approach based upon findings from playground, phenomenal landscape, and garden research. Children’s developmental needs, perceptions, and preferences were taken into direct account in the design process (Eberbach, 1988).

In a discussion of marketing to children, Benfield & Benfield (1999) attributed much of the increased interest in and success of children’s gardens in the U.S. to changing demographics and American’s associated changing tastes. The 36-some million children between the ages of 5 and 16 represent about 15% of the U.S. population
and possess significant spending power and the ability to carry strong leisure preferences into their adult years, offering both short and long-term benefits to public gardens.

*Increasing visitation numbers and financial gain are not the only rewards of bringing children into gardens. Gardens and museums that reach out to the next generation through children’s programming are working to preserve the past, enhance the present, and ensure their future. Today’s visiting children are tomorrow’s stewards, and creating an atmosphere that encourages multi-generational interaction and learning could be the single most important step your garden can take in order to guarantee success on many levels in years to come. Including children and families in your gardens will pay off with interest (Benfield & Benfield, 1999, p. 17).*

In the same issue of AABGA’s *PublicGarden* magazine, Victoria Mattern noted the explosion of children’s gardens either recently established or being installed in the U.S. She suggested that the new wave of children’s gardens reflected a shift in the way public gardens view their young visitors and educational programming for them. Catherine Eberbach, then Director of Exhibitions at The New York Botanical Garden explained, “Children and families were underrepresented in public gardens until we [public gardens] realized that this is an important audience. It also became clear that we could reach and keep this audience by using interactive exhibits and landscapes through which kids have the freedom to explore on their own.” (Mattern, 1999, p. 3).

*Landscape architects and designers, teachers and botanic gardens consider the "children's garden" as one of the strongest trends in gardening. Begun nearly 10 years ago, it continues to generate interest and does not appear to be slowing down. This is attributed to the fact that this inter-generational environment has so many opportunities within its green borders: helping children develop social skills, enhancing school curricula, bringing families together, and an awareness of the link between nature and our food, clothing and shelter, to name just a few. Children's gardens replace the free exploration of the natural world that no longer occurs in today's era of TV's, video games and concern over safety (American Horticultural Society, 2005).*

Despite the current trend toward creating more children’s gardens in schools and at public gardens in the U.S., it is not a completely rosy picture for children’s gardens or
their advocates. The contemporary emphasis on intellectual development through conceptual dissection and standardized testing has produced a significant loss of teaching and learning through plant-based activities (Wellhousen, 2002). Complicating this issue for supporters of children’s gardens is the lack of definition of what garden based learning entails (Partnership for Plant Based Learning, 2005).

Benefits to Children through Garden-Based Learning

The children’s garden movement is supported and fueled by a dynamic interface that relies upon an interdisciplinary theoretical effort in the social, behavioral, developmental, ecological and agricultural sciences. A number of theoretical frameworks and their applications support the shift towards incorporating garden systems within the basic educational curriculum. Children’s gardens serve as a natural context for experiential and project based learning that is vital to learner-centered pedagogy. Additionally, children’s gardens and age appropriate activities in community gardens provide stimulating educational environments for youth to learn important life skills explicated within positive youth development theories (U.S. Peace Corps, 1998; Subramaniam, 2003). Educators and change agents have found children’s gardens to be an effective context in which to teach about sustainability theory through environmentally sustainable practices, ecology and environmental science. Social justice and social change theories have also been broached within a children’s garden context by encouraging a perspective where success may be defined as personal growth and progress in learning, support is given to local empowerment for individuals and communities, and
there is active promotion of cultural preservation, local self-sufficiency, and cultural participation (Subramaniam, 2003).

The study of children’s gardens, when couched in terms of environmental education research, is by its very nature interdisciplinary. Environmental education is often linked with science education; however, it also requires understanding within economics, math, geography, ethics, language, politics, and other subjects. As nearly any subject can be taught in the integrated context of a children’s garden, so can environmental education concepts be integrated throughout the entire curriculum (Braus & Wood, 1993; Disinger, 1998).

Garden-based learning offers a real-life context for integrated learning, which provides a vehicle for higher order thinking, construction of knowledge, and the development of analytical and synthesis skills (Drake, 1998; Hayzlett, 2004; Subramaniam, 2002). Outdoor classroom activities can address Gardner’s multiple intelligences theories of teaching and learning. Children’s gardens have discernible benefits, and have been noted as providing mainly informal, but also formal and non-formal, learning for children and people of all ages (Olien, in Line & Moran, 2001). Activities and learning in a garden encourages fine and gross motor skills, instills inquiry-based education, and teaches science through horticulture; the programming appeals to a wide audience that includes, but is not limited to, children; visitors to the garden develop a greater understanding of the roles that plants and animals play in our everyday lives, and develop aesthetic appreciation for the earth and its gardens (Conley, 1999). The many benefits to children through garden-based learning are detailed in the following sections.
People/Plant Connections

*Earth is a plant-oriented planet. The green plant is fundamental to all other life* (Janick, 1992, p. 19). *Horticulture must increase in importance, in schools, in homes, in communities, to underscore the interconnectedness of the living world and to improve the beauty and the quality of life here on earth* (ibid, p. 27).

Charles Lewis eloquently detailed the essential connection between people and plants throughout human history. He noted that chlorophyll, the lifeblood of plants, and hemoglobin, the life blood of humans, have almost identical structures, with only the core atom varying from magnesium to iron, respectively. People, especially children, are genetically predisposed to physical and mental connections with nature, gardens, and plants. Important aspects of gardening for humans are psychological well-being, greater socialization, community development, intergenerational bonding, and a sense of interconnectedness. Reintroducing green nature into cities through gardens and tree plantings can increase social harmony, communication, friendship, self-esteem, patience, learning, grounding, and healing. Plants are a vital component of therapy and rehabilitation, restoration, the arts, and medicine (Lewis, 1992, 1994, 1996).

The critical relationship between humans and green nature has, in modern life, been severed, fouling the very nest that gave us life. Drug and alcohol abuse, rape, robbery, assault, pregnancy, and teen suicide are all on the rise and listed as the top problems facing teachers in the 90’s. The increasing symptoms of dysfunction are, in part, a consequence of the mismatch between innate human physiological and neurological needs and the results of technical prowess and the modern view of nature solely as a resource. *Plants are telling us the story of the universe of which we are a part. But will we listen?* (Lewis, 1996, p. 134).
Some hypotheses suggest that humans are evolutionarily “hardwired” to affiliate with natural environments; there is an essential and fundamental need for human beings to connect with and create various memories through activities and experiences within natural environments. Developmental and intelligence theories suggest that children are naturally curious and predisposed to explore the natural world at an early age. The younger the child the more he or she learns through sensory and physical activity (Kellert & Wilson, 1993; Orr, 2002; Rivkin, 1997; Subramaniam, 2002).

Children have a natural affinity towards nature. Dirt, water, plants, and small animals attract and hold children’s attention for hours, days, even a lifetime – so eloquently portrayed by Robert Pyle [1993]. This conclusion, drawn from observations of children over many years, supports the ‘biophilia hypothesis’ of biologist E. O. Wilson [1984], which suggests that humans are genetically programmed to be drawn to nature – not surprising, since we are an integral part of the natural system (Moore & Wong, 1997, p. 202).

Wonder & Enchantment

A number of authors have expressed a strong belief in the wonder and enchantment that children, youth, and even adults can find in gardens and outdoor environments. The following quotes best illustrate the main points they make:

_A garden is also a place of fantasy: in wendy houses, tree houses and dens children can create a whole world of their own. In so many children’s stories, it is in the garden that the magic happens_ (Bryan, 1986, p. 11).

_The experience of wonder no less than that of the sublime makes up part of the aesthetics of rare experiences. Each depends on moments in which we find ourselves struck by effects within nature whose power over us depends on their not being common or everyday_ (Fisher, 1998, p.1).

_Gardening is enjoyed by adults because of the sense of creation we gather from bringing something from the garden to the dinner table. But gardening can also be an incredibly powerful experience for children. Just imagine the look of wonder on your children’s faces as they discover new abilities or skills or finally understand a concept that previously escaped their comprehension_ (Richardson, 1998, p. 5).
To be enchanted is, in the moment of its activation, to assent wholeheartedly to life – not to this or that particular condition or aspect of it but to the experience of living itself. Moreover, these momentary experiences, as they accumulate, can have salutary effects on the background sense of being that informs daily life (Bennett, 2001, pp. 159-160).

There is, for example, the encounter with plants that, in response to an overabundance of aphids on their leaves, call ladybugs to their rescue by means of a language of chemical scents. Such behavior turns out to be but one of the many ways in which plants possess a kind of agency. Plants participate in interpreting their environment at a level well below that of human interpretations but in a way that nevertheless bears a family resemblance to it, thus belying our claims to uniqueness. Or, consider the amazing ant, whose ability to navigate around obstacles and to work collectively provides a model for computer scientists seeking to design Internet, telephone, and air traffic routing systems… (Bennett, 2001, p. 170).

Almost every author of books and articles about children’s gardens speaks passionately about the joy, wonder, and enchantment that children, youth, and adults alike can experience in the garden.

Play

There is a significant segment of experts that assert the importance of play in overall human development; however, the lack of deep connection and understanding by adults in the design of play environments has been catalogued as well.

Nowhere is this limitation of adult sensibility more apparent then in the way adults provide for children’s play (Lambert, 1974, p. 11).

The adventure playground is free space, space where children can do things they are normally prevented from doing. There is a whole world of difference between this and the ‘familiar, dull, unimaginatively equipped, asphalted, flat squares or rectangles’ (Joseph, 1970) provided by most local authorities (Lambert, 1974, p. 14).

The nature of play, as far as the adult world is concerned, is that it is incidental. When we set out to provide for a child’s play, we are already encroaching on his world…Our job is simply to allow them the space and scope they need to [play] (Lambert, 1974, p. 155).
To design a play environment for children is to design cities, buildings, parks, roads, and utilities from the point of view of children (Senda, 1992, Preface).

Building on the work of many others in the field of social research, I make the following four assumptions. First, play is the way children learn and is an essential part of their growth and development. Second, play is not limited to young children. Adults engage in play as an essential experience throughout the life cycle. Third, playing outside is an intrinsic need because it provides a uniqueness of experience that cannot be offered elsewhere. Finally, play environments are educational settings (Stine, 1997, p. 17).

Within the arena of children’s gardening, there is a growing movement to specifically allow for free-flowing, open-ended play as a vital means of discovery and learning. With the increase of the ever-more regimented and programmed lives of children in developed countries, there is a clarion call for wild and native areas in which children and youth can manipulate, create, ponder, and interact with natural elements. This movement is rooted in the philosophical notions of the concept of nature and natural education proposed by Rousseau, Goethe, and Humboldt (Cheskey, 2001b; Francis, 1994; Hart, 2004; Hermand, 1997; Louv, 2005; Lovejoy, 2005).

The Environment as Integrated Context for Learning

The Environment As an Integrating Context (EIC) Model developed by State Education and Environment Roundtable (SEER) interconnects best practices in education into an instructional tapestry that improves student achievement by using local natural and community surroundings as a context for learning [and] ...has been found to improve student’s standardized test scores in all subjects, reduce discipline problems, and improve teacher satisfaction (Rushing, 2004, pp. 142-143).

Over a ten-year span of time, Moore & Wong (1997) observed an array of benefits to students of various ages after converting an asphalted schoolyard into an environmental yard. The greening of the formally sterile area brought a variety of vegetation that facilitated an active, hands-on playing and learning style that
encompassed formal, informal, and non-formal learning. The authors found that gardens are unsurpassed as vehicles for interdisciplinary environmental education and allow for a range of varied physical activities; gardens actualize growth and change and cyclic trends; they provide a venue for limitless interaction and imaging by children; water provides an extraordinary stimulus for playing and learning; and small animals are valuable as learning resources and provide a healthier habitat. The environmental yard created a sense of place and positively influenced children’s attitudes towards their school experience. The natural environment encouraged the development of gross and fine motor skills among others, and the sensory power of the natural environment aided cognitive development. Children will carry the process of socialization forward if given settings they can appropriate and respect, fostering peaceful coexistence. The diverse settings stimulated children to explore and discover, record, communicate, express, and apply new knowledge to other contexts and issues and problems. The learning process of science can be greatly strengthened by studying live events in authentic natural settings; the expanded range of indoor-outdoor learning settings accommodated a wider range of learning styles; a far broader scope of experiences and cultural development can be addressed in a hands-on style impossible on a regular abiotic site; and animated, natural settings reinforced the principles of accessibility, adaptation, and integration for children with differing mental and physical abilities as well as children from diverse ethnic and cultural backgrounds. Benefits of the environmental yard were not limited to current students of the school. Community members enhanced collective efforts and out-of-school use of the space reminded the community of childhood values. Former (graduated) school children indicated the long-term benefits to individual development,
to social integration, and to the growth of deeply embedded environmental values. In
summarizing the valuable influence of the environmental yard on the students, the school
in general, and the community, the authors enthusiastically expressed their beliefs that
education in a natural environment holds the promise of escape from hedonistic,
egocentric, present-centered lifestyles.

In a broad-ranging report from the Evergreen Foundation (2000), numerous
studies were cited as examples of the benefits of naturalized school grounds, some of
which specifically included school gardening activities. Among the many student
benefits from naturalized school grounds were enhanced general health, more meaningful
play and learning, safer and less hostile outdoor environments, more gender-neutral play
spaces, lower exposure to toxins, experiential learning opportunities, improved academic
performance, greater pride and ownership in learning, a chance to participate in
democracy, better understanding of cultural differences, creation of sense of place.
Teacher and school benefits included new curriculum connections, increased morale and
enthusiasm for teaching, increased engagement and enthusiasm for learning exhibited by
students, reduced discipline and classroom management problems, reduction of antisocial
behavior on school grounds, better connections to community, and increased pride in
school. Lastly, the community benefits listed were stronger sense of community,
increased community satisfaction, banked social capital, creation of healthy land ethic
and environmental citizenship, better community health, active involvement of parents in
children’s school, improved natural environment, and possible financial savings.

Expanding upon the research and practical applications espoused by the Learning
Through Landscapes organization, the British government’s department for education
and employment published a bulletin explicating the benefits that can be reaped from using school grounds as an outdoor classroom. The fact that this environment supports and enriches the entire school curriculum and education of all pupils was especially prominent. Educational use of school grounds was reported as providing relevant, first hand experiential learning opportunities throughout the school curriculum - including English and language, math, science, technology and design, information technology, physical education, geography, environmental education, history, religious studies, drama and art, music, pupils with special needs, gifted children, and informal play and socialization (Billmore et al., 1999).

Gardens that are integrated into school resource use planning can compost food and yard waste, and teachers can use the garden in a hands-on manner to teach basic ecological principles, science, math, social studies, art, music, and much more (Kirschbaum, 1999; The Green Schools Initiative, 2005).

In an inner-city elementary schools garden project in San Antonio, 300 Master Gardeners established 105 gardens by 1993, serving well over 10,000 elementary school children in the San Antonio area. The Master Gardeners hypothesized that real-life experiences in a garden environment could positively assist children in dealing with family problems, drive-by shootings, gangs, poverty, and chaos they found in their neighborhoods. Interviews with children, parents, teachers, administrators and the Master Gardeners assigned to each garden revealed six predominant themes: moral development, academic learning, parent/child/community interactions, pleasant experiences, the influence of the Master Gardener, and perceived problems. The data indicated overall that the children learned moral lessons, had opportunities to enhance
their normal curriculum, and gained pleasure from their successful labors and increased interaction with parents/adults. In short, the children learned to value living things and to handle the anger that comes from having valued things harmed by neglect or violence (Alexander, North, & Hendren, 1995; Hayzlett, 2004).

Similarly, in a case study of elementary school children who participated in the creation and development of a learning garden in Iowa, the children and teachers had positive responses about their garden experiences through several themes, such as increased academic benefits, greater aesthetic value/public relations, improved responsible citizenry/connectedness/ownership, increased parent/child/ community interactions, decreased plant blindness, and intended maintenance/ownership/continuation (Hayzlett, 2004).

A biologically rich environment stimulates the senses and the imaginations of children. This natural curiosity and imagination are nurtured when the garden is part of an integrated curriculum.

A study of 40 schools in the United States in which the environment is used as an ‘integrating context for learning’ (Closing the Achievement Gap, 1998), convincingly demonstrates the pedagogical advantages of this approach. Of the 252 teachers who participated in the study, the majority reported that when the natural environment was the context for hands-on, project-based learning, student performance improved in the following areas: standardized test scores, grade point average, willingness to stay on task, adaptability to various learning styles, and problem-solving (Bell, 2001, p.9).

**Holistic development**

Tilling the soil, planting a seed, creating a nature trail, feeding the birds – it all seems lightly anachronistic at a time when the real, serious purpose of education, we hear, is to prepare young people to compete in a high-tech, global economy. Of course the real purposes of education are both broader and deeper than this, and...a great many of them can be met in an outdoor classroom (Grant & Littlejohn, 2001, Introduction).
Numerous studies have asserted that direct and indirect experiences of nature, including specifically children’s gardening, has been and may continue to be a critical component in human physical, emotional, intellectual, and even moral development (Chambers, Johansson, & Walcavage, 1995; Davis, 1994; Foster, 1917; Hefley, 1973; Johnson & Tunnicliffe, 2000; Kahn & Kellert, 2002; Louv, 2005; Lucas, 1994, 1995; MacLatchie, 1977; Miller, 1904; Moore & Wong, 1997; Ocone, 1983; Rivkin, 1997; Skelly & Zajicek, 1998). Gardening for children can: create a long-lasting deeply held environmental ethic, help students to connect with nature in very profound ways, imbue a holistic sense, give an immediate and direct connection to our food source, give students a feeling of accomplishment, and nurture a sense of community (Pivnick, 2001; Tilgner, 1988). It can also make valuable connections between disciplines or subject areas such as science, math, and social studies, foster science literacy, improve the behavior and attitude of young people, and provide a wholesome activity that keeps all kids engaged (Eames-Sheavly, 1999). Environment-based education can teach kids science and nurture creativity while fostering environmental stewardship (Billmore et al., 1999; Louv, 2005).

In an international survey of a cross-section of educators regarding the applications and uses of garden-based learning in rural and urban areas, Daniel Desmond and Jim Grieshop from the University of California, Davis, found the following applications in various cultures around the world:

1) Academic skills – core academic training, especially in science and math; real world hands-on experiences; enrichment of core curriculum in language arts; supporting standards based education in countries with national or regional education standards.
2) Personal development – add sense of excitement, adventure, emotional impact and aesthetic appreciation to learning; improve nutrition, diet and health; teach the art and science of cooking; re-establish the celebratory nature of shared meals.

3) Social and moral development – teach sustainable development; teach ecological literacy and/or environmental education; teach the joy and dignity of work; teach respect for public and private property.

4) Sustainable development – gardens are the appropriate venue to introduce children to the interconnections that link nature to economic systems and society.

5) Vocational education – gardens represent a historic and contemporary model for developing vocational skills in agriculture, natural resource management, and science.

6) Vocational and/or subsistence skills – teach basic skills and vocational competencies; produce food and other commodities for subsistence consumption and trade.

7) Life skills – teach about food and fiber production; engage youth in community service and environmental care; engage youth in lessons of leadership and decision-making.

8) Community development – gardens often serve as a focal point for community dialogue capacity building and partnerships; gardens often organize individuals for action for water delivery, cooperatives, and transportation.

9) Food security – gardens can address hunger at the individual, family, and community levels through planning, growing, and sharing; gardens can be the beginning point for teaching and developing food policy.

10) School grounds greening – gardens provide practical productive strategies to transform sterile school grounds into attractive and productive learning centers; hands-on activities in outdoor classrooms make learning more interesting while demonstrating other benefits such as decreased absenteeism and discipline problems (Subramanian, 2003, p. 8).

In the Executive Summary of a white paper commissioned by the Partnership for Plant-Based Learning, three reasons were offered for employing plant-based education in grades K-12: 1) the vital but often overlooked importance of plants ecologically and in human history, 2) the strength and diversity of the connections between the study of
plants and the core standards of a number of academic disciplines, and 3) the importance of the benefits of the human connection with nature, and the critical role that plants play in this connection. A survey of active plant-based learning programs found that survey respondents felt their programs utilized many of the strategies of the best practice social constructivist model. Common goals of the programs included inquiry and problem-solving, understanding specific science concepts, stewardship, life skills, encouraging high-level thinking, understanding of native habitats, health concepts, environmental awareness, lifelong love of gardening, and creating wildlife spaces (Lewis, 2004; Partnership for Plant Based Learning, 2005).

Childhood experiences of gardens and gardening can contribute to the four characteristics which, according to Hungerford and Volk, are best predictors, when all are present, of acting responsibly toward the environment: environmental sensitivity or empathy, in-depth knowledge of specific issues, personal involvement in change, and self-confidence regarding action skills (Chawla, 1994). Both passive and active interactions with plants during childhood are associated with positive adult values about trees. The strongest influence came from active gardening, such as picking flowers or planting trees as a child (Lohr & Pearson-Mims, 2005).

*Every child should have mud pies, grasshoppers, water bugs, tadpoles, frogs, mud turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade, water lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of his education* (Quote by Luther Burbank, 1929, as found in the Hershey Children’s Garden, Cleveland Botanical Garden – Heffernan, 2004)
Interpersonal skills

The garden classroom provides opportunities for children to learn interpersonal skills by interacting cooperatively with other children on project-based activities. Working on collaborative projects, students learn to communicate with their peers, use democratic principles and work together toward common goals (Lieberman & Hoody, 1998). Students in a one-year school gardening program increased their overall life skills by 1.5 points compared to a group of students that did not participate in the school gardening program, and positively influenced the constructs of working with groups and self-understanding (Robinson & Zajicek, 2005). In the case of community gardens, children learn about their communities by interacting with elders. This includes opportunities to interact and learn about people in their communities who represent cultures different than their own. Working, playing and learning in a neighborhood community garden setting helps children develop a sense of community awareness and social justice (Krasny, 2004). Social activities and service projects are intended outcomes of some garden-based curricula. Garden experiences have a positive effect on interpersonal relationships and attitudes toward school (Walicek, Bradley, & Zajicek, 2001), as well as the development of nurturing behavior in young children (Green, 1994). Alexander, North, & Hendren (1995) found delayed gratification, independence, cooperation, self-esteem, enthusiasm/anticipation, nurturing living things and exposure to role models from different walks of life were evident moral benefits of school gardening. Other references note the importance of gardening in channeling aggressive behaviors.
through physical work, managing impulsive behavior through the delayed gratification inherent in gardening, and increasing frustration tolerance in learning to deal with the unexpected and uncontrollable aspects of gardening (Davis, 1994; Evergreen, 2000; Mattson, 1992).

Teachers everywhere acknowledge that enriching students’ outdoor learning environment reduces anti-social behavior such as violence, bullying, vandalism, and littering...Over the years, decreases in juvenile delinquency have been reported during periods of school and community gardening (Coffey, 2001a, p.3).

Cognitive skills

Studies of schools and other groups that use garden-based curriculum have shown an increased interest in science and improved science test scores by students. In a survey of adult program coordinators using the Junior Master Gardener (JMG) curriculum across the country, 85% said that JMG increased children’s interest in science. In the same survey, 95.8% of the respondents rated school gardening as a somewhat or very successful teaching tool (Boleman & Cummings, 2004). A study of an inner-city youth gardening program found that the gardening activities provided opportunities to gather significant factual and practical science knowledge that was very context-specific (Rahm, 1999). In a Louisiana study of JMG curriculum, the results showed that even once weekly use of gardening activities and hands-on classroom activities improved science achievement test scores (Smith, 2003).

In a mainly qualitative study of 40 schools in 13 states with environment-based education (broadly defined as using a school’s surroundings and community as a framework for learning; may include schoolyard habitats, schoolyard gardens, community gardens, etc.) teachers and administrators reported increased knowledge and
understanding of science content, concepts, processes, and principles; better ability to apply science to real-world situations; and greater enthusiasm and interest in learning science. These students also scored higher, on three of four comparative studies of standardized science achievement data, than their peers from traditional programs (Lieberman & Hoody, 1998). In the same study, educators reported improved understanding of mathematical concepts and content; better mastery of math skills; and more enthusiasm for studying math than students in the traditional programs. Environment-based learning helped the students recognize the practical value of math for quantifying and understanding the world around them (Lieberman & Hoody, 1998).

Another study conducted with third, fourth, and fifth grade students showed that those students who participated in school gardening activities scored significantly higher on science achievement tests compared to students who did not experience garden-based learning activities (Klemmer, Waliczek, & Zajicek, 2005).

In a study conducted by Barbara Sheffield (1992), she attempted to measure the cognitive and affective effects of an interdisciplinary garden-based curriculum on underachieving elementary students. In a five-week summer program, one group was taught through the garden-based program, while a control group received traditional methods. The group taught through the garden-based program outperformed the control group in general information, reading recognition, reading comprehension, and total reading (Kirschbaum, 1999; Sheffield, 1992).

After surveying and interviewing teachers and staff of a career center with a children’s garden in Ohio, Bauer (2002) found that the majority of the teaching staff at the center felt the garden was a key learning component for the students and community.
While only a third of staff agreed that test scores increased specifically because of the garden, 83% agreed that it provided an outdoor learning environment tied to the county curriculum. Qualitative interviews revealed an attachment and involvement by staff that yielded a pride in their garden and the support it received from students and the community at large (Bauer, 2002).

A biologically rich environment stimulates the senses and the imaginations of children. This natural curiosity and imagination can be further nurtured when flora and fauna are part of an inquiry-based approach to teaching and learning (Mills & Donnelly, 2001). One of the fundamental principles of creating a culture of inquiry is allowing learners to pursue their own questions, not taking away their questions and giving them someone else’s (O’Keefe, 2005). Children can explore their own lines of inquiry in a natural environment by planting seeds and exposing them to scientific experimentation, gaze at insects through magnifying glasses, test water quality, observe the life cycle of amphibians, gauge the weather, and monitor bird migration.

Garden-based learning has been particularly beneficial in environmental education, ecoliteracy, and teaching scientific concepts. Gardens are used as knowledge-building tools in the Down-to-Earth Program (DTE) and have had an impact on increased knowledge of the scientific method, plants, fertilizer, and pests; and positive attitudinal and behavior changes, increased awareness, and facilitation of higher order thinking processes (Subramaniam, 2003). Educational use of school grounds was reported as having positive affects on student attitudes towards their environment and can help pupils to be better informed, responsible, and enterprising (Billmore et al., 1999).
Other cognitive benefits to children and youth attributed to learning in a garden setting consist of language skills, including learning English as a second language (Billmore et al., 1999; Davis, 1994; Purdy, in Pesch, 1984; Miller, Heimlich, & Daudi, 1999), problem-solving skills (Bell, 2001; Davis, 1994), critical thinking and decision making (Louv, 2005), learning to work independently (Davis, 1994), and enhancement of concentration levels and attention spans (Bell, 2001; Davis, 1994).

Improved Nutrition & Health

Nearly half of the 54 million children that attend public school in the U.S. obtain breakfast, lunch, and/or after school snacks through the National School Lunch Program. The alarming increase of diet related disease among school age children is being connected in part to the quality of meals eaten at school. Budgetary constraints have frequently compelled school districts to serve the unwanted surplus of industrial agriculture. For example, in 2002 USDA spent $338 million on surplus cheese and beef for school meals and only $159 million on fruits and vegetables. In addition, the overwhelming majority of K-12 schools allow soft drinks, high sugar drinks, candy, and high fat foods to be sold in vending machines, cafeterias, or other on-campus sites. Childhood obesity has been directly attributed to physical inactivity and diet (Orr, 2002; The Green Schools Initiative, 2005).

The American Dietetic Association, Society for Nutrition Education, and American Food Service Association (2003), in a position paper on comprehensive school health programs, view the garden as an ideal learning laboratory for enhancing the school environment, reinforcing nutrition education and providing physical activity. Similarly, The Green Schools Initiative (2005) supports children’s gardening as a creative way to
teach health, nutrition, and the environment. In 1995, the California Department of Education inaugurated a ‘Garden in Every School’ program, in part because research had shown a clear connection between nutrition and learning. Children are ready to learn and better able to achieve their fullest potential if they are well nourished and healthy. Gardening activities enhanced the quality and meaningfulness of children’s learning on a wider level, with a number of additional benefits. The Department’s Nutrition Education and Training Section observed five benefits of garden-based nutrition education: building bridges between school and community, promoting transfer of information from one generation to another, developing environmental awareness in students by caring for a living environment, providing opportunities for cultural exchange, and building life skills (California Dept. of Education, 2003; Kirschbaum, 1999). In a project that involved integrating nutrition and gardening among children in grades one through four, the outcomes have gone well beyond an understanding of good nutrition and the origin of fresh food, to include enhancing the quality and meaningfulness of learning (Canaris, 1995).

The results of a partnership between the 5-A-Day and Team Nutrition programs showed vegetable gardens to be an important part of an integrated approach to improve the consumption of fruits and vegetables by elementary school children (Miller & Rhoades, 1999). Improvement in attitudes towards the consumption of fruits and vegetables by children participating in the Junior Master Gardener curriculum has been documented. In the JMG survey cited earlier, 63.8% of the respondents stated that youth tried new fruits and vegetables as a result of their participation in the JMG program (Boleman & Cummings, 2003). In a separate study out of Texas A&M University, as a
result of the Nutrition in the Garden program, children’s attitudes towards fruits and vegetables became significantly more positive, as well as an increased likelihood they would choose fruits and vegetables as snacks (Lineberger & Zajicek, 2000). Several researchers have noted that school gardens serve as the ideal context for nutritional programs and have conducted studies that demonstrate that children who plant and harvest their own vegetables are more willing to taste and like them (Morris, Briggs, & Zidenberg-Sherr, 2000).

Exposure to nature has been shown to alleviate stress and promote health (Cheskey, 2001a; Davis, 1994; Elliott, 1978; Ulrich & Parsons, 1992; Van Horn et al., 1993). Through her seminal book *The Ecology of Imagination in Childhood* (1977), Canadian researcher Edith Cobb demonstrated that vibrant mental health in the adults that she interviewed was closely linked to creativity. She further concluded that creative expression is rooted in a child’s relationship with the complexity, plasticity, and manipulability of the natural world (Cobb, 1977; Evergreen, 2000). Richard Louv (2005) reported that thoughtful exposure of youngsters to nature can be a powerful form of therapy for attention-deficit disorder, depression, obesity and other maladies.

**Children’s Garden Design**

The discipline of landscape architecture has undergone an evolution over the last half century, with changing demands and needs initiating reconsideration in the ways in which the design activity is understood and taught, as well as the discipline’s approach to theory. In “Theory in Landscape Architecture: A Reader” (Swaffield, 2002), numerous distinguished authors outline current issues and trends within landscape architecture.
While this book and several other excellent resources informed this research (Murphy, 2005; Siciliano, 2005; Simonds, 1998; Wolschke-Bulmahn, 1997), the focus of this section was narrowed specifically to children’s garden design and design for outdoor environments for children and youth. As noted earlier, there is a trend in the U.S. for public gardens to establish a children’s garden as one of, if not the primary, featured areas for exploration by visitors and this topic was viewed as a timely one by this researcher. The following section briefly describes the approaches taken by numerous authors in describing the functionality of children’s gardens, the process of design in that arena, and recommended elements within children’s gardens. Elements are offered in a synthesized list that cites numerous sources.

There have been a significant number of authors writing about children’s gardens that have offered their opinions on design considerations and elements that should be included within the garden. These are discussed in the following section. The authors in this chapter have had innumerable hours of interaction with children and youth in garden settings. Their collective wisdom is immense. For the sake of brevity, and to get to the root of what are the critical design considerations in creating a children’s garden and the essential elements that are recommended they contain, I have attempted to lump all within a meta-synthesis of children’s garden authors. Four main approaches to the discussion of children’s garden design emerged from the literature. One approach used was functionality - the activities in which children and youth would engage in an outdoor environment, or should be able to engage, were most emphasized; the essential elements noted were portrayed through their respective functions. Another approach was procedural – the steps one would take in order to effectively design a children’s garden.
A third approach was structural – specific elements and features within a children’s garden were listed. Lastly, many authors included parts of each of these three approaches – functional, procedural, and structural – in a mixed approach to children’s garden design. In all of the approaches, physiological considerations and developmental stages of young people were used as overarching guidelines in the recommendations offered.

**Functional approach**

A significant number of authors couched their recommendations for the design of children’s outdoor learning environments in terms of the activities that could be pursued within the space and the numerous skills enhanced through interaction. The age-appropriate experiences for children should provide for a wide range of movement, contain great variety and levels of complexity, stimulation of all the senses, and address safety and comfort issues. The elements contained within the outdoor learning environment should allow for a range of activities that enhance psycho-motor skills, acquisition of knowledge, and increased social skills. Fine motor skills, gross motor skills, manipulation and alteration, construction, observation, exploration, art, language, problem-solving opportunities, social and domestic role play, cooperation, and others were listed (Cheskey, 2001a; Coffey, 2001a; Eames-Sheavly, 1999; Jansson, 1984; Rushing, 2004; Schaal, 1994; Steele & Wright, in Pesch, 1984; Taylor, in Mattern, 1999; Van Horn et al., 1993; Wellhousen, 2002; Whiren, 2004).

Senda (1992) depicted design elements and features in terms of maximizing their effectiveness in allowing for children’s play within an outdoor learning environment. Fundamentally, there must be a place to play, time to play, friends to play with, and an
understanding of what they actually do. The design of space and equipment for play

takes the following criteria into consideration:

- There must be a circulation of play. That is, there must be a clear flow of
  movement which comprises one big activity.
- The process must be safe but rich in variety.
- The process must not be singularly patterned and must have shortcuts and
  bypasses.
- The process must entail symbolic high places.
- The process must contain parts where children can experience ‘dizziness’.
- The process must offer large and small gathering places.
- The process as a whole must not be closed. It must be open and have a number of
  access routes.

Senda (1992) went on to list six types of spaces as play environments for children:

- Nature spaces – spaces endowed with trees, water, and living creatures are the
  spaces most basic and important to children’s play.
- Open spaces – these are extensive spaces where children can run around to their
  hearts’ content.
- Road spaces – roads are where children meet each other and they serve as a
  network connecting various bases for play.
- Adventure spaces – these are spaces full of confusion, such as rubbish dumps and
  construction sites. They serve to stimulate children’s imagination.
- Hideout spaces – the bases children make and keep secret from their parents and
  teachers. Children grow up through this experience of having independent spaces
  unknown to their parents and other adults.
- Play structure spaces – these are spaces which have play structures as their
  medium. They will have a growing importance as places where play can be
  concentrated and as symbolic playgrounds (pp. 97-98).

Stine (1997) suggested that outside spaces for children and youth be analyzed as

to whether a range of dimensions is present or absent. The nine dimensions noted by

Stine were elements/activities that promote play in a child’s physical environment and

contain a distinct duality for children to identify and differentiate between:

- Accessible and inaccessible,
- Active and passive,
- Challenge/risk and repetition/security,
- Hard and soft,
Roger Hart has consistently lobbied for wild experiences for children; areas of natural feel where children can construct and build and run and discover. These can be whole natural areas or wild parts of more formally designed children’s gardens (Hart, 1994, 2004). Similarly, Francis (1994) and Cheskey (2001b) called for less design in our children’s lives, allowing them more free-flowing exploration of natural or wild areas.

Employing a functional approach, but on a much more specific level, Robin Moore (1993) eloquently outlines the role of plants in children’s outdoor learning environments - and even plants as play settings:

*Plants can be designed into many different types of play settings, but they should also be considered as play settings in and of themselves. Individually, collectively, or in combination with people-made elements, different types of plants can greatly extend the range of play activity: collecting plant parts, climbing and playing in trees, hide-and-seek games, and general exploration. Together with soil, sand, and water, plants provide manipulative settings that are quite different than the static, unchangeable character of fixed play structures* (Moore, 1993, p. 3).

He goes on to detail the function of plants in the design of children’s outdoor environments:

- Enclosure – the size, shape, and enclosure of play spaces can be enhanced by being wholly or partially defined with plants.
- Identity – distinctive plantings and specimen plants provide visual identity and a sense of place to children’s environments.
- Movement – the experience of movement through play areas can be greatly enhanced by using plants in relation to topography.
- Climbing – tree-climbing is universally popular.
- Play props – vegetation supplies a wide variety of play resources that children can harvest for themselves.
• Programmed activities/education – plants can be used to support many different program activities that require spatial diversity and a stimulating atmosphere.

• Accessibility/integration – plants settings can create intimate, touchable spaces that are accessible to children with disabilities and therefore offer particular advantages as integrated settings.

• Landmarks – objects with a clear visual identity, such as trees, large rocks, and aquatic features, function as landmarks.

• Seasonal change – plants mark the passing of the seasons and introduce children to a sense of time and natural processes.

• Wildlife enhancement – it is important for children to interact with wildlife as an environmental education resource. Plants support wildlife by providing essential food and shelter.

• Climate modification – because plants are so varied, they provide a greater range of microclimate choice than people-made structures.

• Environmental quality – plants in play areas are an important determinant of environmental quality. Erosion, for example, is a common problem in children’s play areas.

• Use of native and introduced species – the most important reason to consider native species for play areas is that they are key components of the ecological and cultural heritage of the local region, and offer children highly significant experiential learning opportunities.

• Drought resistance – interaction with these plant communities can have an important educational impact on children, giving them knowledge necessary to make conservation-based decisions as adults (Moore, 1993, pp. 5-10).

**Procedural approach**

Stine (1997) contends that a better understanding of the process of creating a children’s space is needed. The designer has a brief and intense relationship to the environment. The users and maintainers of the space develop a relationship to the space over time. Teachers and maintainers inherit the consequences of a designer’s fleeting creative involvement. The child seeks rich, sensory experiences in the space and opportunities to manipulate and mess about. S/he is all about the active and the now.

The designer is viewed as a past participant, the teacher and maintainers of the space have to focus on the future, and the children are the now players.
The three players in the creation of a setting, the maker, the maintainer, and the messer, are approaching from different viewpoints, operating at different points in time that are potentially in conflict with each other. The mess and disorder currently being created by the playful child may drive the teacher and the visually trained designer to distraction (Olwig, 1990). The adult’s emphasis on future issues of appearance may severely limit the child’s opportunity to actively explore within the setting…The thinking and concepts of a past design process may be lost and no longer available as catalysts for currently needed physical changes. These three players are discrete parts of a whole, operating within different but overlapping time frames. Like a component of an ecosystem, they must be interrelated but also have lives of their own. Each player’s diversity of thought, action, role, skills, and viewpoint should enhance the other’s experiences. At times, they will be in conflict, but through an understanding of the different roles, values, and expectations, better collaboration and, ultimately, solutions to the creation of outdoor educational settings for children is possible (Stine, 1997, p. 10).

Stine (1997) further explains the role of the designer: In a thoughtful process, the designer takes into account what exists and provides an opportunity for the players to express themselves, to be effective, and to feel empowered. The designer’s role is a critical part of the triangle of players who together create a place that goes beyond the narrow and timid to encompass the ‘enchantments of childhood.

It is important to note that many children’s gardens are designed and maintained to satisfy adult perceptions and values. Children’s ideas add a dimension to the design process for gardens that is much needed and often neglected. Design of children’s gardens should be based upon knowledge of child development, preferences, and activities (Eberbach, 1988).

Learning Through Landscapes was formed in the UK in 1990 to address the essential need for children to have healthy, natural outdoor school environments. Their five guiding principles are mainly procedural in nature, and take into account the importance of children’s views and preferences in the design process:
School grounds have a significant impact on children’s development,
Any changes to school grounds, if they are to be successful, must involve the children,
Developing school grounds should be a ‘holistic’ effort, meaning the widest possible involvement in the process and in the definition of the formal and informal and hidden curriculum that takes place there,
The development of a school ground is a multi-professional activity (i.e., involving parents, children, teachers, administration, landscape architects, architects, artists, and ecologists), and
School grounds should be developed in a sustainable way (Lucas, 1995).

Expanding on the Learning Through Landscapes principles, Billmore et al. (1999) recognized the importance of an interdisciplinary, procedural approach to designing, establishing, and maintaining outdoor environments at schools. The designer, educators, maintenance staff, pupils, and parents must all be involved in the process – with a key element of training for each of these stakeholders. In this way, each player in the process is aware of the other’s perspective and competent in allowing for many, varied aspects of and influences on the outdoor environment.

Structural approach

The approach of some authors to the discussion of children’s garden design was a structural one. The references mainly listed specific elements, but occasionally referred to some elements or features in more general terms. For example, themed gardens were recommended rather than specifically listing all the elements one might find in a Peter Rabbit garden. Again, physiological aspects and developmental stages of young people were often used as guidelines.

Four significant studies in the literature stressed direct observation or interaction with children and youth to find out what they, the ultimate stakeholders, viewed as essential in a children’s garden experience. Although one could argue that the approach
taken by the researchers was mixed – noting functional aspects of children’s garden
design, emphasizing the incorporation of children’s views into the design process, and
listing concrete elements mentioned by the children - I included it here because the
structural elements that children viewed as essential to a children’s garden were most
prominent.

In a 1987 study, Catherine Eberbach asked 178 first through fifth-grade students
from urban and rural elementary schools to visually describe (draw) what a garden is, and
verbally describe their drawings. What arose from these interactions is a basis for
gardens from a child’s point of view, what children would like gardens to be, and what
garden features and elements are important to children. Garden drawings illustrated
distinct developmental characteristics, such as the use of labels by older, more
linguistically sophisticated students, and whether visuals were centrated (few garden
elements and almost exclusive focus on plants from younger students) or decentrated
(greater diversity of elements as well as non-plant features from older students). Garden
classification fell into ornamental, functional, and combined. Most importantly for this
study was the identification and frequency of landscape elements in the children’s
drawings, listed by grade level. The following table (Table 2.1) shows them clearly:

<table>
<thead>
<tr>
<th>Elements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>22</td>
<td>21</td>
<td>67</td>
<td>43</td>
<td>175</td>
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<tr>
<td>Animal</td>
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<td>10</td>
<td>29</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td>Water feature</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>10</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Building</td>
<td>1</td>
<td>--</td>
<td>3</td>
<td>5</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>Pathway</td>
<td>--</td>
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<td>1</td>
<td>9</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>Fence</td>
<td>--</td>
<td>2</td>
<td>3</td>
<td>14</td>
<td>5</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 2.1. Frequency of landscape elements in children’s drawings, listed by grade level
(Eberbach, 1987)
Table 2.1 continued

<table>
<thead>
<tr>
<th>Elements</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
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<td>Plant Label</td>
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<tr>
<td>Garden Tool</td>
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<tr>
<td>Person</td>
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<tr>
<td>Trellis</td>
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<tr>
<td>Bridge</td>
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</tr>
<tr>
<td>Scarecrow</td>
<td>3</td>
</tr>
<tr>
<td>Statue</td>
<td>--</td>
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<tr>
<td>Plant Stake</td>
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<tr>
<td>Swing</td>
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<tr>
<td>Airship</td>
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<tr>
<td>Seed</td>
<td>--</td>
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<tr>
<td>Plant Pot</td>
<td>--</td>
</tr>
<tr>
<td>Amusement Ride</td>
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<tr>
<td>Boat</td>
<td>--</td>
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<tr>
<td>Tennis Court</td>
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<tr>
<td>Window Box</td>
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<tr>
<td>Plant Light/Stand</td>
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</tr>
<tr>
<td>Rocks</td>
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<tr>
<td>Beehive</td>
<td>--</td>
</tr>
<tr>
<td>Ladder</td>
<td>--</td>
</tr>
<tr>
<td>Topiary</td>
<td>--</td>
</tr>
</tbody>
</table>

Table 2.1. Frequency of landscape elements in children’s drawings, listed by grade level (Eberbach, 1987)

Plants obviously ranked first, with almost every student including them in their drawings. The 2% of students that graphically omitted plants included them in their verbal descriptions of the drawings. Animals, using a broad interpretation, ranked second. This included birds, insects, snakes, and fish in active participation in the garden – eating, bathing, and nesting. Water elements ranked third and evoked a feeling of movement. Buildings ranked forth and may represent an attempt by the children to relate gardens to their home environments.

Some of the conclusions drawn from this study were that plant selection should generally favor those with ornamental qualities, not excluding vegetable plants and those
grown for utility; preferences of students in different grade levels should be considered when gardens are planned, with vegetables and fruits being much more interesting to first graders than older students; use bright bold colors freely; activity is important, such as running water and animal/human activities; and garden details should be at a child’s level and easily accessible (Eberbach, 1987, 1988).

Furthermore, Eberbach offers guidelines in the design process for children’s gardens. Age and developmental level must be identified and accommodated. Scale is incredibly important, an example of which is the fact that children’s diminutive size creates far greater interest by them in the floorscape. Children should have the feeling of possession of their space and the freedom to manipulate objects. Aesthetically pleasing gardens are as vital to children as adults. Bright and bold color use is integral. Activity is the unifying theme of landscape elements. Plant variety to stimulate the sensory experience is essential. Balance of static and loose components creates a range of play and exploration. Places to pause and/or gather, accessibility to the children, a place for adults, privacy for children, and age and size-appropriate interpretation are also mentioned as important guidelines in designing gardens for children (Eberbach, 1988).

At the very least, a well-designed children’s garden would address the following: 1) children understand what gardens are and have an aesthetic preference; 2) perceptions of gardens are shaped by a child’s cognitive development; and 3) activity is used to understand a garden and the child’s place in the garden (Eberbach, 1992).

In creating the renowned 4-H Children’s Garden at Michigan State University (MSU), children enrolled in the MSU Laboratory School in two locations were asked what plants and features they wished to see when they visited the newly established
garden. Suggestions included plants from Peter Rabbit stories, many-colored flowers, a tree house, a beanstalk for Jack to climb, vegetables, dinosaurs, and butterfly watching. The children’s suggestions were then incorporated into the nearly 60 theme gardens within the 4-H Children’s Garden (Taylor, 1994).

Johnson & Tunnicliffe (2000) observed primary school children while visiting botanical gardens in Britain. Primarily what they observed and recorded were the conversations between the children while visiting the gardens. The following is what the children talked about most: 1) Sensory elements – sight (including color, size, shape), smell, touch, hearing, taste; 2) Pertaining to a garden – plant names, plant parts, life cycles, gardening, knowledge about gardens/gardening in general, animals in gardens; and 3) Affinity – specific affinity, similes, family connections. Adults rarely cued pupils into meaningful dialogue or pointed out features of educational interest (Johnson & Tunnicliffe, 2000).

During the design process initiated for the creation of the Hershey Children’s Garden at the Cleveland Botanical Garden (CBG), school children and youth were asked what they wished to see in the garden when it was finished. The elements that they conveyed included: 1) plants – apple trees, watermelons, grapes, corn, strawberries, tomatoes, grass; 2) animals and insects; 3) structures – tree houses, fences; 4) water – ponds, waterfalls (Heffernan, 2004). After completion of the garden, the following were the main elements incorporated into the Hershey Children’s Garden: 1) grand entrance area with fountain court; 2) natural woodland – tree house, pond, bridge, bird garden and bird blind, dinosaur garden, and rock-climbing wall; 3) cultivated garden area – grass patch, child’s cottage, prairie meadow, vegetable and fruit gardens, herb garden,
International Garden, evergreen maze, root-view cabinets, compost bins, digging pit, and scrounger’s garden (a recycled container garden); and 4) plants met the following criteria – interest and delight children; ensure maximum color, fragrance, and interest from early spring through fall; include as many native plants as possible; are hardy and drought-tolerant; and come from local nurseries (Heffernan, 2004).

Many authors offered specific elements as being essential in the design of outdoor learning environments and children’s gardens. The following table (Table 2.2) shows the elements and/or features that emerged from the literature. Rather than arrange elements from most-frequently mentioned to least-frequently mentioned, the table lists them alphabetically and includes the authors citing the particular element. This list of children’s garden elements was condensed and used in the instrument of this research to elicit responses as to the importance of the elements to each of the respondents in Table 2.2 below.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Authors</th>
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<tbody>
<tr>
<td>Adventure playground/play structures</td>
<td>Elliott, 1978; Moore &amp; Wong, 1997; Senda, 1992</td>
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<tr>
<td>Amusement ride</td>
<td>Eberbach, 1987</td>
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<tr>
<td>Animals/pets</td>
<td>Billmore et al., 1999; Bryan, 1986; Eberbach, 1987; Guinness, 1996;</td>
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<td>Heffernan, 2004; Johnson &amp; Tunnicliffe, 2000; Lucas, 1994; Moore &amp; Wong,</td>
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<td></td>
<td>1997; Reese &amp; Striniste, 2003; Senda, 1992</td>
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<tr>
<td>Art (multi-media)</td>
<td>Eames-Sheavly, 1999; Rushing, 2004; Taylor, in Mattern, 1999</td>
</tr>
<tr>
<td>Bathrooms</td>
<td>Taylor, in Mattern, 1999; Whiren, 2004</td>
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<tr>
<td>Bean house/bean stalk</td>
<td>Chevron, 1974; Reese &amp; Striniste, 2003; Taylor, 1994</td>
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<tr>
<td>Beans/scarlet runner bean</td>
<td>Bales, 1996; Chevron, 1974; Hershey, 1995; Whiren, 2004</td>
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<tr>
<td>Berries/fruits</td>
<td>Billmore et al., 1999; Eberbach, 1987; Heffernan, 2004; Hershey, 1995;</td>
</tr>
<tr>
<td></td>
<td>Lovejoy, 1999; Whiren, 2004</td>
</tr>
<tr>
<td>Boat</td>
<td>Eberbach, 1987</td>
</tr>
<tr>
<td>Bridge</td>
<td>Eberbach, 1987; Gordon, 1972; Heffernan, 2004; Pennington, 2001; Rushing,</td>
</tr>
<tr>
<td></td>
<td>2004</td>
</tr>
<tr>
<td>Broccoli</td>
<td>Richardson, 1998</td>
</tr>
<tr>
<td>Building</td>
<td>Eberbach, 1987</td>
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Table 2.2. Children’s garden elements/features cited by authors
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<th>Elements</th>
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<tbody>
<tr>
<td>Bulbs – Bales, 1996; Billmore et al., 1999; Reese &amp; Striniste, 2003</td>
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<td>Bulletin board - Subramaniam, 2003</td>
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<tr>
<td>Butterflybush - Bales, 1996</td>
<td></td>
</tr>
<tr>
<td>Carrots - Bales, 1996; Hershey, 1995; Lovejoy, 1999; Richardson, 1998</td>
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<tr>
<td>Celery - Richardson, 1998</td>
<td></td>
</tr>
<tr>
<td>Chinese lanterns - Bales, 1996</td>
<td></td>
</tr>
<tr>
<td>Cleome - Bales, 1996</td>
<td></td>
</tr>
<tr>
<td>Climbing frame - Guinness, 1996</td>
<td></td>
</tr>
<tr>
<td>Cockscobs - Bales, 1996</td>
<td></td>
</tr>
<tr>
<td>Compost/vermicululture - Billmore et al., 1999; Coffey, 2001b; Eames-Sheavly, 1999; Heffernan, 2004; Hershey, 1995; Kirschbaum, 1999; Life Lab Science Program, 1997; Lovejoy, 1999; Lucas, 1994; Mahar, 2001; Richardson, 1998; Rushing, 2004; Subramaniam, 2003; The Green Schools Initiative, 2005</td>
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<tr>
<td>Containers (of various size) – Billmore et al., 1999; Eberbach, 1987; Elliott, 1978; Heffernan, 2004; Lovejoy, 1999; Rushing, 2004</td>
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<tr>
<td>Corn - Heffernan, 2004; Hershey, 1995; Lovejoy, 1999; Lucas, 1994; Richardson, 1998</td>
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<td>Cucumbers - Hershey, 1995; Richardson, 1998</td>
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<tr>
<td>Dinosaur – Taylor, 1994</td>
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<td>Dried perennials/annuals - Bales, 1996</td>
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<td>Elevation (varying) – Billmore et al., 1999; Gordon, 1972; Moore &amp; Wong, 1997; Rushing, 2004; Senda, 1992</td>
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<td>Entrances - Billmore et al., 1999; Moore &amp; Wong, 1997; Senda, 1992; Stout, 2001</td>
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<tr>
<td>Evening primroses (Oenothera sp.) - Lovejoy, 1999</td>
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<tr>
<td>Fences – Billmore et al., 1999; Chevron, 1974; Coffey, 2001b; Eberbach, 1987; Heffernan, 2004; Jaffe &amp; Appel, 1990; Lucas, 1994; Moore, 1993; Rushing, 2004; Steele &amp; Wright, in Pesch, 1984; Stout, 2001; Taylor, in Mattern, 1999; Whiren, 2004</td>
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<td>Flower beds – Billmore et al., 1999; Bryan, 1986; Eames-Sheavly, 1999; Guinness, 1996; Moore &amp; Wong, 1997; Steele &amp; Wright, in Pesch, 1984</td>
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<tr>
<td>Foam pits – Gordon, 1972</td>
<td></td>
</tr>
<tr>
<td>Four-o-clocks - Bales, 1996; Lovejoy, 1999</td>
<td></td>
</tr>
<tr>
<td>Game settings (multi-purpose) – Billmore et al., 1999; Guinness, 1996; Moore &amp; Wong, 1997</td>
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<tr>
<td>Gathering/meeting areas – Coffey, 2001b; Eames-Sheavly, 1999; Eberbach, 1987, 1988; Moore &amp; Wong, 1997; Rushing, 2004; Senda, 1992; Taylor, in Mattern, 1999; Whiren, 2004</td>
<td></td>
</tr>
<tr>
<td>Globe amaranth - Bales, 1996</td>
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</tr>
<tr>
<td>Gourds - Bales, 1996; Hershey, 1995; Lovejoy, 1999</td>
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<td>Dunn, 1994; Heffernan, 2004; Steele &amp; Wright, in Pesch, 1984</td>
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<td>Hideaways/enclosure</td>
<td>Billmore et al., 1999; Eames-Sheavly, 1999; Lovejoy, 1999; Moore, 1993; Moore &amp; Wong, 1997; Rushing, 2004; Senda, 1992; Steele &amp; Wright, in Pesch, 1984; Taylor, in Mattern, 1999</td>
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<tr>
<td>Hen house</td>
<td>Lucas, 1994</td>
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<tr>
<td>Hollyhocks</td>
<td>Lovejoy, 1999</td>
</tr>
<tr>
<td>Impatiens</td>
<td>Bales, 1996</td>
</tr>
<tr>
<td>Lawn/grass areas</td>
<td>Billmore et al., 1999; Bryan, 1986; Elliott, 1978; Heffernan, 2004; Gordon, 1972; Guinness, 1996; Kientiz &amp; Kent, 1996</td>
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<tr>
<td>Lemon verbena</td>
<td>Lovejoy, 1999</td>
</tr>
<tr>
<td>Lettuce/leafy greens</td>
<td>Hershey, 1995; Richardson, 1998</td>
</tr>
<tr>
<td>Love-in-a-puff</td>
<td>Bales, 1996</td>
</tr>
<tr>
<td>Marigolds</td>
<td>Hershey, 1995</td>
</tr>
<tr>
<td>Maze</td>
<td>Billmore et al., 1999; Chevron, 1974; Heffernan, 2004; Lucas, 1994; Taylor, in Mattern, 1999</td>
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<tr>
<td>Melons</td>
<td>Heffernan, 2004; Hershey, 1995; Richardson, 1998</td>
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<tr>
<td>Mimosa</td>
<td>Lovejoy, 1999</td>
</tr>
<tr>
<td>Money plant</td>
<td>Bales, 1996</td>
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<tr>
<td>Moon vine</td>
<td>Bales, 1996; Lovejoy, 1999</td>
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<tr>
<td>Morning glory</td>
<td>Bales, 1996</td>
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<tr>
<td>Nasturtium</td>
<td>Bales, 1996; Lovejoy, 1999</td>
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<tr>
<td>Onions (Allium sp.)</td>
<td>Lovejoy, 1999</td>
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<tr>
<td>Orchard</td>
<td>Billmore et al., 1999; Lucas, 1994</td>
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<tr>
<td>Painted stumps</td>
<td>Eames-Sheavly, 1999</td>
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<tr>
<td>Paths/walkways/stepping stones</td>
<td>Billmore et al., 1999; Coffey, 2001b; Eames-Sheavly, 1999; Eberbach, 1987; Lovejoy, 1999; Moore &amp; Wong, 1997; Pennington, 2001; Richardson, 1998; Rushing, 2004; Senda, 1992; Steele &amp; Wright, in Pesch, 1984; Stout, 2001; Subramaniam, 2003; Taylor, in Mattern, 1999; Whiren, 2004</td>
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<td>Patio/terrace</td>
<td>Billmore et al., 1999; Bryan, 1986; Reese &amp; Striniste, 2003</td>
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<td>Peas</td>
<td>Richardson, 1998</td>
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<tr>
<td>People</td>
<td>Eberbach, 1987; Stout, 2001</td>
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<tr>
<td>Performance area</td>
<td>Billmore et al., 1999; Guinness, 1996; Moore &amp; Wong, 1997; Reese &amp; Striniste, 2003</td>
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<td>Pest management items</td>
<td>Richardson, 1998; Subramaniam, 2003</td>
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<tr>
<td>Petunias</td>
<td>Hershey, 1995</td>
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<td>Pinwheels</td>
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<td>Plant label/stake</td>
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<td>Plant light/stand</td>
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<td>Eames-Sheavly, 1999; Eastin, 2004; Eberbach, 1987; Elliott, 1978;</td>
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<td>Gordon, 1972; Guinness, 1996; Hart, 2004; Heffernan, 2004; Hershey,</td>
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<td></td>
<td>Lovejoy, 1999; Moore, 1993; Moore &amp; Wong, 1997; Patterson, 1999;</td>
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<td></td>
<td>Reese &amp; Striniste, 2003; Richardson, 1998; Rushing, 2004; Steele &amp;</td>
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<td>Wright, in Pesch, 1984; Taylor, 1994; Whiren, 2004</td>
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<td>Playhouse/den – Bryan,</td>
<td>1986; Guinness, 1996</td>
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<td>Playpens - Lovejoy, 1999</td>
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<td>Potatoes – Lovejoy, 1999;</td>
<td>Richardson, 1998</td>
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<td>Potting bench - Rushing, 2004</td>
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<td>Pumpkins – Bales, 1996;</td>
<td>Eames-Sheavly, 1999; Eastin, 2004; Eberbach, 1987; Elliott, 1978;</td>
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<td>Gordon, 1972; Guinness, 1996; Hart, 2004; Heffernan, 2004; Hershey,</td>
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<td>Lovejoy, 1999; Moore, 1993; Moore &amp; Wong, 1997; Patterson, 1999;</td>
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<td>Reese &amp; Striniste, 2003; Richardson, 1998; Rushing, 2004; Steele &amp;</td>
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<td>Wright, in Pesch, 1984; Taylor, 1994; Whiren, 2004</td>
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<td>Radishes – Bales, 1996;</td>
<td>Hershey, 1995; Lovejoy, 1999</td>
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<td>Raised beds – Eames-Sheavly, 1999; Elliott, 1978; Chev</td>
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<td>ron, 1974; Richardson, 1998; Rushing, 2004; Taylor, 1994</td>
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<td>Rocks – Billmore et al., 1999; Chev</td>
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<td>Root-view cabinet -</td>
<td>Heffernan, 2004</td>
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<td>Sand pits/digging pits –</td>
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<td>2004; Moore &amp; Wong, 1997</td>
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<td>Scarecrows – Bales,</td>
<td>1996; Eames-Sheavly, 1999; Eberbach, 1987; Hershey, 1995; Richardson,</td>
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<td>1994; Lucas, 1994; Reese &amp; Striniste, 2003; Whiren, 2004</td>
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<td>Kent, 1996; Lucas, 1994; Pennington, 2001; Rushing, 2004; Subramaniam,</td>
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<td>2003; Taylor, in Mattern, 1999; Whiren, 2004</td>
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<td>Security/emergency</td>
<td>telephone/first aid – Billmore et al., 1999; Eames-Sheavly, 1999;</td>
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<td>Sunflower house - Bales, 1996;</td>
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<td>Sunflowers - Bales, 1996;</td>
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<td>Guinness, 1996</td>
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<td>Swing - Eberbach, 1987;</td>
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<td>Tables – Taylor, in Mattern, 1999</td>
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<td>Teepee - Bales, 1996</td>
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<td>Teaching area - Jaffe &amp; Appel,</td>
<td>Life Lab Science Program, 1997; Moore &amp; Wong, 1997; Rushing, 2004;</td>
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<td>1990; Life Lab Science Program,</td>
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<td>1997; Moore &amp; Wong, 1997;</td>
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<td>1998; Taylor, 1994; Whiren, 2004</td>
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<td>Temporary features – Elliott, 1978</td>
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<td>Rushing, 2004; Subramaniam, 2003</td>
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<td>Topiary – Bryan, 1986; Eberbach, 1987; Hammer, 1994</td>
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<td>Trees/woodland - Billmore et al., 1999; Chevron, 1974; Guinness, 1996; Hart, 2004; Heffernan, 2004; Lovejoy, 1999; Lucas, 1994; Maslin, 1994; Moore, 1993; Moore &amp; Wong, 1997; Senda, 1992; Steele &amp; Wright, in Pesch, 1984</td>
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<td>Vertical structures - Billmore et al., 1999; Eames-Sheavly, 1999; Eberbach, 1987; Moore &amp; Wong, 1997; Rushing, 2004; Taylor, in Mattern, 1999</td>
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<td>Vistas - Chevron, 1974</td>
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<td>Weather station - Billmore et al., 1999; Lucas, 1994; Rushing, 2004</td>
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<td>Wildlife - Bales, 1996; Cheskey, 2001b; Coffey, 2001b; Eberbach, 1987; Francis, 1994; Moore, 1993; Pennington, 2001; Reese &amp; Striniste, 2003; Rushing, 2004; Stout, 2001; Subramaniam, 2003; Taylor, 1994</td>
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<td>Woolly lamb’s ear - Bales, 1996; Lovejoy, 1999</td>
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<td>Zinnia - Bales, 1996; Hershey, 1995</td>
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Table 2.2. Children’s garden elements/features cited by authors

Within the process of further synthesis of this list, some elements were condensed for presentation in the questionnaire used in this research. For example, Cleome, Zinnia, petunias, and several other flowers were subsumed under the one element of Annual flowers (see Appendix A).

Mixed approach

As mentioned previously, a number of authors included aspects of function, process, and structure together in their approaches to the discussion of children’s garden design. The following two sources provide good examples of this mixed approach in that they highlight all these aspects of children’s garden design through their listed criteria.

Designing a garden for kids:

- Know your audience – who visits? Research, read, and readjust your brain.
- Fit your niche – grow what is local, grow and show themes unique to your immediate geographical area.
- Big is not better – child’s scale! Seating, benches, tables all should be kid-sized.
- Contain the entire area – gives children ownership and a feeling of security for parents.
- Create mini-green worlds – enchantment, magic. Mazes, arbors, tunnels of vines and gourds, sunflower houses, weeping trees, etc.
- Plant take-away ideas – families can use in their home gardens.
- Details are dynamite – kids see it all up close and personal. Detail the walks, create peep holes in fences.
Interactive displays are paramount – each display should draw children in to look closer or ‘do’ something.

Stifle the Latin names – keep the language simple. Nothing should be above 3rd grade reading level.

Dazzle young visitors with a rainbow of color – bright and cheery.

Reach out to kids through their stomachs – they love to learn about the vegetables and foods they eat every day. Make the connection between plants and people.

Gardens are for people of all ages and abilities – make sure access is not denied to those in wheelchairs, using canes or walkers, or moms with strollers. Provide stroller parking lots, family bathrooms with diaper changing areas, and drinking water.

Create an ageless landscape for the young and young at heart – don’t limit by age range.

Have FUN – most important part of the process. You’re never too old to have a happy childhood (Jane L. Taylor, in Mattern, 1999, p. 8).

As a frequent collaborator with Jane L. Taylor, Dr. Alice Whiren designated a thorough list of criteria based upon research findings and literature within child and youth development:

- Clarify the purpose of the garden and the ultimate consumers most likely to benefit from it.
- Plan for the health & safety of the children from the beginning – easy efficient access to water, cluster drinking fountain and toilet facilities, toilets should have changing tables, provide acceptable seat for children to eat, enclose the garden with vegetation or effective fencing, select and maintain plants with safety in mind, provide clear deep boundaries for water features, and provide access to emergency telephone and first aid.
- Provide quality maintenance – maintain beds in good order, remove trash and empty containers.
- Design for optimal sensory experiences – all senses, plant mini-gardens for variety in vegetation and a variety of sensory experiences.
- Design for small groups, individuals, and class size groups.
- Design from the child’s point of view.
- Layout the garden with full understanding that you’re providing cues for behavior (ex: a gully is to clamber into and out of), boundaries and pathways should be very clear and lead children to learning and discovery, select artifacts with care.
- Plant so the cycle of life becomes more transparent.
- If possible, design activity sites where children can investigate.
- Keep signs consistent with the purpose of the garden.
- Development and learning are outcomes of experience and maturation; new development is based on earlier development (Whiren, 2004).
Summary

The review of the literature outlined the history of children’s gardening from ancient times to the current state of affairs explored in this research study. The many benefits to children from interacting and learning in a garden setting were detailed, with an emphasis on the garden as an integrated context for the holistic development of children into adulthood. Lastly, the design process for creation of a children’s garden was examined to highlight the approaches taken by numerous authors, as well as the essential elements recommended be included in the gardens. Chapter 3 offers initial comments regarding paradigm and methodology, and describes the instrumentation, data collection, sampling procedures, and data analysis employed within this study.
CHAPTER 3

METHODOLOGY

Footfalls echo in the memory
Down the passage which we did not take
Towards the door we never opened
Into the rose garden.
-T.S. Eliot, 1944

Research is one of many ways of knowing or understanding. It is a process of systematic inquiry that is designed to collect, analyze, interpret, and use data to understand, describe, predict, or control an educational or psychological phenomenon or to empower individuals in such contexts (Mertens, 1998, p. 2).

As described in Chapter 1 of this document, the purpose of this research was to review and synthesize existing studies and resources delineating the benefits to children from experiences in gardens and/or plant-based learning, to initiate the exploration of the construct of children’s garden, to elicit what the essential elements of a children’s garden should be from various stakeholders, and to ascertain stakeholder perceptions concerning the autonomy of visitors in accessing and utilizing a children’s garden. The first research objective was tackled in the literature review with a meta-synthesis of benefits to children from plant-based learning and children’s garden experiences. The second research objective of initiating exploration of the construct of children’s garden was discussed in Chapter 1 in the context of personal experiences at annual Youth Garden Symposia hosted by the American Horticultural Society (AHS) and the first Congress of the
Partnership for Plant Based Learning in 2004. The delimitations of this study presented in Chapter 1 noted that further exploration of the children’s garden construct was planned as future research and not one of the objectives to be met within the scope of this endeavor. The third research objective of eliciting from stakeholders what the essential elements of a children’s garden should be was chiefly approached in Chapter 2 with a meta-synthesis of the literature to determine what elements and features were recommended by various authors and organizations. The remaining process of pursuing this research objective was explicated later in this chapter. Similarly, the fourth and last research objective of ascertaining stakeholder preferences concerning the autonomy of visitors in accessing and utilizing a children’s garden was briefly discussed in both Chapters 1 and 2, and further explicated in this chapter by thoroughly detailing the methodology of this research study.

Paradigm and Methodology

I felt a need to make a few comments and observations about paradigm at the outset of this chapter. One could make an argument that the reporting of assumptions in Chapter 1 sufficed for this purpose; however, I wished to expand a bit by citing literature in the education and environmental education fields that discuss paradigm and methodology in educational research.

If we agree that educational inquiry is multi-paradigmatic there is no need to fuse, no reason or need to find compromise, but there is a need to value different perspectives, assuming that knowledge is a social construction of communities of inquirers operating from various paradigmatic perspectives (each shaped by their unique distinct meta-theoretical and methodological assumptions) (Robottom & Hart, 1993, p. 16).
Gough & Reid (2000) contend that it is not enough to accept the existence of multiple research perspectives if one maintains an underlying view that the perspective with the best assumptions will ultimately be proved right. What may truly advance the efforts of environmental education researchers is to acknowledge that nobody knows what actions by researchers might best serve either education or the environment, by accepting the existence of socially-constructed *multiple* truths. “Arguments about the “goodness” of alternative paradigms simply must stop. The key to using any method of inquiry rests with the validity of the research itself and not which paradigm is used” (Hungerford, in Smith-Sebasto, 2000).

There has been a wide-spread mistake to equate the terms quantitative and scientific, as if they were synonymous. Quantitative data can be an important part of education research without it mimicking the sciences or somehow being positivist. In actual educational research, there is often an overlap or mixture of approaches. During data collection, most methods in educational research will yield both quantitative and qualitative data, which can compliment each other. Methods can and should be mixed (Teddlie & Tashakkori, 2003; Wellington, 2000). It has always been my contention that the research question dictates methodology – what Teddlie & Tashakkori (2003) call “the dictatorship of the research question.” How does one best collect data to answer the question posited? How do I explore the phenomenon I wish to study in a manner that will yield the richest data? Matching methods to specific questions and purposes of research falls into what Mertens (2005) illustrates as the pragmatic paradigm in education and psychology research; mixed methods can be very useful if they provide better opportunities for answering the research questions (Teddlie & Tashakkori, 2003).
This study relied upon grounded theory in that the guiding substantive theory emerged from (was grounded in) the data. Grounded theory is well suited as an exploratory methodology to investigate problems for which little theory has been developed (Denzin & Lincoln, 2000; Merriam & Simpson, 1984; Wellington, 2000). Grounded theory approaches aim to develop theory from the researcher’s engagement with the data rather than test preconceived theory against data collected for that purpose (Glaser & Strauss, 1967; Gough & Reid, 2000; Denzin & Lincoln, 2000; Wellington, 2000; Wiersma, 1995). Bryman & Burgess (1994) note that grounded theory approaches are often characteristic of only a particular phase or aspect of a research study (Gough & Reid, 2000).

In employing survey research for a significant portion of my research, there was a consistent effort by me to follow many of the recommended guidelines in the concept of total survey design (Dillman, 1978; Fowler, 2002; Punch, 2003). This required a holistic examination of the research process, not an emphasis on one or two aspects of the survey. The tightly interrelated issues inherent within the research objectives, quality of the sample, instrumentation, data collection, data analysis, and mode of reporting were methodically scrutinized and explicated in the sections below.

Instrumentation

In terms of instrumentation for this study, the main method of data collection chosen was survey research - specifically, a questionnaire. Although data also emerged from the researcher’s personal experiences and conversations, as well as a meta-synthesis of the literature, the one instrument developed for this research was a questionnaire.
Each research question was approached with the dictum: the research question dictates the method. Therefore, the third and fourth research questions were determined to be best addressed through survey research (Mertens, 2005). “Survey research is probably the single most widely used research type in educational research” (Wiersma, 1995, p. 169). Keeping in mind that survey data may contribute to the development of theory as much as interview or observational data (Wellington, 2000), I felt that the questionnaire (with both ‘qualitative’ and ‘quantitative’ questions) was most appropriate in yielding the exploratory descriptive data desired. Questionnaires, though mainly employed to collect quantitative data, are nevertheless valuable in qualitative data through open-ended questions (Wellington, 2000).

The development of the instrument necessitated planning for a logical train of thought by respondents. Although it is generally recommended that demographic questions and open-ended items on a questionnaire follow selected-response items (Dillman, 1978; Wellington, 2000; Wiersma, 1995), I chose to place them at the front end of the self-administered questionnaire. They were questions that applied to all respondents, were fairly easy to answer, and were not deemed threatening (Alreck & Settle, 2004). The first question concerning the respondent’s current role in connection with children’s gardens framed their answers for the remainder of the questionnaire, and provided vital information for the researcher in terms of how the respondent considered themselves connected with children’s gardens. It set the stage and suggested what types of questions would follow (Alreck & Settle, 2004). The second, demographic question about age was viewed as important in analysis of the respondent’s subsequent answers, especially in terms of associations and comparisons (Bradburn & Sudman, 1979). The
open-ended question asking respondents to describe what a children’s garden is to them was placed before the questions concerning children’s garden elements/features and visitor autonomy as a means for respondents to initiate thinking about children’s gardens, how they conceptualize them, what elements and/or features they feel are essential in a children’s garden, etc. Importantly, this open-ended item allowed respondents an opportunity to answer at least one question in their own words (Fowler, 2002). Also, this question was viewed as fitting most appropriately before the items about children’s garden elements and preferences about visitor autonomy because of the sequential nature of the thinking process by respondents in completing the questionnaire (Mertens, 2005; Wiersma, 1995). The next question was derived from the meta-synthesis of the literature in offering a long list of children’s garden elements and/or features and asked respondents to indicate the importance of each element/feature for inclusion in their concept of a children’s garden. This question took the form of an 8-point, multiple-rating Likert-type scale as aspects of the affective domain are measured successfully with Likert-type scales (Nardi, 2003; Wiersma, 1995). Extremes of the scale were labeled as “N/A” (Not/Applicable) and “Not Important at All” on one end and “Essential” on the other. Intermediate points on the scale were not labeled for several reasons: 1) consensus on the meaning of words such as “Very” or “Slightly” is less likely than for the interpretation of a series of numbers, 2) representation of intermediate points with labels tends to be visually uneven and disrupts the conceptual mapping of the underlying evaluation, and 3) with only numbers there is no possible mistake about there being only a single dimension or continuum (Alreck & Settle, 2004). The list of elements/features required two pages to visually represent. Therefore, the stapled questionnaire was
formatted double-sided such that this question laid left and right, like a butterfly, when being answered. Respondents were given the opportunity to list “Other elements” and to describe them in their own words (Kemper, Stringfield, & Teddlie, 2003). The last question asked respondents to represent their preferences for level of visitor autonomy in a children’s garden setting. Initially, this question took the form of a differential statement technique. However, during the pilot testing of this instrument described later in this chapter, the 22 colleagues I called upon to evaluate the instrument almost uniformly evaluated the last question as requiring an unreasonable level of sophistication to complete. There was also a general consensus that given the apparent difficulty of answering the question, respondents might opt to leave the question blank. The question was reformatted to offer respondents a straight-forward representation, through a visual analog scale, to indicate their preferences. This was considered an appropriate questioning technique by the researcher, in consultation with a research statistics colleague, for acquiring accurate respondent preferences (Nardi, 2003; Wellington, 2000; Wiersma, 1995). In addition, it was suggested by several of the pilot test respondents that preference for visitor autonomy may have a direct correlation with the age of the visitor. Therefore, I changed the question to ask respondents to indicate their autonomy preferences based upon four different age groups of visitors: young children [age 0 to age 6], children [age 7 to age 12], youth [age 13 to age 18], and adults [over 18 years of age]. The age groups were determined through personal observations and developmental psychology literature (Austrian, 2002; Schuster & Ashburn, 1980; Vander Zanden, 1989). The adult age group was included as a way to compare respondent answers between their own age group [adult] and the three age groups for children and youth. At the conclusion
of the questionnaire, respondents were thanked for their time and consideration
(Wellington, 2000; Wiersma, 1995), and given an opportunity to share further comments
about the research study (Denzin & Lincoln, 2000; Wellington, 2000; Wiersma, 1995).

None of the items in the questionnaire were deemed to be of a threatening nature
based upon survey research literature (Alreck & Settle, 2004; Bradburn & Sudman, 1979;
Fowler, 2002; Mertens, 2005). Indeed, The Ohio State University’s human subjects
review officials granted an exemption for full review by the Institutional Review Board
to this research within 24 hours of applying for it. The questionnaire was deliberately
constructed such that it was pertinent, clear, and reasonably easy for respondents to
answer. Individual questions were constructed with maximum focus, brevity, and clarity
in mind (Alreck & Settle, 2004). Instructions for answering the questions erred on the
side of thoroughness, knowing that more sophisticated respondents would probably
comprehend the actions requested of them quickly and others needing more complete
guidance required sufficient direction (Alreck & Settle, 2004). Above all, the length of
the questionnaire was kept as short as possible (Dillman, 1978; Mertens, 2005).
Evidence suggests that long surveys are less likely to be completed or returned; length of
time to complete a survey should not exceed 20 minutes (Newman & McNeil, 1998).
Completion of the questionnaire was accomplished by pilot test respondents within an
average range of twelve to fifteen minutes. The threat of social desirability bias was
determined to be low by pilot test respondents; self-administered questionnaires have the
lowest probability for producing socially desirable answers (Alreck & Settle, 2004;
Dillman, 1978). In addition, a self-administered questionnaire was chosen for the
following reasons: 1) appropriate form for mailing to the children’s gardens sampled, 2)
appropriate form for distributing to a large group at one time – the Symposium attendees, 3) best design for measuring items with numerous response categories – such as the list of children’s garden elements/features, and 4) measuring attitudes and opinions that are not usually observable – preference for visitor autonomy, for example (Nardi, 2003).

A cover letter for the questionnaire was written by me to make the following points to respondents:

- Purpose of the research and reason for this recipient being selected,
- Inform the recipient as to what will be done with the collected information,
- Assure confidentiality,
- Mention the importance of response,
- Give a time estimate for completion of the questionnaire,
- Give a deadline for return of the questionnaire,
- Remind the recipient about the enclosed postage-paid envelope for the mailed questionnaires to children’s gardens; provide instructions for turning in the completed questionnaires for those collected at the Youth Garden Symposium,
- Express my appreciation for completing the questionnaire, and
- Present my signature and The Ohio State University letterhead (Newman & McNeil, 1998; Wiersma, 1995).

(See Appendix A).

The paper stock used was considered a “good” 24-lb. weight per ream. A cream color was selected. Paper was a standard 8-1/2-by-11-inch letter size. Type size was an easy-to-read 12-point type in Times New Roman font. Printing color was black (Alreck & Settle, 2004; Mertens, 2005). Each questionnaire was accompanied by an addressed envelope in which to place it. This provided for respondent anonymity in returning questionnaires, as well as allowing for mailing them to me in case they were not completed and collected with others at the AHS Symposium and at the children’s garden sites (Alreck & Settle, 2004; Dillman, 1978).
Validity and Reliability

An essential piece of instrumentation in research is pilot testing (Alreck & Settle, 2004; Nardi, 2003; Punch, 2003; Wellington, 2000; Wiersma, 1995). The questionnaire was pilot tested by 22 colleagues employed in the fields of environmental education, evaluation, research statistics, marketing, education, rural sociology, computer programming, psychology, and the children’s garden arena. They were asked to evaluate the instrument for validity as well as comprehension, clarity, appearance, ambiguity, response threat, time for completion, and ease of completion by intended respondents. Minor changes were subsequently made to each of the questions, with a reformulation of the last question described above.

The instrument was not field tested for several reasons. First, this research was exploratory descriptive in nature and the specific action of field testing pre-established categories of data for reliability was not considered by this researcher as being appropriate for this study (Denzin & Lincoln, 2000; Lincoln & Guba, 1985). Second, I viewed the literature from which much of the data emerged as uneven in nature. Reliability was already a possible threat. The need to move the field of children’s gardening forward and generate published research seen as valid and reliable was explained in Chapter 1. Third, I considered the process of analyzing the study data as an appropriate way in which to address issues of reliability and I planned to report issues of reliability that emerged. Although the instrument was not field tested for the reasons given, several steps were taken in the development of the instrument to ensure reliability (Alreck & Settle, 2004; Fowler, 2002). Questions asked of all respondents were identical. Wording of the questions was thoroughly examined and passed through
numerous iterations until deemed appropriate by pilot testers. The sequencing of questions was examined and constructed for logical train of thought for respondents. Use of poorly defined terms was kept to a minimum. Double-barreled questions were avoided or separated into discrete questions. There was a focus on anticipating what respondents would perceive as constituting an adequate answer.

**Data Collection**

The mixed method approach to collection of data used in this research was directly related to triangulation, giving it methodological rigor (Denzin & Lincoln, 2000; Nardi, 2003; Teddlie & Tashakkori, 2003; Wellington, 2000). Triangulation of the data from this research study consisted of the personal experiences of the researcher, the meta-synthesis of the literature, data collected through the research instrument (questionnaire), and the data presented by Marcia Eames-Sheavly of Cornell University described later in this section. The following explanation of the data collection process was offered as an account of what was done, and when, by the researcher in order to describe research actions and allow for future replication by other researchers (Fowler, 2002; Wellington, 2000; Wiersma, 2000).

My initial data collection could be conceptualized as the ten years of experience I have had as a children’s garden horticulturist, educator, designer, visitor, and administrator. These experiences allowed me to network with knowledgeable children’s garden authorities and become what one might refer to as an insider in the arena of children’s gardens. In Chapter 1, I addressed the assumptions I hold as a consequence of these experiences. Suffice it to say, if I had never interacted with children in a garden
setting or interacted with esteemed colleagues at numerous symposia and meetings, I would not have formed the research questions that were part and parcel to this research. I significantly relied upon my personal experiences and relationships in guiding me through my data collection.

The meta-synthesis of the literature occurred over a number of months in 2004 and 2005. This involved an extensive literature review and subsequent synthesis of the information collected (Nardi, 2003). In terms of meeting the research objective of outlining the body of knowledge concerning benefits to children and youth from children’s garden experiences and/or plant-based learning, the focus was obviously just that. Other foci included children’s garden elements and/or features, children’s garden design, visitor experiences and levels of autonomy in a garden setting, history of children’s gardens, educational research, and research procedures. In social science research, an effective and pertinent literature review can not only yield information to critically inform further research steps, but can satisfy a research objective to the point that subsequent data collection is not warranted (Hart, 2001; Mertens, 2005; Newman & McNeil, 1998).

In May, 2005, I contacted Stephanie Jutila, Education Programs Manager for the American Horticultural Society (AHS), who in turn spoke with Tom Underwood, Director of Horticultural Programs at AHS, to receive their consent for collection of data at the annual Youth Garden Symposium in Atlanta, GA, July 28-30, 2005. As a former colleague of Tom Underwood, I knew that he and Ms. Jutila would be doing the lion’s share of coordinating the symposium. Both agreed to allow me to disseminate my research questionnaire to all of the symposium attendees in Atlanta. The annual AHS
symposium was begun in 1993 and is widely regarded as the key conference for children’s garden stakeholders and enthusiasts. The symposia venues have varied greatly, with a return to AHS headquarters in Alexandria, VA, approximately every five years. The advisory panel for children’s gardening at AHS, of which I have been a member since 1996, has endeavored to reach as wide an audience as possible, seeking regional diversity and collaboration with esteemed institutions, such as the Atlanta Botanical Garden and Wonderland Gardens in 2005. Attendance at the AHS symposia has fluctuated, but remained within a range of 95 to 350. The attendance figure for the 2005 AHS Youth Garden Symposium was 202 (including staff members from AHS, Atlanta Botanical Garden, and Wonderland Gardens).

In June, 2005, a 3-day workshop was held at Cornell University in which seven youth, 15- to 17-year-olds, were asked to be children’s garden consultants. Marcia Eames-Sheavly, a well-known children’s garden expert, was the extension specialist managing the workshop. She had contacted the other members of the AHS education panel, including myself, early in 2005 to explain the theme of the workshop and elicit questions for the youth participants. In years past, Eames-Sheavly had expressed a belief that the members of the AHS education panel should be incorporating the thoughts and wishes of children and youth, the ultimate stakeholders of children’s gardens, in the planning and execution of AHS Youth Garden Symposia. The workshop offered by Cornell extension was exactly that: an opportunity to ask youth about children’s garden concepts, what they believe is working well, what in their opinion doesn’t work, and what recommendations for improvement they had to offer. I took the opportunity to contact her and include my research questions in the list of issues to be discussed during
the workshop. Ms. Eames-Sheavly crossed every “t” and dotted every “i” in the process of submitting materials to the institutional review board at Cornell University, as well as collaborating with a human development researcher. The researcher formally evaluated the workshop approach, provided pre-event surveys, conducted observations, held a focus group with the youth participants, and conducted follow-up work. Some of the results of the Cornell workshop were presented at the AHS Youth Garden Symposium in Atlanta within her keynote presentation (Eames-Sheavly, 2005a). At that time, she also gave me her notes from the workshop, as well as copies of the youth power point presentations (Eames-Sheavly, 2005b). (See Appendix C)

In order to secure an agreement from five different children’s gardens to participate in my research, I called each of the garden’s directors on the telephone. I spoke with each about the nature of the research and the possibility of obtaining data from the garden’s staff members, as well as garden visitors. Through email, I provided them with a draft of the questionnaire (with draft cover letter), an outline of who would be asked to complete the questionnaire, dates of data collection, and instructions for what was needed in a letter of support from them. A letter of support was garnered from Tom Underwood at AHS and three of the garden directors. Additionally, I asked each director if there was a children’s garden staff member who could ask a few of their visitors to complete the questionnaire. I emphasized the fact that this participation was strictly voluntary, and included the cover letter with each questionnaire. A brief script for the children’s garden staff member approaching visitors was written and shared with each garden (see Appendix B).
A number of recommended actions were taken in this research in an effort to generate as high a response rate as possible (Fowler, 2002; Wellington, 2000; Wiersma, 1995). The questionnaires mailed to children’s gardens were prefaced with a personal telephone call by me to the director/administrator. Mailings to individual children’s gardens contained: 1) a letter of instruction to the director of the garden, 2) a large, stamped, addressed envelope for ease in returning all of the completed questionnaires, 3) the questionnaires, and 4) the staff member script for approaching garden visitors (Alreck & Settle, 2004). The questionnaires were prepared to look as neat, concise, visually pleasing, and professional as possible; a carefully crafted cover letter was included with each questionnaire as the first page. AHS Director of Horticultural Programs, Tom Underwood, allowed me to make a general announcement to all of the Youth Garden Symposium attendees gathered in the main auditorium on the first day of the symposium, informing them of my research questionnaire and asking them to complete it if they wished. AHS had a daily update newsletter for the three days of the symposium available to all attendees that contained a reminder (on the second day) to pick up my questionnaire and envelope, complete it if they wished, and brief instructions as to how to turn in completed questionnaires (see Appendix B). Lastly, follow-up telephone calls and emails were made by me to children’s garden directors as a reminder to mail in the completed questionnaires from that particular garden.

The number of completed questionnaires I received at the AHS Symposium was 69, with 16 more mailed in the individual envelopes provided. The ultimate number of completed questionnaires that I received from Symposium attendees was 85, a response rate of 42% based upon a total attendance of 202. The five children’s gardens were given
100 questionnaires total; however, each garden was asked to complete *at least five* questionnaires to elicit information from each of the stakeholders that were operationalized in Chapter 1, for a combined minimum of 25. I received 35 completed questionnaires from the children’s gardens: a 35% response rate, based on the maximum. The total number of completed questionnaires received was 120. These were considered acceptable rates (Mertens, 2005).

In August, 2005, I was in Jackson, Mississippi, for a consulting job as a program evaluator and was kindly invited to be a guest on “The Gestalt Gardener”, a Mississippi Public Broadcasting radio show hosted by Felder Rushing and Dr. Dirt, reaching a five-state listening audience. Felder invited me to his home later the same day. After enjoying his terrific garden, profiled in a number of shows and publications, we had an enthusiastic conversation about children’s gardens. Rushing had long been an advocate for easy, effective gardens for children and youth, and had given innumerable presentations about the subject. Though certainly not a scripted interview, our conversation was an influence on this research and provided some excellent data.

**Description of the Study Samples**

One could make a case in this research study that it was difficult to identify the population from which to frame a sample selection (Alreck & Settle, 2004; Mertens, 2005). As the definitions of a children’s garden and the act of children’s gardening have never been explicated to date, the population of people involved in/connected with children’s gardens/gardening could be as vast as the parent who shows their child how to start a plant in a cup on the windowsill to the greatest living children’s garden designer.
The sample frame within the population identified for this research study was children’s
garden stakeholders, as operationally defined in Chapter 1: children’s garden visitors,
children’s garden designers, children’s garden directors/administrators, children’s garden
horticulturists, and children’s garden educators.

The type of sampling employed in this research study was purposive. There was
no thought to employ probability, or random, sampling as that approach was not
appropriate for the exploratory descriptive research being conducted (Denzin & Lincoln,
2000; Kemper, Stringfield, & Teddlie, 2003; Wellington, 2000; Wiersma, 1995). The
criteria of goal orientation, measurability, practicality, and economy were used in the
sampling design of this research (Wiersma, 1995). The sampling was designed such that
it would fulfill, to varying degrees, the precepts suggested in mixed method research
design: generate a thorough database on the type of phenomenon studied, enhance the
researcher’s ability to make inferences from the data and produce credible explanations,
be feasible and ethical, should allow the transfer/generalization of the conclusions of the
study to other settings or populations, and attention is paid to efficiency of the sampling
design (Kemper, Stringfield, & Teddlie, 2003).

To best describe the approach taken concerning this study’s sampling, I would
characterize it as purposive, non-random, convenient, and selective, with an aim of being
highly representative. While there was a nod to maximum variation sampling - a seeking
out of individuals, organizations, and/or settings by the researcher that represent the
greatest differences or extremes of the phenomenon being studied (Kemper, Stringfield,
& Teddlie, 2003; Mertens, 2005; Wellington, 2000; Wiersma, 1995) – there was not
sufficient enough information in the meta-synthesis of the literature or my personal
experiences to identify what would be deemed the ‘extreme’ individuals or organizations involved in children’s gardening. Instead, I acquired as much variation in sampling as possible by collecting data from the stakeholders of five different children’s gardens and the many and varied attendees of the annual AHS Youth Garden Symposium. Past symposium attendees have come from professional and non-professional fields as varied as the formal, informal, and non-formal sectors of education, horticulture therapy, agriculture, library science, youth leadership, volunteerism, academia, public gardening, tourism and leisure industry, dramatic arts, concerned parents, landscape architecture, literature, nutrition, ethnobotany and numerous others.

I employed a mainly qualitative approach to this research – or rather, my theoretical drive was inductive (Morse, 2003). Therefore, sample size was difficult to determine a priori. In purposive sampling, the size of the sample is determined by informational considerations. The purpose is to maximize information and collection of data is often terminated when no new information is forthcoming (Lincoln & Guba, 1985; Morse, 2003). Some guidelines offered for determining sample size within a mixed-method study design suggested that 100 completed questionnaires were appropriate for survey research (Mertens, 2005). The populations sampled for this research included all of the operationalized children’s garden stakeholder groups from five gardens in North America and attendees of the American Horticultural Society (AHS) Youth Garden Symposium in Atlanta, GA, July 27-30, 2005. The five children’s gardens chosen for data collection were the Michigan 4-H Children’s Garden, Coastal Maine Botanical Garden, Cleveland Botanical Garden, Atlanta Botanical Garden, and Huntington Gardens (CA). The selection of these gardens was predicated on several criteria: 1) possession of
a children’s garden (or proposed children’s garden) within their boundaries, if not the entire garden; 2) variation in length of establishment of the children’s garden – for example, the Michigan 4-H Children’s Garden opened in 1993 and Coastal Maine Botanical Garden plans to open their children’s garden in 2007; 3) accessibility to each of the stakeholders of that children’s garden; 4) regional diversity; and 5) differing garden designers. The five children’s gardens sampled were asked to provide at least five completed questionnaires from the stakeholders determined earlier – namely, the children’s garden director/administrator, educator, designer, horticulturist, and visitor(s).

In the case of Coastal Maine Botanical Garden, which had not begun construction on their proposed children’s garden by the time of data collection in 2005, the garden director, staff anticipated to perform the stakeholder roles indicated in the future, and current visitors to the Botanical Garden were asked to complete the questionnaire.

Collected data were entered by me into the SPSS-PC+ computer program on my computer. The format was constructed for clarity and checked many times to guard against error in data recording (Alreck & Settle, 2004). The analytical procedures taken were detailed in the following section.

**Data Analysis**

One possibility for analyzing data in educational research is to use pre-established, or a priori, categories derived from previous literature or research. The pre-existing categories are then applied to one’s own data. Another possibility is not to have pre-established data, but to allow the categories to emerge in the data themselves, a posteriori. Lastly, the third possibility for analyzing data is to combine pre-established, a
priori, categories of data with categories that emerge from the data, a posteriori data. This is a rational approach because existing categories derived from past research and previous literature can be used to make sense of the emergent data that requires new categorization and provides fresh information and insight into the phenomenon studied (Wellington, 2000). I employed the third (mixed) approach to analysis of data in this research.

Much of the data analysis in this study relied upon description, but not entirely. The varied and rich information that I gathered over years of professional experiences basically went unreported in this research study; however, these past experiences and discussions served me well in framing the research questions of this study, as depicted in Chapter 1. The analysis of the data collected through the comprehensive literature review consisted mainly of a meta-synthesis explicated in Chapter 2. The analysis of data collected through the research instrument was described in the following section of this chapter. I consulted with a doctoral candidate in statistics and several quantitative researchers at The Ohio State University during the development of the research instrument; they evaluated the instrument for general usability and recommended the best statistical analysis procedures to be performed after data collection (Newman & McNeil, 1998). It should be duly noted that mixed methods data analysis techniques should not be dictated by the underlying epistemological orientation but rather should stem from the research purpose (Onwuegbuzie & Teddlie, 2003). Since the research purpose was to explore and describe, the data analysis techniques used and subsequent reporting style were tailored for that purpose.
The first two questions of the questionnaire were demographic in nature. The first question concerning the respondent’s connection or role with children’s gardening was used as a factor in analysis of subsequent questions, particularly as an important part in analysis for comparisons and associations. The same can be said for the second question about the age of respondents. The open-ended question on the questionnaire that asked respondents to describe what a children’s garden is to them did not pre-establish data, but allowed for the categories to emerge in the data themselves, a posteriori. Some initial representative responses to this item were offered in Chapter 4. The meta-synthesis of the literature reported in Chapter 2 revealed a long list of elements and features of children’s gardens recommended by many authors. These elements/features, or categories of data, emerged in the literature review and served as pre-established categories for questionnaire respondents to reflect upon and rate as to their relative importance for inclusion in each respondent’s concept of a children’s garden. The opportunity for respondents to offer new and different children’s garden elements/features was incorporated into the instrument. The last question gathered data concerning respondents’ preferences for visitor autonomy in a children’s garden setting. It emerged from my personal experiences in the field, as well as the meta-synthesis of the literature. Categorization of the data was pre-established for the questionnaire, represented in the visitor autonomy continuum on which respondents indicated their answers for each discrete age group of children’s garden visitors.

Analysis of quantitative data is generally viewed as straight-forward, especially when using a computer software program such as SPSS (Alreck & Settle, 2004). “Computers are extremely useful for data analysis because they are functional, fast,
accurate, and accessible” (Wiersma, 1995, p. 352). I used the SPSS-PC+ program in the analysis of data from the questionnaire. Since the data collected in this study were non-random, purposive data, there was a consistent direction of interpreting the data for exploration and description, but not for inference, conclusion, and generalization. Reporting reliability in a number such as Cronbach’s alpha was simply not applicable to this research study. There was no attempt to measure a construct over an extended period of time nor sample disparate populations about a personality aspect. Descriptive measures such as percentage distribution, mean, and standard deviation were computed and reported (Wiersma, 1995). Inferential statistics were reported as well, with corresponding p values included. Inferential statistics were viewed as tools in this endeavor, never as proof. Strategies outlined in mixed method research design were used as guidelines (Kemper, Stringfield, & Teddlie, 2003).

Data were coded such that they could be easily analyzed through the SPSS computer program. Missing answers were not coded, but left blank so that the computer treated them as missing data (Nardi, 2003). Analysis of the data for the quantified research questions was accomplished through methods such as percentage distribution, mean, standard deviation, association, and comparison. In percentage distribution, the set of all scores, or distribution, for the research question were placed in a table to indicate the percentage of responses for each (Nardi, 2003; Wiersma, 1995). The percentages for the children’s garden elements were presented under the appropriate headings of “N/A” (Not/Applicable), “Not Important at All”, up to “Essential”. The percentages for each element/feature were likewise presented this way:
Animals/wildlife  2  6  12  5  5  8  13  27

Figure 3.1. Children’s garden element question format on questionnaire

The mean was reported as average of the responses reflecting reported importance of each children’s garden element/feature, and the standard deviation showed the relative amount of agreement among respondents on each element’s importance. Presentation of the data was accomplished through tables and figures, such as the visual equivalent of the visitor autonomy continuums presented in the questionnaire (Newman & McNeil, 1998). Some non-parametric tests, such as the Kruskal-Wallis Test, were run to examine comparisons and associations (Alreck & Settle, 2004; Mertens, 2005; Nardi, 2003; Punch, 2003). For example, each stakeholder role was compared to responses that assigned importance to children’s garden elements/features. Cluster analysis was run on the children’s garden elements based on their perceived importance assigned by all respondents. Multi-variate analysis of variance was used to determine if stakeholder role, age, and respondent origin influenced the level of preferred visitor autonomy in all visitor age groups. Chapter 4 presents the research findings and Chapter 5 includes a summary of findings, reflection of literature support, implications, and recommendations for both researchers and practitioners.
Summary

This chapter outlined various paradigmatic and methodological issues for this research through a comprehensive discussion of the approach, instrumentation, data collection, sampling, and analysis of this study.
The research findings for each of the research questions were addressed in turn in this chapter, with corresponding data analysis accompanying the discussion. To reiterate, the research questions of this study were:

1. What is known about benefits to children from children’s garden experiences and/or plant-based learning?
2. What is a children’s garden?
3. What are the essential elements/features that a children’s garden should contain?
4. What are the current preferences between and among children’s garden stakeholders concerning the level of autonomy that garden visitors should be afforded in accessing and utilizing the garden?

Research Findings

What is known about benefits to children from children’s garden experiences and/or plant-based learning?

The first research question concerning benefits to children from children’s garden experiences and/or plant-based learning was explicated through the comprehensive literature review in chapter 2. Readers of this research study are encouraged to examine
Chapter 2 for a detailed meta-synthesis. Further discussion of this question follows in Chapter 5.

**What is a children’s garden?**

The second question concerning initial exploration of the definition of the construct of ‘children’s garden’ was discussed in the delimitations of this study presented in Chapter 1; it was noted that further exploration of the children’s garden construct was planned as future research and not one of the objectives to be met within the scope of this endeavor. However, some preliminary data are offered here. The examples are mainly written answers to the open-ended item on the research questionnaire: “Think about what a children’s garden is to you. Please describe it.” These constitute a glimpse into how the children’s garden stakeholders sampled in this research define the construct.

Many of the research questionnaire respondents mentioned the actions of exploration and discovery in their concepts of a children’s garden:

- A place to explore, dream, wonder, discover, play, test ideas (educator)

- A place where youth can learn, explore, investigate the natural world through experiential, hands-on, minds-on activities as well as activities that they can self-direct (director)

- A place of fun/delight/exploration/retreat/discovery/tangibility/respect/interface/enchantment/learning/affirmation/challenge (visitor)

- A place where children can discover while playing (designer)

- A children’s garden should be a sanctuary for exploration... (educator)

Respondents couched their conceptions of children’s gardens within an interactive, hands-on, experiential framework for visitors:
A place to experience the wonder of nature, to have positive interactions with adults, a place of wonder & enchantment, to experiment, observe, taste, learn, touch touch touch...A place to solve problems, collaborate, recreate and so much more. Even a place to relax & be still (horticulturist)

A children’s garden should always be hands on – touch the soil, plant the plant, hold the caterpillar (educator)

It might be a garden where children do hands-on gardening (old fashioned garden of plots where kids garden) or it might reflect the more recent trend of being an experiential garden, but whatever type of garden it is, it focuses on children’s experiences (educator)

A place where everyone can interact with nature, horticulture, sculpture, and their surroundings (horticulturist)

A children’s garden is a place for kids to explore. They should be able to use all 5 senses in experiencing the garden – Hands on! (visitor)

The garden was conceived as varied in appealing to all senses, as well as offering varied and different experiences for visitors:

The more diverse the plant and wildlife the better – variety will allow teacher and parents to show children the secrets and mysteries of nature (educator)

Children have access to experience the plants, insects, critters & natural world with their five senses (designer)

A place to use all of your senses...a place full of colors, textures, fragrance and life (educator)

The aspect of specifically framing a children’s garden for them [children and youth] was common, especially designing for a smaller physical presence or allowing them freedom of activity apart from adults:

A children’s garden is educational, fun, magical, beautiful and especially pint sized (educator)

An environment of a scale & scope that is attractive to, comfortable for and nurturing of learning of children (visitor)

A garden scaled to a child’s size and that attracts a child inside it (educator)
A safe place for finding things out without tall people bugging you about how it ought to be (educator)

Throughout the questionnaire responses there was a prominence placed on the importance of the connection to and appreciation of the natural world/plants/food. Some respondents emphasized inculcating an environmental ethic, while others saw the people/plant connection as fundamental to engaged living:

It’s the entire outdoors – where children can connect with all components of the land and sky – where kids can interact with planet Earth and draw energy from it. A children’s garden should help kids connect their food, clothing, shelter, and peace with the Earth – natural resources, plants, and animals – they learn respect and responsibility in the “garden” (educator)

A place of wonder that stimulates curiosity about our marvelous plant world. A garden that is totally plant-oriented that shows all the importance of plants in our daily lives (designer)

There are spaces for structured plants – i.e. vegetable garden to help facilitate kids’ connection to their earth through their food. But, there must also be space for wild things – a place where things grow in what a strict gardener would say was weedy or chaotic – well that’s how life is! Let the kids see the bugs eating the leaf, let them wonder about the hill of dirt made by the mole – don’t squash their sense of curiosity! (educator)

Some respondents combined all or most of the previously mentioned components in their conceptualization of a children’s garden:

Sensory, hands on, interactive, free to explore/pick/”damage” (what most gardeners think children will do to the garden). Plants that can make direct connections to children’s lives/food/craft/art (educator)

A children’s garden is a place of diverse natural and gardenesque spaces created in a scale that makes children comfortable and safe enough that they can explore freely... These gardens are places where children can learn both by their own experience as well as a variety of more formal ways (director)

A children’s garden is a place for children to learn about & explore the world around them in a safe environment. Not only are plants used in the garden but sculptures (art pieces – scarecrows, topiaries, etc.), wildlife is attracted to the
A garden of wonder, delight, and “fairy-tale” like qualities for children, based on hands-on, interactive activities within the garden. A garden that inspires and educates kids to grow plants – flowers, veg., etc. A garden that has child-size features and where kids can really see how food is grown and how plants supply people with many of our basic needs (director)

There were a few respondents who obviously contemplated the question of what is a children’s garden at length and offered insightful and multifaceted answers. They are presented here in entirety:

What is a children’s garden? This is a question I get a lot and I usually answer it in 2 parts. There are children’s gardens where kids are actively “gardening” i.e. Brooklyn Botanic Garden or National Arboretum’s Children’s Garden and then there are “discovery/adventure” gardens. I believe both are important in that they both give children the chance to be outdoors – to play, explore, pretend, discover, learn, be responsible, produce and have fun! Children’s gardens are planned/unplanned, small/large, designed/natural, traditional/non-traditional. Children’s gardens are more than a definition – they are a necessary, vital part of growing to be a steward of our world! (director)

What is a Children’s Garden to me?

There are many types of gardens that are designed for children – all with different missions because they are in different places, fostered by different people. For example, a garden in a school with a captive and smaller audience that is supervised (for the most part) will be very different from a children’s garden in a public park. Park gardens are not typically built for formal or informal learning. Park gardens are built as “wild places” for kids simply to play outside with nature, or added to typical swings or slides. These places may or may not be supervised by adults, but they are always used by kids for “unscripted play and spontaneous learning”. Both, however, are children’s gardens and have been called as such.

A third type of children’s garden is that which can be found within the realm of a public garden or arboretum. Here larger volumes of visitors, all ages, sometimes supervised come to enjoy the garden. What is inside this type of garden has to be powerful and magical enough to accomplish two goals: to entice the kids to return; and to inspire parents, teachers, park officials, politicians, etc. to take what they have experienced and build a place for kids to connect with nature in their own communities on a daily basis. (continued)
My description of a children’s garden coincides with the third type of garden in a public garden setting. These spaces, in my experience, are almost always designed for two types of learning: programmed (field trips, docents, garden programs) and unprogrammed (drop in visitor, weekend family “quality” time). We know that children learn best when a mentor, docent, or parent is helping them engage in an activity, answering questions as they go, or through an animated story or puppet show. But that is not the only way they learn. They learn through their own unscripted play, spontaneously. It is through this unprogrammed arena that we provide to them that their visits are fresh and different each time they return, fueled by simply their own imagination and natural curiosity. So our gardens generally must accommodate and encourage both kinds of activities, programmed and unprogrammed.

This children’s garden is brimming with interactive delight that empowers each child to take ownership of their garden. There is water they can touch, animals they can see and possibly feed or pet, high spaces for them to view their kingdom, small places of their very own (no adults allowed), whimsy and magic surrounded by plants of every shape, size, color, texture, smell and taste. (I generally gave these items a 7 [Essential] on the next page.)

Functionally, they need active places, quiet places, sunny spots, shady and cool areas. They will need spaces to gather small groups of children on a field trip, and spaces to orient the whole class. The garden will need to be near parking and restrooms, handwashing and drinking fountains. It will need places to eat a snack or picnic lunch. It has benches sized just for kids and fences to keep them from wandering beyond the eyesight of their guardians. (I generally gave these items a 6 on the next page.)

Items circled as a “1” [Not Important at All] may be important to some gardens and their caregivers, but not all. Each garden has a unique vision, location, horticultural and educational desires led by the staff and Board who will care for the garden. Yes, we need flowers, but the kind (vines, sunflowers, annuals, perennials, etc.) is up to each individual garden’s wish list (designer)

Seven youth participated as children’s garden consultants in the Cornell University workshop in June, 2005. Four youth were grouped in a design and planning team and three youth were grouped in an educational programming team. “Through those lenses, the teens visited gardens, listened to presentations, explored numerous children’s gardens from around the nation on-line, tried some garden-based learning activities, and had discussions on topics such as adult involvement in activities, and various approaches to design. They also learned what being a “consultant” meant and
how to prepare for their final presentation. At the end of the event, each cloistered for an hour and a half, and put together power point presentations on their findings” (Eames-Sheavly, 2005b). In thinking about what a children’s garden is to them, the two teams reported the following:

*A children’s garden is: Children’s gardens are a learning environment that is safe and secure, that opens the minds of children to nature by combining hands on activities and fun exercises that help make them better aware of their environment.*

- Creativity
- Hands on
- Intelligence
- Literature
- Diversity
- Responsibility
- Enthusiasm
- Necessities
- Satisfaction

(Design and Planning Team)

*A Children’s Garden...

- Exciting
- X marking the spot
- Participating
- Learning
- Observing nature at its best
- Recreation
- Empowering

(Educational Programming Team)

As previously mentioned, it was noted that further exploration of the children’s garden construct was planned as future research and not one of the objectives to be met within the scope of this endeavor. Recommendations for future research within this area are offered in Chapter 5.
What are the essential elements/features that a children’s garden should contain?

The list of recommended elements/features of a children’s garden that emerged from the literature, including cited authors and resources, was discussed in Chapter 2. On the research questionnaire, respondents were given a slightly condensed list of 72 children’s garden elements/features and asked to best indicate how important each is to the respondent in their conception of a children’s garden. The scale ranged from 0 = “N/A” (Not/Applicable) and 1 = “Not Important at All” on one end to 7 = “Essential” on the other. Intermediate points on the scale were not labeled for reasons given in Chapter 3. The sample size was 120. The number of completed questionnaires from AHS Symposium attendees was 85 (71%), and the number of completed questionnaires from the five botanical gardens was 35 (29%). Mean age of respondents was 45, with a standard deviation of 12 years. Administrators had the least amount of variability in age distribution, with a standard deviation of 7.95 years; visitors had the highest amount of variability in age distribution, with a standard deviation of 13.85 years. The percentages of respondents by stakeholder role were 43% self-identified as children’s garden educator, 23% as visitor, 14% as administrator, 12% as designer, and 7.5% as horticulturist.

The frequency distribution by percentage (%) outlining responses for the entire list of 72 children’s garden elements/features is given below in Table 4.1. Other elements noted by respondents are given at the end of the list of 72 elements/features that were on the questionnaire.
<table>
<thead>
<tr>
<th>N/A</th>
<th>Not Important at All</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Animals/wildlife</td>
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<td>2</td>
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<tr>
<td>Annual flowers</td>
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<td>3</td>
</tr>
<tr>
<td>Art</td>
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</tr>
<tr>
<td>Bathrooms</td>
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<td>6</td>
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<tr>
<td>Berries/fruits</td>
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<td>3</td>
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<tr>
<td>Bridge(s)</td>
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<td>5</td>
</tr>
<tr>
<td>Bright colors</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Buildings</td>
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<td>9</td>
</tr>
<tr>
<td>Bulbs</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Compost/Vermiculture</td>
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<td>1</td>
</tr>
<tr>
<td>Containers (various sizes)</td>
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<td>5</td>
</tr>
<tr>
<td>Entrances</td>
<td>4</td>
<td>-</td>
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<tr>
<td>Fences</td>
<td>6</td>
<td>7</td>
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<tr>
<td>Flower beds</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Game(s) area</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Gathering/meeting areas</td>
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<td>2</td>
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<tr>
<td>Gourds</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Greenhouse/cold frame</td>
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<td>11</td>
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<tr>
<td>Hideaways/enclosure</td>
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<td>3</td>
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<tr>
<td>Lawn/grassy areas</td>
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<tr>
<td>Learning stations</td>
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<td>2</td>
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<td>Maze</td>
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<td>3</td>
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<tr>
<td>Melons</td>
<td>4</td>
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<td>Orchard</td>
<td>5</td>
<td>9</td>
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<tr>
<td>Painted stumps</td>
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<td>30</td>
</tr>
<tr>
<td>Paths/walkways</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Patio/terrace</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Perennial flowers</td>
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<tr>
<td>Performance area</td>
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<td>6</td>
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<td>Pest management items</td>
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<tr>
<td>Plants</td>
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<td>-</td>
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<tr>
<td>Plant structures (bean teepee, sunflower house)</td>
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<td>-</td>
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<tr>
<td>Playhouse/den</td>
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<td>4</td>
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<td>Potting bench</td>
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<td>8</td>
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<tr>
<td>Pumpkins</td>
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<td>8</td>
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<tr>
<td>Raised beds</td>
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Table 4.1. Percentage distribution of responses for children’s garden elements/features.
Table 4.1 continued

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<th>Essential</th>
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<td>Rocks</td>
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</tr>
<tr>
<td>Sand pits/digging pits</td>
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<td>6</td>
<td>6</td>
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<tr>
<td>Scarecrows</td>
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<td>8</td>
<td>7</td>
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<tr>
<td>Sculpture/ornament</td>
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<td>5</td>
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<tr>
<td>Seating/benches (adult size)</td>
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<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Seating/benches (kid size)</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Security/emergency phone/first aid station</td>
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<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Sensory elements</td>
<td>-</td>
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<td>7</td>
</tr>
<tr>
<td>Signs</td>
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<td>3</td>
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<tr>
<td>Storage</td>
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<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Strollers/stroller parking lot</td>
<td>13</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Sunflowers</td>
<td>2</td>
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<tr>
<td>Swing(s)</td>
<td>18</td>
<td>27</td>
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<tr>
<td>Tables (adult size)</td>
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<td>Tools/tool shed</td>
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<td>3</td>
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<tr>
<td>Topiary</td>
<td>10</td>
<td>18</td>
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<tr>
<td>Topography/variety in elevation/vistas</td>
<td>8</td>
<td>7</td>
<td>7</td>
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<tr>
<td>Tree houses</td>
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<tr>
<td>Trees</td>
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<td>Vegetables/vegetable plots</td>
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<tr>
<td>Vertical structures (trellis, arbor)</td>
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<tr>
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<td>Water source (for plants)</td>
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<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Windmill</td>
<td>11</td>
<td>22</td>
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</tr>
<tr>
<td>Woodland</td>
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Other elements:

(Continued)
Table 4.1 continued

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</thead>
<tbody>
<tr>
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</tbody>
</table>

Other elements:

- Amusements
- Cooking/kitchen area
- Desert area
- Dinosaur
- Green roofs on structures
- Lighting/night light feature
- Shade cloth
- Solar collectors
- Snack bar outside garden
- Trains
- Water collection/storage

Table 4.1. Percentage distribution of responses for children’s garden elements/features

A more descriptive perspective on these responses is given in Table 4.2, which shows the means and standard deviations. The elements/features are arranged in descending order of the mean value to render any patterns or groupings more obvious.

The means ranged from a high of 6.85 for the children’s garden element of plants to a low of 2.55 for the children’s garden element of painted stumps. The standard deviations ranged from a low of .481 for the element of plants to a high of 2.36 for the element of swing(s). For the 72 elements/features listed on the questionnaire, not taking into account the “other elements” offered by respondents, 61 received responses indicating relative importance of the elements, with a mean of more than 4.0 on the eight-point scale. Twelve of these elements received responses indicating that the element was very important to essential, with a mean of more than 6.0.
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Table 4.2. Means and standard deviations of children’s garden elements/features, arranged in descending order of the mean value (Continued)
The question arose: do respondents attach relative importance to children’s garden elements based upon their stakeholder role? Running the non-parametric Kruskal-Wallis Test, nineteen elements emerged with an attained statistical significance of $p = .050$ or
lower. These elements included: annuals, bathrooms, buildings, games area, greenhouse/cold frame, learning station, maze, patio, pinwheels, plant structures, playhouse, scarecrows, sculpture, security/first aid, signs, swing(s), tools/tool shed, topiary, and tree house. In this test, each stakeholder role has an associated mean rank representing the importance attached to each element. The higher the mean rank, the more important the element is to a stakeholder - relative to the other stakeholders. For example, the first listed element of annuals is most important to horticulturists (mean rank = 85.11); followed by visitors (67.32) and administrators (62.09); with educators (56.18) and designers (45.14) attaching the least importance to this element. The following table shows the children’s garden elements that attained statistical significance of \( p = .050 \) or lower for the above mentioned association.

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Table 4.3. Assigned importance of children’s garden elements based on stakeholder role
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<td>14</td>
<td>52.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>17</td>
<td>48.41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horticulturist</td>
<td>9</td>
<td>66.61</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educator</td>
<td>52</td>
<td>52.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools/shed</td>
<td>Visitor</td>
<td>28</td>
<td>41.80</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>Designer</td>
<td>14</td>
<td>60.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>17</td>
<td>79.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horticulturist</td>
<td>9</td>
<td>61.89</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educator</td>
<td>52</td>
<td>63.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topiary</td>
<td>Visitor</td>
<td>28</td>
<td>74.41</td>
<td>.041</td>
</tr>
<tr>
<td></td>
<td>Designer</td>
<td>13</td>
<td>44.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>17</td>
<td>59.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horticulturist</td>
<td>9</td>
<td>66.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educator</td>
<td>51</td>
<td>53.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree House</td>
<td>Visitor</td>
<td>28</td>
<td>68.09</td>
<td>.028</td>
</tr>
<tr>
<td></td>
<td>Designer</td>
<td>14</td>
<td>47.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>17</td>
<td>63.32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horticulturist</td>
<td>9</td>
<td>87.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educator</td>
<td>52</td>
<td>54.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3. Assigned importance of children’s garden elements based upon stakeholder role

To further explicate the research findings, each element listed above has varying importance assigned to it based upon stakeholder role. The element of annuals was previously discussed as an example. For the second listed children’s garden element of bathrooms, visitors assigned the greatest importance to that element, with administrators and horticulturists assigning some importance, and educators and designers assigning the least importance to that element. Turning the data on its axis, the elements are briefly discussed based upon the stakeholder that assigned them greatest importance, relative to
the other stakeholders. Children’s garden visitors assigned greatest importance to
bathrooms, buildings, games area, greenhouse/cold frame, learning stations, maze,
patio/terrace, pinwheels, security/emergency phone/first aid, swing(s), and topiary.
Children’s garden horticulturists assigned greatest importance to annuals, plant
structures, playhouse/den, sculpture/ornament, signs, and tree house. Children’s garden
administrators/directors assigned greatest importance to the elements of scarecrows and
tools/tool shed. Discernible trends and patterns within these listed children’s garden
elements are discussed in more length in Chapter 5.

A corresponding question arose: do respondents attach relative importance to
children’s garden elements based upon their [stakeholder] age? The stakeholder age
ranges were mainly formed by decade long intervals, starting at age 18; respondents over
60 years of age were condensed into one range because only three respondents in this
study were older than 70 and none were over 76 years of age. Therefore, the stakeholder
age groups formed were 18-29, 30-39, 40-49, 50-59, 60 and older. Running the non-
parametric Kruskal-Wallis Test, only two elements emerged with an attained statistical
significance of p = .050: sensory (.024), and wildlife (.041). The 40-49 age group of
stakeholders attached greatest importance to sensory elements in a children’s garden
(70.21), followed by the 50-59 age group (59.24), 60+ age group (57.50), the 18-29 age
group (55.23), and the 30-39 age group attached the least importance to sensory elements
(46.60). With the children’s garden element of wildlife, the 50-59 age group of
stakeholders attached the greatest importance (71.50), followed by the 40-49 age group
(62.58), the 30-39 age group (58.55), the 18-29 age group (52.37), and the 60+ age group
of stakeholders attached the least importance to the wildlife element in children’s gardens (41.71). Again, further discussion of these research findings is offered in Chapter 5.

A cluster analysis of the children’s garden elements/features based upon responses from all of the 120 completed questionnaires was examined. The elements/features emerged in five separate clusters; the results are offered below.

Cluster 1 – high mean of perceived importance (mean = 6.8 out of 7) and consistently rated of high importance (standard deviation = 0.53):

- Plants
- Water source for plants

Cluster 2 – high mean of perceived importance (mean = 6.12), but not as consistently rated of high importance as with Cluster 1 (standard deviation = 1.408):

- Sensory
- Water source for people
- Water feature(s)
- Perennials
- Plant structures (bean teepee, sunflower house)
- Vegetables/vegetable plots
- Wildlife
- Teaching area
- Trees
- Paths
- Seating/benches (kid size)
- Hideaways/enclosure
- Gathering/meeting areas
- Animals/wildlife
- Vertical structures (trellis, arbor)

Cluster 3 – less high in perceived importance (mean = 5.51), and even less consistently rated as with Cluster 2 (standard deviation = 1.774):

- Learning stations
- Flower beds
- Security/emergency phone/first aid
- Annuals
- Entrances
- Bright colors
- Art
- Tables (kid size)
- Compost/Vermiculture
- Raised beds
- Vines
- Seating/benches (adults size)
- Bathrooms
- Sunflowers
- Signs
- Rocks
- Theme gardens
- Tools/tool shed
- Wildflowers/meadow
Cluster 4 – lower perceived importance (mean = 4.64) and variably consistent ratings (standard deviation = 2.045). This cluster is a bit like a bag of mixed nuts:

- Scarecrows
- Potting bench
- Strollers/stroller parking lot
- Sandpits
- Storage
- Seeds/seed saving
- Tree houses
- Topography/variety in elevation/vistas
- Lawn/grassy areas
- Playhouse
- Fences
- Weather station
- Performance area
- Containers (various sizes)
- Temporary features
- Pumpkins
- Bulbs
- Tables (adult size)

Cluster 5 – perceived least in importance on average (mean = 3.41), with lowest consistency (standard deviation = 2.134):

- Pest management items
- Patio/terrace
- Greenhouse/cold frame
- Topiary
- Swing(s)
- Painted stumps
- Melons
- Orchard
- Buildings
- Windmill
- Pinwheels

Greater reduction of the number of clusters was not accomplished with statistical significance; however, a qualitative analysis of the clusters yielded some interesting trends and patterns that are further discussed in Chapter 5.

The seven youth who participated as children’s garden consultants in the Cornell University workshop in June, 2005, also addressed the issue of essential elements of a children’s garden, as well as great things in a children’s garden, things that don’t work in children’s gardens, what’s missing, and recommendations for improvement (Eames-Sheavly, 2005b). Although the youth consultants were not given the list of 72 elements/
features that emerged from the literature from which to indicate perceived importance, 
they nevertheless reported what they felt were the essential elements/features that a 
children’s garden should contain:

The **Essential Elements of a Children’s Garden**
- Smaller Scale objects used by children. (water fountains, chairs, tunnels, etc.)
- Child safe areas
- Secure boundaries around areas
- Safe accessible pathways
- Educational activities and areas
- Good location of site

(Design and Planning Team)

The Essential Elements of a Children’s Garden
- Inviting environment
- Both educational and fun
- Information center
- Interactive website
- Passionate staff

(Educational Programming Team)

The teams went on to expand their presentation by reporting the following:

**Great Children’s Garden Designs include the following:**
- Tall Mazes
- Slides
- Sense of enclosure
- Sculptures
- Animals
- Waterfalls
- Fountains
- Butterfly Gardens
- Play areas and natural structures
- Trees or covered structures for shade

(Design and Planning Team)
Great Things in a Children’s Garden
• Incorporating wildlife
• Wide variety of programs
• Product-Crop association
• Undisturbed nature
• Community sponsors

(Educational Programming Team)

Things that **don’t work** in Children’s Garden Designs include the following:
• Bad location (by major roadways)
• Concrete pathways
• Hazardous plants
• Picnic tables
• A lot of metal (benches, swings, etc.)
• Fences holding people back
• Honey Bees (unless controlled)
• Products unrelated to gardens
• Nude statues
• Fake figures

(Design and Planning Team)

Things that don’t work in a Children’s Garden
• Talking Tours
• Charging admission
• Strictly educational focus
• Activities only for young children

(Educational Programming Team)

What’s Missing? Here’s what we didn’t see that we wish we had:
• Transportation (trains, boats, etc.)
• Stage for programs or activities
• Natural pathways (no concrete) Ex: cobblestone pathways
• Hanging vines
• Wading pools (some water features)
• “Freedom Areas” (grass)
• Fish ponds
• Granite or grass furniture
• Bridges over waterways or gardens
• Pictures/words in grass

(Design and Planning Team)
What’s Missing?
- More international aspects
- Community rooms
- Community pool
- Bad example garden
- Beauty and use of weeds
- Conservation classes

(Educational Programming Team)

Recommendations for Improvement
- Stay away from theme park atmosphere
- Pick good locations  Ex: Stay away from roadways or buildings
- Enclose areas without using metal fencing
- Interesting atmosphere
- Shady places
- Stage areas where children can express themselves to an audience

(Design and Planning Team)

Recommendations for Improvement
- Donations
- Intergenerational activities
- More community involvement
- Hands on tours
- More fine arts

(Educational Programming Team)

During the team presentation to a group of adults, numerous questions were asked of the youth. Marcia Eames-Sheavly (2005b) noted points raised by the youth at least three times in their presentation. The teens remarked on “fake” materials more than any other topic. “They despised the look of them, and kept coming back to the notion of a children’s garden being, first, a garden. They also understood the need for concrete walkways for accessibility, but absolutely hated the look of them, and urged adults to consider alternative preparations in design: colored concrete, pressed leaves, anything to soften this surface” (Eames-Sheavly, 2005b). Other points raised by the teens included the need for fun, the critical nature of children’s safety, passionate staff being the key to
the whole educational experience, conservation/nature themes, intergenerational perspective – using an approach that did not limit activities to certain age groups:

Q: Does a children’s garden need a focal point – a large design feature of some kind?

A: Yes, definitely!

Q: Do you think it’s important that public gardens have special areas as “children’s gardens”? Is it necessary in a public garden setting?

A: We think it is. A children’s garden is different – scaled differently, more age appropriate for kids, and much more appealing. From what we learned, children’s gardens are also visited by families, senior citizens, etc. We think they’re the ideal.

Q: What was the most exciting thing you saw?

A: Living sculpture, particularly grass furniture.

Q: What is the one most important aspect of a garden program or design that makes learning fun and exciting?

A: Passionate and enthusiastic staff.
A: The freedom to explore on your own.
A: Being able to change a child’s mind (“Teenagers don’t like to be outside anymore.”)
(Eames-Sheavly, 2005b). (See Appendix C)

As noted earlier, a more in-depth examination of the essential elements/features that a children’s garden should contain is offered in Chapter 5.

What are the current preferences between and among children’s garden stakeholders concerning the level of autonomy that garden visitors should be afforded in accessing and utilizing the garden?

The research question concerning stakeholder preferences about the level of visitor autonomy afforded visitors in children’s gardens emerged in the literature review
and from personal experiences by this researcher (Cheskey, 2001b; Francis, 1994; Hart, 2004; Hermand, 1997; Lovejoy, 2005). On the research questionnaire, respondents were asked to indicate their preferences concerning the level of autonomy afforded four age groups of visitors: ages 0-6, ages 7-12, ages 13-18, age 18 and above. The level of visitor autonomy was represented on a continuum as seen below in Figure 4.1:

$$\begin{array}{c|c|c|c}
\text{Completely Un-Programmed} & \text{Significantly} & \text{Significantly Completely Programmed} \\
\hline
\text{Un-Programmed} & \text{Significantly} & \text{Completely Programmed} \\
\end{array}$$

Fig. 4.1. Continuum representing level of visitor autonomy

The sample size was 120. The number of completed questionnaires from AHS Symposium attendees was 85 (71%), and the number of completed questionnaires from the five botanical gardens was 35 (29%). Mean age of respondents was 45, with a standard deviation of 12 years. Administrators had the least amount of variability in age distribution, with a standard deviation of 7.95 years; visitors had the highest amount of variability in age distribution, with a standard deviation of 13.85 years. The percentages of respondents by stakeholder role were 43% self-identified as children’s garden educator, 23% as visitor, 14% as administrator, 12% as designer, and 7.5% as horticulturist.

The question of whether stakeholder role had any influence on their preferred level of visitor autonomy in a children’s garden was examined. Using multi-variate analysis of variance, there was no sufficient statistical evidence to show that stakeholder role influenced the level of preferred visitor autonomy in all children’s garden visitor age groups (Hotelling’s Trace = .085, p = .961). All stakeholders indicated preferences for less programmed activities - or greater visitor autonomy - in children’s gardens.
Table 4.4. Preferred level of visitor autonomy by stakeholder role

<table>
<thead>
<tr>
<th>Stakeholder Role</th>
<th>Age 0 to 6</th>
<th>Age 7 to 12</th>
<th>Age 13 to 18</th>
<th>Age 18 plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor</td>
<td>Mean 34.00</td>
<td>30.79</td>
<td>29.07</td>
<td>20.81</td>
</tr>
<tr>
<td></td>
<td>N 28</td>
<td>28</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation 21.536</td>
<td>22.051</td>
<td>19.723</td>
<td>24.295</td>
</tr>
<tr>
<td>Designer</td>
<td>Mean 36.21</td>
<td>35.21</td>
<td>38.50</td>
<td>31.71</td>
</tr>
<tr>
<td></td>
<td>N 14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Administrator</td>
<td>Mean 33.53</td>
<td>38.47</td>
<td>40.12</td>
<td>24.71</td>
</tr>
<tr>
<td></td>
<td>N 17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation 18.672</td>
<td>14.045</td>
<td>18.798</td>
<td>17.800</td>
</tr>
<tr>
<td>Horticulturist</td>
<td>Mean 32.56</td>
<td>33.78</td>
<td>36.56</td>
<td>27.33</td>
</tr>
<tr>
<td></td>
<td>N 9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Educator</td>
<td>Mean 32.35</td>
<td>35.38</td>
<td>34.32</td>
<td>33.19</td>
</tr>
<tr>
<td></td>
<td>N 51</td>
<td>50</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>Total</td>
<td>Mean 33.38</td>
<td>34.59</td>
<td>34.62</td>
<td>28.39</td>
</tr>
<tr>
<td></td>
<td>N 119</td>
<td>118</td>
<td>117</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation 19.525</td>
<td>17.408</td>
<td>19.663</td>
<td>21.246</td>
</tr>
</tbody>
</table>

Figure 4.2 represents this data on a continuum for each age group of garden visitors (as seen in the research questionnaire) with a key for stakeholder roles. Each continuum line has 80 distinct points from which respondents chose to indicate their preferences. There are vertical lines on each end of the continuum, and between points 20 and 21, middle points 40 and 41, and points 60 and 61.
The question of whether stakeholder age had any influence on their [stakeholder] preferred level of visitor autonomy in a children’s garden was examined. The stakeholder age ranges were mainly formed by decade long intervals, starting at age 18; respondents over 60 years of age were condensed into one range because only three respondents in this study were older than 70 and none were over 76 years of age.
Although there were children’s garden visitors who may have responded with the input of children and youth with them, the age of all designated respondents was at least 18 years of age or older. Therefore, the stakeholder age groups formed were 18-29, 30-39, 40-49, 50-59, 60 and older. Again, using multi-variate analysis of variance, the preferred level of visitor autonomy in children’s gardens was influenced by stakeholder age (Hotelling’s Trace = .350, p = .016).

<table>
<thead>
<tr>
<th>Stakeholder Age</th>
<th>Age 0 to 6</th>
<th>Age 7 to 12</th>
<th>Age 13 to 18</th>
<th>Age 18 plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 18-29</td>
<td>Mean</td>
<td>29.29</td>
<td>36.86</td>
<td>49.29</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>19.325</td>
<td>15.689</td>
<td>12.462</td>
</tr>
<tr>
<td>Age 30-39</td>
<td>Mean</td>
<td>31.45</td>
<td>31.85</td>
<td>25.16</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>20</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>22.267</td>
<td>20.350</td>
<td>21.446</td>
</tr>
<tr>
<td>Age 40-49</td>
<td>Mean</td>
<td>32.18</td>
<td>31.60</td>
<td>34.70</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>19.343</td>
<td>17.076</td>
<td>19.677</td>
</tr>
<tr>
<td>Age 50-59</td>
<td>Mean</td>
<td>35.10</td>
<td>37.39</td>
<td>36.90</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>31</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>17.507</td>
<td>14.635</td>
<td>18.582</td>
</tr>
<tr>
<td>Age 60 &amp; above</td>
<td>Mean</td>
<td>39.86</td>
<td>38.92</td>
<td>27.00</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>14</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>33.38</td>
<td>34.59</td>
<td>34.62</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>119</td>
<td>118</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>19.525</td>
<td>17.408</td>
<td>19.663</td>
</tr>
</tbody>
</table>

Table 4.5. Preferred level of visitor autonomy by stakeholder age

Figure 4.3 represents this data on a continuum line for each age group of garden visitors (as seen in the research questionnaire) with a key for stakeholder age in ranges.
In conducting this analysis, the question of whether stakeholder age and role had any influence on their [stakeholder] preferred level of visitor autonomy in a children’s garden was scrutinized. The interaction of stakeholder role and stakeholder age for preferred level of visitor autonomy was not statistically significant (Hotelling’s Trace = .534, p = .656).
The question of whether the origin of respondents - i.e. whether attendees of the 2005 AHS Children & Youth Garden Symposium or respondents from the five botanical gardens sampled - had any influence on their [stakeholder] preferred level of visitor autonomy in a children’s garden was also investigated. In another run of the multivariate analysis of variance, it was found that the origin of stakeholders did influence the level of preferred children’s garden visitor autonomy within all visitor age groups (Hotelling’s Trace = .128, p = .015). Those respondents who attended the AHS Symposium preferred less visitor autonomy – more programmed activities – for children’s garden visitors than did respondents from the five botanical gardens sampled.

All of the research findings concerning the question of preferred level of children’s garden visitor autonomy by stakeholders are discussed and further detailed in Chapter 5. It should be noted that some respondents indicated that children’s gardens should offer both programmed and un-programmed activities and opportunities for visitors. Four respondents marked “both” for ages 0-6, five marked both for ages 7-12, three marked both for ages 13-18, and five marked both for age 18 and above. One thoughtful respondent whose answer I detailed earlier in this chapter was identified by me to be Cindy Tyler, partner in the landscape architecture firm of Marshall-Tyler-Rausch. I contacted her to confirm this and obtain her permission to identify her as the respondent. Her answer included a description of programmed and unprogrammed activities, illustrating this aspect in her conceptualization of a children’s garden:

*My description of a children's garden coincides with the third type of garden in a public garden setting. These spaces, in my experience, are almost always designed for two types of learning: programmed (field trips, docents, garden programs) and unprogrammed (drop in visitor, weekend family “quality” time). We know that children learn best when a mentor, docent, or parent is helping*
them engage in an activity, answering questions as they go, or through an animated story or puppet show. But that is not the only way they learn. They learn through their own unscripted play, spontaneously. It is through this unprogrammed arena that we provide to them that their visits are fresh and different each time they return, fueled by simply their own imagination and natural curiosity. So our gardens generally must accommodate and encourage both kinds of activities, programmed and unprogrammed (Tyler, 2005).

Summary

This chapter presented most of the research findings from this study, with the meta-synthesis of the literature explicated in Chapter 2 as the exception. Data emerged from the researcher’s personal experiences, the review of the literature, the data obtained from the Cornell University workshop, the open-ended items on the research questionnaire, the quantifiable items on the research questionnaire, and various analyses of the collected data. Chapter 5 includes a reiteration of the purpose of the study, a summary of the research findings, a discussion of the literature and whether it supports or does not support the findings, implications, and recommendations for researchers and practitioners in the field.
CHAPTER 5
SUMMARY, DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter includes a reiteration of the purpose of the study, as well as a summary of the research findings, a discussion of the literature and whether it supports or does not support the findings, implications, and recommendations that emerged from conducting the study. Each of the research questions was examined in this manner, respectively. The fundamental basis of this chapter was to identify general patterns and offer commentary concerning the emergent data and analyses. Recommendations were made for practitioners in the field as well as for future research endeavors.

Purpose of the Study

The overall purpose of this study was to review and synthesize the existing body of knowledge concerning the benefits to children from experiences in children’s gardens and the recommended elements that should be included in children’s gardens. Secondly, the purpose of this research was to elicit the responses of various children’s garden stakeholders - i.e., children’s garden educators, directors/ administrators, designers, visitors, and horticulturists – in regards to how they conceptualize a children’s garden, what they think are the essential elements or features of a children’s garden, and their preferences concerning the autonomy of garden visitors. This research was meant to
explore basic constructs and issues within the area of children’s gardens, highlight existing research, and underscore respondent differences or similarities that emerged from this study. In order to move the field forward into progressive discourse between and among children’s garden stakeholders, a fundamental exploration of key constructs and issues was viewed by this researcher as paramount.

What is known about benefits to children from children’s garden experiences and/or plant-based learning?

The first research question concerning benefits to children from children’s garden experiences and/or plant-based learning was explicated through the comprehensive literature review in chapter 2. In the subsequent meta-synthesis of the literature, a number of related issues were examined. The outline of the history of children’s gardening gave a brief glimpse of recorded efforts in this arena from ancient Persia to modern day America. The proliferation of children’s garden programs early in the 20th Century in the U.S. was beautifully documented from the contemporary writings of Louise Miller (1904) and the historical work conducted by Rose Hayden-Smith (2004). Despite a resurgence of children’s gardening activities during WWII, the importance placed on hard science and math in the 50’s and 60’s rarely included teaching and learning these subjects through a plant-based filter. Increased environmental awareness in the 70’s and 80’s brought with it a greater call for naturalistic learning of all subjects; however, the current emphasis placed on competing in the high-tech global economy and ‘teaching to tests’ in formal education in the U.S. has created an atmosphere where children spend less and less time connected with nature, less and less time engaged in
plant-based learning. If the essential connection between people and plants espoused by a number of authors is correct, then the general trends of modern society in the U.S. and elsewhere are anathema to this connection (Eastin, 2004; Janick, 1992; Kellert & Wilson, 1993; Lewis, 1992, 1994, 1996; Louv, 2005; Lovejoy, 2005; Moore & Wong, 1997; Orr, 2002; Rivkin, 1997; Subramaniam, 2002; Wellhousen, 2002). These advocates, a courageous few, are importantly focusing on this vital connection for people to plants and natural experiences. All of their messages need to be published and widely disseminated, with a focus on reaching the individuals and organizations that have the ability to draft educational policy or establish pedagogical parameters.

Opportunities for children to experience wonder and enchantment arose in the literature as important aspects of learning in natural environments (Bennett, 2001; Bryan, 1986; Fisher, 1998; Richardson, 1998), as did the many benefits to children and youth from play in natural environments (Lambert, 1974; Senda, 1992; Stine, 1997). This facet of play in a wild area or un-designed part of a garden has been advocated for by a number of experts (Cheskey, 2001b; Francis, 1994; Hart, 2004; Hermand, 1997; Lovejoy, 2005). Children’s garden stakeholder preferences for the level of programmed and unprogrammed activities in a garden setting was explored more thoroughly in this chapter as it related to the last research question of this study. Although these items may fall outside the boundaries of what many educators measure as benefits to children and youth, the fact remains that they are significant ingredients of child and youth development. More research needs to be conducted to highlight them within gardens and natural environments.
Of the many reported benefits to children and youth in the affective, cognitive, and psycho-motor domains, there was an overall and consistent assertion in the literature that garden experiences and plant-based learning can be inclusive, integrative, multi-dimensional, and holistic. Chapter 2 of this research detailed reported studies that focused on specific benefits to children – cognitive skills, for example. Rather than present all of these studies again in this section, a focus on the concepts inherent within holistic development through plant-based experiences is warranted. Numerous studies have asserted that direct and indirect experiences of nature, including specifically children’s gardening, has been and may continue to be a critical component in human physical, emotional, intellectual, and even moral development (Billmore et al., 1999; Chambers, Johansson, & Walcavage, 1995; Davis, 1994; Eames-Sheavly, 1999; Foster, 1917; Hefley, 1973; Johnson & Tunnicliffe, 2000; Kahn & Kellert, 2002; Lewis, 2004; Louv, 2005; Lucas, 1994, 1995; MacLatchie, 1977; Miller, 1904; Moore & Wong, 1997; Ocone, 1983; Partnership for Plant Based Learning, 2005; Pivnick, 2001; Rivkin, 1997; Skelly & Zajicek, 1998; Subramaniam, 2003; Tilgner, 1988).

The environment as an integrated context for learning was frequently reported in the literature as being beneficial for children and youth. Learning in a natural setting was reported as improving cognitive skills, socialization skills, health and nutrition, environmental attitudes, community involvement, and a host of other knowledge, skills, attitudes, and behaviors (Alexander, North, & Hendren, 1995; Bauer, 2002; Bell, 2001; Billmore et al., 1999; Boleman & Cummings, 2003; California Dept. of Education, 2003; Chawla, 1994; Cheskey, 2001a; Cobb, 1977; Coffey, 2001a; Davis, 1994; Elliott, 1978; Evergreen, 2000; Grant & Littlejohn, 2001; Green, 1994; Hayzlett, 2004; Kirschbaum,
So what does the literature report as benefits to children and youth from children’s garden experiences and/or plant-based learning? Holistic development of children (and human beings in general) – with positive influences on knowledge, skills, attitudes, and behaviors - is reported as greatly enhanced from experiences in a natural environment, through plant based learning, and specific experiences in a garden setting. The environment effectively serves as an integrated context for learning. Obviously, more research is needed in the field to substantiate direct benefits to humans from these types of experiences and activities. The need for this research was highlighted in Chapter 1 of this study. As previously stated by Delaine Eastin (2002), let there be no doubt about the critical role that published research plays for practitioners in advocating for the creation of children’s gardens and outdoor environments, best practices in conducting educational activities in a garden setting, and the sustainability of established outdoor learning environments.

What is a children’s garden?

Noted in the research findings were some characteristics that emerged in the qualitative data of this research, constituting a glimpse into how the children’s garden
stakeholders sampled in this research define the construct. Included were 1) exploration and discovery; 2) interactive, hands-on, experiential; 3) appealing to all senses, offering varied and different experiences; 4) specifically designed for children - a smaller physical presence and allowing freedom of activity apart from adults; 5) connection to and appreciation of the natural world/plants/food, inculcating an environmental ethic, and offering a people/plant connection. Several of these characteristics dovetail with the three working definitions of plant based education crafted at the 2004 Congress for the Partnership for Plant Based Learning: 1) plant based education is a systems approach to learning using the natural world as a laboratory, 2) plant based education is an experiential approach to integrated learning using plants as the medium (vehicle), and 3) plant based education is an approach to integrated learning using relevant experiences with plants (as a foundation for strengthening communities and connecting people with the natural world). The aspect of an integrated context for learning discussed in the previous section of this chapter is a fundamental part of these three working definitions for plant based education.

The literature review provided no example of a definition for the children’s garden construct and scant mention of the characteristics that emerged from respondents in this study. Eberbach (1988) offered guidelines in the design process for children’s gardens that noted some of the previously mentioned characteristics: play and exploration, activity, sensory experiences through plant variety, child’s scale, feeling of possession of their space and the freedom to manipulate objects, aesthetically pleasing, bright and bold color use, and gathering places. I do not have the temerity to offer a definition here; nor did I intend to offer a definition through this research. As mentioned
in Chapters 1 and 3, this particular research question dictates a research methodology not pursued in this study. However, I offer some personal insights into the nature of a construct definition, with accompanying implications and recommendations.

The thoughtful response to this question that I detailed in Chapter 4 was received from a children’s garden designer and attendee of the AHS Symposium. Cindy Tyler, partner in the landscape architecture firm of Marshall-Tyler-Rausch, was contacted, confirmed that she was the respondent, and gave her permission to identify her as the respondent. Her response guided me down a different path in my perception of a definition for the construct. Rather than a concise definition - something that has so far eluded academics and practitioners in the field - I began to envision a typology based upon Tyler’s response, my previous experiences, and other data that emerged in this research study. The fact that the construct of children’s garden has never been defined is, in my opinion, partly due to a number of attributes such as the widely divergent contexts in which one finds them and the fundamentally discrete functions that they serve. The pertinent parts of her response are reiterated here:

There are many types of gardens that are designed for children – all with different missions because they are in different places, fostered by different people. For example, a garden in a school with a captive and smaller audience that is supervised (for the most part) will be very different from a children’s garden in a public park. Park gardens are not typically built for formal or informal learning. Park gardens are built as “wild places” for kids simply to play outside with nature, or added to typical swings or slides. These places may or may not be supervised by adults, but they are always used by kids for “unscripted play and spontaneous learning”. Both, however, are children’s gardens and have been called as such.

A third type of children’s garden is that which can be found within the realm of a public garden or arboretum. Here larger volumes of visitors, all ages, sometimes supervised come to enjoy the garden. What is inside this type of garden has to be powerful and magical enough to accomplish two goals: to entice the kids to return; and to inspire parents, teachers, park officials, politicians, etc.
to take what they have experienced and build a place for kids to connect with nature in their own communities on a daily basis... These spaces, in my experience, are almost always designed for two types of learning: programmed (field trips, docents, garden programs) and unprogrammed (drop in visitor, weekend family “quality” time) (Tyler, 2005).

The following table (Table 5.1) presents the typology I offer for children’s gardens:

<table>
<thead>
<tr>
<th>School Garden/ Outdoor Classroom/ Schoolyard Habitat</th>
<th>Children’s Garden in a Public Park or Recreation Area</th>
<th>Children’s Garden alone or in a Botanical Garden/ Arboretum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal education</td>
<td>Non-formal education</td>
<td>Mainly informal and non-formal education</td>
</tr>
<tr>
<td>Smaller volume of visitors; frequent visits</td>
<td>Larger volume of visitors; frequent or infrequent visits</td>
<td>Larger volume of visitors; frequent or infrequent visits</td>
</tr>
<tr>
<td>Children &amp; youth with teacher supervision</td>
<td>People of all ages with varying supervision</td>
<td>People of all ages with varying supervision</td>
</tr>
<tr>
<td>Child-centered</td>
<td>Mainly family-centered</td>
<td>Child and family-centered</td>
</tr>
<tr>
<td>Active gardening, possibly by plot</td>
<td>No active gardening</td>
<td>Mixed: some with active gardening and some with no active gardening</td>
</tr>
</tbody>
</table>

Table 5.1. Children’s garden typology

Obviously, this typology is not complete nor in final form; it is simply an initial effort to generate academic dialogue about structuring the construct of children’s garden within the field. For example, where do children’s gardens on personal property fit in this typology; do experts in the field wish to only consider public gardens? What about a children’s garden at a public library – does that garden fit within the Public Park or Recreation Area type? What about the amount of time that children and youth spend in one, or several, gardens: should the typology reflect the temporal aspect? The act of gardening in one’s own plot over time, rather than occasionally visiting a children’s garden, may be an aspect of the typology that should be examined more closely. The fact is that there are innumerable children’s garden contexts, purposes, missions, and activities; therefore, the possibility of any number of them not fitting neatly into a
typology is high. However, I present a typology for a number of reasons emanating from social science and behavioral research: 1) they help provide the field with organizational structure, 2) they provide clear, distinct examples, 3) they are helpful in establishing a common language for the field, 4) they help practitioners navigate the much broader construct and provide a variety of paths that may be used in accomplishing their goals, and 5) they are useful as an educational tool, familiarizing students with prototypes or providing examples to be critically examined (Teddlie & Tashakkori, 2003).

The implications of this typology are plentiful for both researchers and practitioners. Researchers and academics could engage in further investigation of this typology, critically examine it, offer their own interpretations, refine and tweak it – all to the benefit of the field. Practitioners could gain a greater understanding of the broad range of what children’s gardens are, rather than adhering to a fixed, pre-determined definition of what a children’s garden is. They could use the typology as a tool in determining what a children’s garden entails for them and their clientele, in their locations and contexts, and the way(s) in which they intend to utilize the garden or outdoor environment.

What are the essential elements/features that a children’s garden should contain?

One of the foci of the meta-synthesis of the literature was children’s garden design. This subject could have stood alone as a separate line of inquiry: “What is known about children’s garden design?” I chose to investigate it as it specifically related to the recommendations by various authors about essential elements and features that a children’s garden should contain - the focus of the previously stated research question.
Before delving into the research findings for recommended elements/features, I will briefly discuss what emerged in the literature review concerning children’s garden design and design for children’s outdoor learning environments.

Four main approaches to the discussion of children’s garden design were discerned by me within the literature. One approach used was functionality - the activities in which children and youth would engage in an outdoor environment, or should be able to engage, were most emphasized; the essential elements noted were portrayed through their respective functions. Another approach was procedural – the steps one would take in order to effectively design a children’s garden. A third approach was structural – specific elements and features within a children’s garden were listed. Lastly, many authors included parts of each of these three approaches or perspectives – functional, procedural, and structural – in a mixed approach to children’s garden design. In all of the approaches, physiological considerations and developmental stages of young people were used as overarching guidelines in the recommendations offered.

These approaches to children’s garden design were the result of the synthesis and interpretation of the reviewed literature. Another viewpoint is that each approach constitutes a technique in designing children’s gardens and outdoor environments. These techniques could be further delineated and correlated to the types of children’s gardens explicated in the previous section of this chapter. For example, the literature tends to favor a procedural design approach when discussing a school garden. There is an emphasis on garnering support from all of the school’s stakeholders to ensure success. The connection between type of garden being established and the design approach employed could be much more fully explored. Practitioners could use the children’s
garden typology and the design approaches discussed in this research as a way to interpret their own methods and activities in the field.

As for the specific elements and features that a children’s garden should entail, a list of elements/features emerged directly from the literature reviewed. Respondents of the research questionnaire indicated the importance that they placed on each of the 72 elements/features listed, and were given an opportunity to specify any elements not on the list they felt should be. Chapter 4 showed the percentage distribution, mean, and standard deviation values for the scaled importance of children’s garden elements/features. They were arranged in descending order of the mean value, within a range of 6.85 for the children’s garden element of plants to 2.55 for the children’s garden element of painted stumps. The standard deviations ranged from a low of .481 for the element of plants to a high of 2.36 for the element of swing(s). For the 72 elements/features listed on the questionnaire, not taking into account the “other elements” offered by respondents, 61 received responses indicating relative importance of the elements, with a mean of more than 4.0 on the eight-point scale. Twelve of these elements received responses indicating that the element was very important to essential, with a mean of more than 6.0.

Plants received the highest mean value, with the smallest standard deviation. Respondents had a significant degree of agreement upon the essential nature of plants as an element within a children’s garden. This was certainly born out in the literature review: 27 resources recommended plants be a part of children’s gardens, the highest number of resources for an individual element. Of the few studies conducted with children, plants ranked very high, if not the highest, in all of them (Eberbach, 1987, 1988, 1992; Heffernan, 2004; Taylor, 1994). Water source for plants came in second, also with
a high mean value and low standard deviation. This element was supported in the literature, but not strongly. One reason for this may be that authors and experts simply consider this common knowledge. Plants need water and it is assumed that a source for them will be made available in a children’s garden. Sensory elements came in third. This element was supported by a significant number of resources in the literature review, and repeatedly noted in the responses to the open-ended question concerning what is a children’s garden. The element of trees was fourth, water source for people fifth, paths was sixth, and water feature(s) seventh. Obviously, these elements were all supported in the literature by a varying number of authors or they wouldn’t have been listed on the questionnaire in the first place. Rather than re-listing elements in descending order based upon mean value, the greater meaning of responses concerning the elements/features that a children’s garden should contain may be found elsewhere.

The cluster analysis of the data revealed five discrete clusters, with two children’s garden elements/features falling into the first cluster, 15 elements in the second cluster, 19 elements in the third, 25 in the fourth, and 11 elements in the fifth cluster. The elements/features in clusters 1, 2, and 3 corresponded very closely with the elements obtaining the highest mean values of assigned importance by respondents, in descending order. The remaining elements in clusters 4 and 5 were those obtaining the lower mean values with greater deviation between responses concerning those elements. There are a number of implications that emerge from the data for this researcher.

The first pattern I discerned in the cluster analysis is that the 36 children’s garden elements/features in clusters 1, 2, and 3 were viewed as important or very important by respondents and the remaining 36 elements in clusters 4 and 5 were not viewed as very
important. This coincided with mean values above 5.18 for the first 36 elements and mean values at or below 5.07 for the second 36 elements. The 17 children’s garden elements in clusters 1 and 2 could be viewed as the most important to essential for respondents; the 19 elements in cluster 3 viewed as important, but not essential; the 25 elements in cluster 4 were not important to respondents; and the 11 elements in cluster 5 viewed by respondents as not important at all. This was the most straight-forward interpretation. Additional attempts to characterize the elements in each of the five clusters by whether they are biotic or abiotic, inherently active or passive, or any other perceptible pattern were not fruitful. However, comparing the information from the cluster analysis of children’s garden elements with the information from the Kruskal-Wallis Tests that were run concerning children’s garden elements shows some very interesting patterns.

The children’s garden elements/features emerging from the data analysis that elicited a statistically significant difference in assigned importance based upon stakeholder role were annuals (.03), bathrooms (.014), buildings (.001), games area (.007), greenhouse/cold frame (.006), learning stations (.001), maze (.000), patio/terrace (.002), pinwheels (.015), plant structures (.018), playhouse/den (.002), scarecrows (.045), sculpture/ornament (.042), security/first aid (.043), signs (.013), swings (.001), tools/tool shed (.005), topiary (.041), and tree house (.028). Almost all of these elements received a high level of agreement on their importance from visitors: bathrooms, buildings, games area, greenhouse, maze, patio, pinwheels, security/emergency phone/first aid, swings, and topiary. One implication of this may be their preoccupation with the “creature comforts” – bathrooms, buildings, patio, and security - and those elements/features that provide the
greatest opportunities for activity for their children – games area, learning stations, maze, pinwheels, and swings. Another implication may be much more direct: the elements that visitors consistently assigned value to as important were ones that they had previous experience with and were most familiar from parks and playground outings. The most interesting aspect of this is that none of these elements deemed important by visitors (relative to other stakeholders) were assigned very important to essential status by respondents overall. Bathrooms, learning stations, and security/phone/aid fell into cluster 3 – important, but not essential – and the remaining elements of buildings, games area, greenhouse, maze, patio, pinwheels, swings, and topiary fell into clusters 4 and 5 – not important or not important at all. This would indicate, at least in my view, a disconnect between what visitors value and what other children’s garden stakeholders value as important elements in a garden. At the very least, it shows that children’s garden visitors would expect to see these elements in a children’s garden that they visit.

The children’s garden elements that received a high level of agreement on their importance from horticulturists (relative to other stakeholders) were annuals, plant structures, playhouse/den, sculpture/ornament, signs, and tree house. The direct implication of this is that these are the elements that children’s garden horticulturists value more highly than other children’s garden stakeholders do. The element of plant structures fell into cluster 2 as very important to respondents overall; the elements of annuals and signs fell into cluster 3 – important, but not essential – and the remaining elements of playhouse/den, sculpture/ornament, and tree house fell into clusters 4 and 5 – not important or not important at all to respondents overall. Again, this may indicate a
disconnect between what horticulturists value and what other children’s garden stakeholders value as important elements in a garden.

Lastly, the elements of scarecrows and tools/tool shed elicited significant agreement from administrators/directors as being important in a children’s garden. The implication of this may be elusive. One could propose that administrators are ultimately tasked with maintenance issues for the garden and these two elements fall within their purview. The purchase of tools, responsibility for their proper storage, and planning for the legalities of their proper usage in a children’s garden would fall to administrators—but this may be stretching the connection too far. The element of tools/tool shed fell into cluster 3 – important, but not essential – and the element of scarecrows fell into cluster 4. There may be a disconnect between administrators and other children’s garden stakeholders concerning the value of these two elements, but I tend to think that this is an anomaly. More information is needed in order to assess a trend or pattern.

Possibilities for research concerning differences in the importance assigned to children’s garden elements based upon stakeholder role are abundant. Do designers value hardscape elements more than other stakeholders? It doesn’t appear so in this study. Are visitors more concerned about creature comforts in the garden than others? The indication is yes, and the youth consultants from the Cornell workshop stressed them as well, especially safety (Eames-Sheavly, 2005b). Do horticulturists place more importance on plants in the garden more than other stakeholders? This research implied otherwise. A possible area of research is concerning which elements/features are more familiar to children’s garden visitors and ones they expect to see when they visit a children’s garden. There may be a need for practitioners to explicate the mission of their
gardens more thoroughly; if the intention of visiting is to connect with nature and experience first and foremost a garden, not a playground or amusement park - as many respondents stated in their conceptualizations of what a children’s garden is, then it may behoove practitioners to ask themselves whether more immediate information is needed by visitors in terms of what they, and what their children, can expect to see and do while in the children’s garden. The aspect of the garden being interactive and appealing to all five senses for children emerged strongly in this research, but there appears to be some disagreement on which interactive elements/features are most valued by visitors and which are most valued by other children’s garden stakeholders.

In terms of the children’s garden elements/features emerging from the data analysis that elicited a difference in assigned importance based upon stakeholder age, there were only two elements found with an attained statistical significance of \( p = .050 \): sensory (.024), and wildlife (.041). The 40-49 age group of stakeholders attached greatest importance to sensory elements in a children’s garden (70.21), followed by the 50-59 age group (59.24), 60+ age group (57.50), the 18-29 age group (55.23); and the 30-39 age group attached the least importance to sensory elements (46.60). With the children’s garden element of wildlife, the 50-59 age group of stakeholders attached the greatest importance (71.50), followed by the 40-49 age group (62.58), the 30-39 age group (58.55), the 18-29 age group (52.37); and the 60+ age group of stakeholders attached the least importance to the wildlife element in children’s gardens (41.71). Both of these children’s garden elements fell into cluster 3 – important, but not essential (although ‘sensory’ received the third highest mean value of all elements (mean = 6.50, standard deviation = 1.111). Frankly, I’m not sure what to make of these findings. In the
case of the children’s garden element of sensory, the age group assigning it most importance was the next older to the age group assigning it the least importance. In the case of the children’s garden element of wildlife, the age group assigning it least importance was the next older to the age group assigning it the most importance. Obviously, more research needs to be conducted to see if stakeholder age has any significant influence on the importance assigned to individual children’s garden elements/features. An area of investigation within this research question that may yield far richer data would be the comparison of responses between children and adults, and between different age groups of children. Later in this chapter, I call for additional research with children and youth concerning their perceptions of children’s gardens, their preferences, and their recommendations for academics and practitioners. This area of research would certainly fall within that call.

In compiling the list of 72 children’s garden elements/features that emerged from the literature, there was a conscious decision to list them alphabetically so as not to bias responses concerning importance. If water feature(s) were listed first, for example, there could be a distinct inference that it must be of great importance for children’s gardens. Additionally, there was a conscious decision to incorporate the same element on different levels. The element of plants was listed individually, but so were trees, perennials, vegetables, vines, sunflowers, annuals, wildflowers, berries/fruits, pumpkins, orchard, woodland, bulbs, gourds, and melons – all of them plants. So why were the mean values for these elements so different? Melons, with a mean of 3.88 and a standard deviation of 1.937, was consistently assigned low importance, while vegetables – of which melons are a type – was consistently assigned high importance, with a mean of 6.01 and a standard
deviation of 1.417. One reason for this may be reluctance on the part of children’s garden stakeholders to specify individual plant types, a much narrower focus, over more general terms for plants. Plants, trees, perennials, vegetables, and vines may be of a sufficiently broad nature to warrant high values. Melons, gourds, bulbs, and pumpkins may be too specific to garner similar values. The only plant element to elicit a statistically significant difference in assigned value based upon stakeholder role was annuals, with children’s garden horticulturists assigning it the greatest importance relative to the other stakeholder roles. Visitors and administrators assigned annuals importance, with educators and designers assigning annuals the least importance. One implication may be that plants obviously play an essential role in children’s gardens, but requiring stakeholders to provide narrow, discrete examples of the plants they would recommend is anathema to the contextual nature of each garden. A recommendation for further research is to investigate the knowledge, attitudes, and behaviors of children’s garden stakeholders in relation to specific plant choices for their gardens. Another recommendation is to acknowledge the contextual nature of plant choice for individual gardens and instead investigate overarching principles of plant choice for the creation of the best outdoor environments possible. The latter type of research (principles of plant choice) has been offered by Robin Moore (1993), but further research in this area may prove fertile. Another recommendation is to further explicate the meaning of elements. What are respondent conceptualizations of ‘buildings’, for example. One could look at essential elements and further break down what is meant by each. Would stakeholder role or age play a part in definition of individual children’s garden elements?
Of special note within the findings of this research question is the fact that the children’s garden element of animals/wildlife and the children’s garden element of wildlife, listed separately, garnered almost the exact same results from respondents. The measures for wildlife (mean = 5.95, standard deviation = 1.685) and for animals/wildlife (mean = 5.93, standard deviation = 1.694) would indicate a high reliability of the instrument. Of course, administering the questionnaire to various samples over a longer period of time would be a much stronger indicator of reliability.

The seven youth who participated in the Cornell University workshop as garden consultants confirmed the importance of several elements/features, offered their suggestions about elements that a great children’s garden would contain, things that don’t work in children’s gardens, what’s missing, and recommendations for improvement (Eames-Sheavly, 2005b). Essential elements they noted included objects scaled for child-size, safe areas, secure boundaries, pathways, educational areas, an information center, interactive website; an inviting environment that is both educational and fun, with passionate staff. Great children’s gardens include tall mazes, slides, enclosure, sculpture, animals, waterfalls, fountains, butterfly gardens, play areas and natural structures, trees or covered structures for shade, wildlife, a wide variety of programs, product-crop association, undisturbed nature, and community sponsors. A number of specific children’s garden elements were reported as “missing” in all of the gardens that the youth consultants saw personally and on the internet. These included transportation (trains, boats, etc.), stage for programs or activities, natural pathways (no concrete – cobblestone pathways instead, for example), hanging vines, wading pools (some water features), “freedom areas” (grass), fish ponds, granite or grass furniture, bridges over waterways or
gardens, pictures/words in grass, more international aspects, community rooms, community pool, a bad example garden, beauty and use of weeds, and conservation classes. The majority of these elements/features emerged in the literature review for this study; however, there were a few suggested elements not recommended by authors previously. The idea of a product-crop association represented in a children’s garden was unique, as was grass furniture, pictures/words in grass, a community room or community pool, a bad example garden [“Here’s what NOT to do with a garden,” or “Here’s an example of a neglected garden.”], and specifying the beauty and use of weeds. For me, the implications and recommendations stemming from this data go hand-in-hand. There is a great need for additional research with children and youth concerning their perceptions of children’s gardens, their preferences, and their recommendations for academics and practitioners. I view children and youth as the ultimate stakeholders of these gardens; does it not behoove us to include them in every stage of planning, designing, developing, implementing, maintaining, evaluating, and sustaining children’s gardens and outdoor environments?

In the beginning stages of instrumentation, another item was placed on the questionnaire that was identified as a possible influence on the list of recommended elements/features of a children’s garden. Later, this item was determined to be an entirely discrete research question better pursued at a future time. The notion of constraints on the establishment of one’s ideal children’s garden, with all of the elements that one may wish to include, was forthright in this researcher’s mind. Data from the literature review were relativelysparse concerning the measurement of constraints in creating a children’s garden; however, resources that did mention these issues were fairly
emphatic about their importance. If the question were framed within a survey technique, it might take the following form:

- There are many issues that you may have to address in creating a children’s garden. If you were building your ideal garden, how much importance would you place on each of the following issues in establishing your children’s garden?

<table>
<thead>
<tr>
<th></th>
<th>Not Important</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
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<td>Accessibility</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>7</td>
</tr>
<tr>
<td>Alignment of garden features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>with educational outcomes</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>3</td>
<td>4</td>
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<td>5</td>
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<td>7</td>
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Figure 5.1. Proposed question measuring importance of various constraints in the establishment of children’s gardens

Different stakeholders may indicate widely divergent levels of importance as to constraints. For example, one might hypothesize that a children’s garden administrator/director would impart a much higher level of importance on these issues within the process of establishing a garden than a children’s garden visitor would indicate. The implications for this could be significant in explicating the elements/features that different stakeholders indicate are essential in their conceptions of a children’s garden. It might explain why children’s garden visitors consistently considered buildings as very important or essential while children’s garden educators did not. I would certainly recommend that this particular area be investigated further through subsequent research.

There are a plethora of questions that could be posed in this particular area; the general recommendation for academics and practitioners is that more information needs
to be gathered from all of the stakeholders of children’s gardens to better delineate aspects of the field and better offer best practices.

**What are the current preferences between and among children’s garden stakeholders concerning the level of autonomy that garden visitors should be afforded in accessing and utilizing the garden?**

The last research question explored children’s garden stakeholder preferences concerning the level of visitor autonomy while engaged in a garden. On the research questionnaire, respondents were given a visual analog scale in the form of a continuum and were asked to indicate their preferences for visitor autonomy afforded four age groups of visitors that came from the developmental psychology literature: ages 0-6, ages 7-12, ages 13-18, age 18 and above. As reported earlier, the sample size was 120. The number of completed questionnaires from AHS Symposium attendees was 85 (71%), and the number of completed questionnaires from the five botanical gardens was 35 (29%). Mean age of respondents was 45, with a standard deviation of 12 years. Administrators had the least amount of variability in age distribution, with a standard deviation of 7.95 years; visitors had the highest amount of variability in age distribution, with a standard deviation of 13.85 years. The percentages of respondents by stakeholder role were 43% self-identified as children’s garden educator, 23% as visitor, 14% as administrator, 12% as designer, and 7.5% as horticulturist. Stakeholder age ranges were mainly formed by decade long intervals, starting at age 18; respondents over 60 years of age were condensed into one range because only three respondents in this study were older than 70 and none were over 76 years of age. Although there were children’s garden visitors who
may have responded with the input of children and youth accompanying them, the age of all designated respondents was at least 18 years of age or older. Therefore, the stakeholder age groups formed were 18-29, 30-39, 40-49, 50-59, 60 and older.

The multi-variate analysis of variance revealed that significant differences between stakeholders in their preferred levels of visitor autonomy in a children’s garden did not emerge based upon their [stakeholder] role. What did emerge was a generally consistent preference by all stakeholders for un-programmed activities, or greater visitor autonomy, in children’s gardens. Despite the general preference for more un-programmed activities for children’s garden visitors by all stakeholders, there were some interesting patterns discerned within these parameters. The first analysis of data with 100 respondents showed a greater variability in responses than did the data analysis with 120 respondents. Is this an implication that greater data collection would yield greater consistency between and among stakeholders concerning preferred levels of visitor autonomy in a children’s garden? Further research is needed to find out. Children’s garden visitors tended to prefer less programmed activities, or more visitor autonomy, as the age of visitor increased. In other words, they preferred more programmed activities for children ages 0-6, a little less for children ages 7-12, a little less for youth 13-18, and the least programmed activities for visitors age 18 and above. This may be an indication that respondents were equating amount of supervision with the amount of programmed activities for children and youth. Interestingly, children’s garden educators preferred more programmed activities for visitors (or less visitor autonomy) in the 18 and above age group than in the other children and youth age groups. This may be an indication that children’s garden educators were not equating supervision with level of programmed
activities. Children’s garden visitors, administrators, and horticulturists all tended to afford greater autonomy to visitors age 18 and above. I cannot proffer an explanation of this without again asking whether the constructs of supervision, visitor autonomy, and programmed activity were viewed as discrete and separate by respondents in this study; there is a need to explore the interconnectedness or discreteness of these constructs, as I discuss further in this chapter.

The multi-variate analysis of variance revealed that significant differences between stakeholders in their preferred levels of visitor autonomy in a children’s garden emerged based upon their [stakeholder] age. Again, the general trend in the data showed a preference for less programmed activities for children’s garden visitors in all age groups. The exception was respondents in the 18-29 age group preferring more programmed activities (less visitor autonomy) for visitors aged 13-18 and 18 and above. So respondents aged 18-29 preferred more programmed activities and less autonomy for visitors close to, or within, their own age group. This was by far the most interesting pattern to me. Do young respondents recall with freshness a number of sundry and sordid acts of vandalism they perpetrated on children’s gardens, thereby making them leery of greater autonomy for youth and adults? Had they previously experienced wondrous and transforming programs in a children’s garden that made them prefer programmed activities for youth and adults? This is an area rich with portent for exploration.

Respondents aged 60 and above tended to prefer less programmed activities, or greater visitor autonomy, as the age of the visitor increased. In other words, they preferred more programmed activities for children ages 0-6, a little less for children ages 7-12, a little less for youth 13-18, and the least programmed activities for visitors age 18 and above.
They prefer the greatest amount of autonomy to be afforded adult visitors, like themselves. Just as I discussed a similar trend for children’s garden visitors in the previous paragraph, this may be an indication that respondents aged 60 and above were equating amount of supervision with the amount of programmed activities for children, youth, and adults. More research needs to be conducted to find if this is indeed the case. Respondents aged 30-39 and 50-59 indicated fairly stable preferences for level of visitor autonomy in the visitor age groups of 0-6, 7-12, and 13-18, with slightly less programmed activities (more visitor autonomy) for visitors aged 18 and above. Respondents in the 40-49 age group were also fairly stable in their indicated preferences for visitor autonomy in all visitor age groups; however, they did indicate a preference for slightly greater programmed activities (less visitor autonomy) in the 13-18 visitor age group. Is there an element of mistrust of youth aged 13-18 in the 40-49 age group? Do respondents in their 40’s feel that the 13-18 age group of children’s garden visitors is the best window of opportunity for benefit from programmed activities? Again, more research needs to be conducted to find if this is indeed the case.

The multi-variate analysis of variance revealed that significant differences between stakeholders in their preferred levels of visitor autonomy in a children’s garden emerged based upon the origin of stakeholders – whether attendees of the 2005 AHS Children & Youth Garden Symposium or respondents from the five botanical gardens sampled. Attendees of the Symposium preferred more programmed activities – less visitor autonomy – for visitors than did stakeholders from the five botanical gardens. Why would this be the case? One implication could be that since the symposium attendees constituted a majority of self-identified children’s garden educators, they see
the value or need for more programmed activities for visitors. Another implication could be that there are more active practitioners embodied in the stakeholders sampled at the five botanical gardens and they see a need for less programmed activities (greater visitor autonomy) for a number of reasons. Are children’s garden stakeholders at botanical gardens overwhelmed in their duties to the point they prefer visitors to “do their own thing” and leave them [stakeholders] alone? Have stakeholders at the botanical gardens seen rich, heart-warming experiences by visitors that were afforded free-flowing exploration in the garden? Again, more research needs to be conducted to discern palpable trends within the area of this research question.

The degree of support for this study’s research findings in the literature is difficult to address. While there have been wonderful books and articles written about the need for wild and un-programmed experiences for children and youth in nature, some specifically in a garden setting, there are none that I know of that examined preferences for visitor autonomy in these settings based upon stakeholder role or age of respondent. Recommendations for intergenerational activities in a garden setting have certainly been offered, such as Dirck and Molly Brown’s terrific work with the Roots & Shoots School Garden program (2005); however, as a research focus, I have been at a loss to identify any. The implication of this is quite clear: research in this area needs to be conducted and practitioner experiences need to be documented.

As for general implications concerning the findings for this research question, there are a number of issues and questions that emerged from the data. Firstly, I must ask whether the questionnaire item sufficiently portrayed the construct I was attempting to explore. Was the connection between level of visitor autonomy and level of programmed
activities valid, clear, and comprehensive? Several respondents identified the difference between level of supervision of visitors and level of autonomy afforded them, and implied that offering a preference for the latter was impossible without some specification of the former. Further research needs to be conducted that methodically accounts for the issue of supervision – an intervening variable, some might say – in the amount of open-ended, free exploration offered children’s garden visitors. Would stakeholder (and non-stakeholder) preferences for level of supervision of garden visitors correlate with preferred levels of visitor autonomy? Would they vary by stakeholder role or age? The use of the term “completely programmed” on the visitor autonomy continuum may have been pejorative: in a field where experts derisively point to the increasingly “programmed” lives that our children are living, the use of an alternative term may have been warranted. Very few respondents would wish to imply that children and youth should be restricted in their activities, or treated as robots or automatons. One of the most prominent aspects recognized by respondents concerning what is a children’s garden was the free-flowing act of exploration and discovery for visitors. Secondly, this question should be asked of non-stakeholders to garner general perceptions on the issue. How does the American public feel about free and open-ended experiences for children and youth in nature and in garden settings? Does a difference exist between the knowledge and attitudes of those people who visit children’s gardens and those people who do not in terms of this issue?

As mentioned in Chapter 4, many respondents reflected a desire for visitors to be afforded both programmed and un-programmed garden activities: “So our gardens generally must accommodate and encourage both kinds of activities, programmed and
“unprogrammed” (Tyler, 2005). Some respondents suggested that there be programmed and un-programmed options for each age group from which to choose. A similar response was that visitors participate in a programmed activity and then be allowed freedom in their subsequent activity choices, or vice versa sequentially. Although the respondent preferences for visitor autonomy fell almost entirely on the un-programmed part of the continuum, I suspect that, if pressed further, most stakeholders would indicate a preference for offering both programmed and un-programmed garden activities. I would recommend more research to confirm this suspicion, and suggest a focus on identifying best practices concerning the amount of endorsed programmed and un-programmed activities for various age groups of children’s garden visitors. Of course, this issue may be completely contextual. A natural environment “un-designed” for children and youth would be inherently un-programmed, while a highly designed children’s garden may be best utilized through programmed activities. This reflects the broad and varied “…types of gardens that are designed for children – all with different missions because they are in different places, fostered by different people” (Tyler, 2005).

Lastly, do stakeholder behaviors concerning this issue match their reported preferences? It is one thing to verbally support open-ended and free-flowing activity in one’s garden, but could be quite another to allow and facilitate it. A very interesting study could entail a comparison between reported preference levels for autonomy afforded visitors and direct observation of stakeholders interacting with visitors in a children’s garden setting.
Further recommendations

There are a few recommendations and lines of inquiry of a broader nature that I offer in conclusion. These cut across the specific research questions posed in this study and dictate varying foci. Further recommended research could include the operationalization of roles for people involved with children’s gardens that I forwarded in this study. Perhaps this requires additional research and explication. Another recommendation is to specifically target horticulturists who work in or maintain children’s gardens and outdoor environments for children. The 7.5% response rate from self-identified children’s garden horticulturists was not of a sufficient nature to detail associations, and certainly not of a magnitude to draw conclusions or offer inferences. One could argue that very few horticulturists are working exclusively within a children’s garden setting today; they tend to be responsible for much larger sections of the public garden, if not the entire garden. Another possibility is that those working in the children’s garden field do not self-identify as a horticulturist. In my own career, I have been tasked with maintaining children’s gardens as a horticulturist, but I self-identify as an educator more than any other stakeholder role. Many people are fulfilling numerous roles in their connections to children’s gardens: jack- and jill-of-all-trades practitioners. One might base stakeholder role upon the amount of current or past experiences in particular roles they had in children’s gardening. This could be an interesting area in which to investigate perceptions of professional roles – and possibly interject the question of who constitutes the most effective change agent. Do past experiences of stakeholders significantly influence their conceptualizations of children’s gardens? What are some children’s garden stakeholder stories detailing their identified values, sense of
community, sustainable concepts, socio-economic status, ethnicity, cultural background, etc. Who visits children’s gardens? Why do they visit? What elements/features could entice and draw visitors of different kinds to children’s gardens? How do children’s garden researchers and practitioners best communicate to the general public the benefits to children and youth from connection to nature and experiences in a garden setting?

Closing Perspective

The trend in the U.S. to establish more children’s gardens is a positive one. However, along with the establishment of these gardens comes the responsibility to offer the best outdoor environments and plant-based learning experiences that can be afforded children, youth, and other visitors – and to maintain them. The discourse among professionals in the field must progress and adopt a constructive tone. The need for research in this area is great, and the onus is on researchers and practitioners to effectively communicate findings to the general public in order to garner interest and inculcate the value of people-plant interactions. It’s a difficult task, but one that may yield incalculable benefits to future generations.


Position of the American Dietetic Association, Society for Nutrition Education, and American School Food Service Association: Nutrition Services: An Essential


APPENDIX A

RESEARCH QUESTIONNAIRE AND COVER LETTER;

IRB APPROVAL
July 18, 2005

Dear Children’s Garden Stakeholder,

As a doctoral candidate of The Ohio State University’s School of Natural Resources, I am conducting research concerning children’s gardens, specifically in North America. The following questionnaire is part of my dissertation research. I am asking people who are visiting a children’s garden, or are professionally involved with children’s gardens, to answer a few questions. The purpose of these questions is to learn what you think, feel, and perceive about gardens designed for children. There are no right or wrong answers: what is most important is that you share your views and experiences.

The information you provide will be used to better understand issues and concepts concerning children’s gardens in North America. Your responses to this questionnaire will be confidential; no individual will be identified with his or her responses. Your participation is strictly voluntary and you may refuse to answer any question you choose not to answer. You may choose not to participate and can withdraw at any time without penalty or repercussions.

Your responses are very important to the success of my research. The information you provide is vital to my increased understanding of what people connected with children’s gardens think, feel, and perceive about issues in this field, and may provide increased understanding for others with whom I share the results. Completing the questionnaire should require no more than 15 minutes. I very much appreciate your completing and returning the questionnaire by August 5, 2005, in the envelope provided.

Thank you for your time!

Sincerely,

Mark A. Miller
Doctoral Candidate
The Ohio State University
What is a Children’s Garden?

The purpose of these questions is to learn what you think, feel, and perceive about gardens designed for children. There are no right or wrong answers: what is most important is that you share your views and experiences.

• Many people serve more than one role within children’s gardens and gardening. In responding to the following questions, please check which ONE role that best describes your current connection to children’s gardens:

    ________ Children’s garden visitor
    ________ Children’s garden designer
    ________ Children’s garden director/administrator
    ________ Children’s garden horticulturist
    ________ Children’s garden educator

• What is your age? ______ If you are answering as a children’s garden visitor, please indicate the ages of the family members who are with you today: _____, _____, _____, _____, _____,
Now, think about the children’s garden you just described. For each of the children’s garden elements/features listed below please circle the number that best indicates how important each is to you in your ideal children’s garden. For example: if an element/feature is essential in your concept of a children’s garden, you would circle number 7. If an element/feature is not important at all to you, then you would circle number 1. If an element/feature is not a part of your garden (Not/Applicable), then you would circle 0.

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168
People have different preferences about the desired level of a visitor’s autonomy [independent choice] in a children’s garden setting. Below, you will find a line that represents the continuum of visitor autonomy – from a completely programmed experience in the garden to a completely un-programmed experience in the garden. Please reflect on your preference for desired level of visitor autonomy. Make an X on the line to represent your preference. For example: if you feel that a visitor should be allowed complete freedom in activity choices with no programmed activities, you would place your X on the line closest to Completely Un-Programmed.

EXAMPLE:

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On the line below, please indicate your preference for visitor autonomy for young children (age 0 to age 6) in a children’s garden. Place an X on the line as instructed.

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On the line below, please indicate your preference for visitor autonomy for children (age 7 to age 12) in a children’s garden. Place an X on the line as instructed.

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On the line below, please indicate your preference for visitor autonomy for youth (age 13 to age 18) in a children’s garden. Place an X on the line as instructed.

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On the line below, please indicate your preference for visitor autonomy for adults (over 18 years of age) in a children’s garden. Place an X on the line as instructed.

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This concludes the children’s garden questions. Thank you for your time and insight! Please share any further comments you wish to make concerning this research study on the back of the cover letter (top page).
TITLE PAGE - APPLICATION FOR EXEMPTION
FROM REVIEW BY THE INSTITUTIONAL REVIEW BOARD
The Ohio State University, Columbus OH 43210

[Form fields filled in]

1. Principal Investigator
   - Name: DR. JOE E. HEIMLICH
   - Department or College: School of Natural Resources
   - Campus Address: 277 KOTTMANN HALL
   - Phone: (614) 292-6926
   - Email: heimlich.1@osu.edu
   - Signature: [Signature]
   - Date: [Date]

2. Co-Investigator
   - Name: MARK A. MILLER
   - Campus Address: 024 MOUNT HALL
   - Phone: (614) 499-5826
   - E-mail: miller.65@osu.edu
   - Signature: [Signature]
   - Date: [Date]

3. Protocol Title: AN EXPLORATION OF CHILDREN'S GARDENS: BENEFITS, ELEMENTS, AND PREFERENCES

4. Source of Funding: NONE

[Other fields and signatures filled in]

Approved by the Policy Coordinating IRB, 5/18/00, revised 12/31/03
APPENDIX B

2005 AMERICAN HORTICULTURAL SOCIETY’S CHILDREN & YOUTH GARDEN SYMPOSIUM DOCUMENTS;

LETTERS OF SUPPORT FROM CHILDREN’S GARDEN DIRECTORS
The American Horticultural Society Presents
THE 2005 NATIONAL CHILDREN & YOUTH GARDEN
SYMPOSIUM

Making Connections

We invite you to join us for three days of inspirational keynote presentations, educational sessions, garden explorations, friendship, and networking.

ATLANTA, GEORGIA
JULY 28-30, 2005

Hosted by Atlanta Botanical Garden and Wonderland Gardens
Make the **Peach State** your destination this summer!

Atlanta, Georgia, is the setting for the 2005 AHS National Children & Youth Garden Symposium. The theme for our 13th annual symposium is “Making Connections.” We invite you to join us as we explore the many connections that can be made through gardening.

From team teaching, cooperative learning, and interdisciplinary studies to environmental education, mentoring, and partnering, we will hear about gardening successes firsthand from the people who make them happen. You will find perspectives that will inspire you to connect with others and to put gardening to work in our communities to build bridges across cultures, the country, and the world. You will learn that play and learning can occur simultaneously and are not mutually exclusive.

Our hosts for 2005, the Atlanta Botanical Garden and Wonderland Gardens, offer an unbelievable variety of resources and experiences to reinforce and expand upon our learnings. An optional Saturday afternoon trip to Callaway Gardens offers further opportunity for field study and to experience the diversity of the region.

This year’s symposium will be headquartered on the beautiful campus of Emory University. A short drive from the Atlanta Botanical Garden in the tree-lined suburban neighborhood of Druid Hills, Emory University is home to nine major academic divisions, numerous centers for advanced study, and a host of prestigious affiliated institutions.

This year’s symposium offers an impressive lineup of great speakers, inspirational gardens, and many opportunities for informal networking. If you want to learn more about creating or enhancing educational programs for children and youth in schools, community programs, or at home, the AHS National Children & Youth Garden Symposium is for you!

### Keynotes

**Mother Nature’s Classroom**

**Sharon Lovejoy**

Sharon is a nationally recognized garden writer, illustrator, and naturalist. Her award-winning books include “Sunflower Houses: Inspiration from the Garden – A Book for Children and Their Grown-Ups” and “Roots, Shoots, Buckets & Boots: Gardening Together with Children.” Known for her gentle spirit and passion for all things green and growing, she is a frequent guest on HGTV, PBS, and the Discovery Channel. Sharon will offer encouragement and inspiration as well as some playful ideas for introducing children to nature through gardening.

**Learning Science Through Inquiry: Doing What Scientists Do**

**Tim O’Keefe**

Tim is an exemplary second-grade teacher from the Center for Inquiry in Columbia, South Carolina. His classroom has been featured in a number of professional development videos, including the PBS “Invisible” series. Through stories, videos, and samples of children’s work, Tim will illuminate the power of making connections across disciplines, between learners, and with the world. He will also highlight children’s investigations as botanists and biologists and show how educators can foster authentic inquiry.

**What Children and Youth Really Need: How Gardening Can Provide It**

**Marcia Eames-Shealy**

Marcia is widely recognized for her innovative work with the New York State Cooperative Extension system and Cornell University’s Department of Horticulture. She has developed many successful garden-based programs for extension educators, teachers, 4-H leaders, and others. Often her work focuses on engaging young people in learning about plants by way of art, culture, or other interdisciplinary avenues. Marcia will give us reason to think about what children really want to get out of our programs, and how we can better address what’s important to them.
GARDEN EXPLORATIONS

Atlanta Botanical Garden

The Atlanta Botanical Garden is located in midtown Atlanta adjacent to Piedmont Park. The garden’s 30 acres include formal display gardens, woodland gardens, a 15-acre hardwood forest, the Dorothy Chapman Fuqua Conservatory, the Fuqua Orchid Center, and a 2-acre Children’s Garden. A dynamic, world-class public garden, the Atlanta Botanical Garden attracts hundreds of thousands of visitors each year.

The Children’s Garden at Atlanta Botanical Garden opened in 1999 and is one of Atlanta’s favorite family destinations. Its themed gardens combine plant education with light-hearted exploration and discovery. Experiences to be found in the Children’s Garden include navigating a caterpillar maze in the Laughter Garden, discovering prehistoric plants and digging for fossils in the Dinosaur Garden, learning about the plants of early America in Grandma’s Garden, and getting a bird’s-eye view of a grand old oak from the three-story Treehouse.

On Thursday, symposium attendees will have the opportunity to spend the afternoon exploring the Atlanta Botanical Garden. Staff will be on hand to answer questions and for those interested, the Children’s Garden will be the focus of a mid-afternoon Q&A session. As an added treat, attendees will have the opportunity to see “Locomotion in the Garden: Trails Across Georgia,” a special garden railway exhibit that opened at the Garden in May and runs through October.

Wonderland Gardens

Wonderland Gardens is a growing public garden that is located 14 miles southeast of midtown Atlanta in urban south DeKalb County. Covering 21 acres, Wonderland is part community garden, part green space destination, and part outdoor classroom for children, seniors, and families. The compelling and inspirational story of Wonderland’s creation and of its founder, Sheldon Fleming, has attracted national attention.

Dedicated to connecting people with nature, Wonderland Gardens features a series of hands-on garden areas that provide the setting for a wide range of activities. A network of paths made of shredded mulch ties the areas together and serves as a constant reminder of the garden’s commitment to the environment. The George Washington Carver Learning Center commemorates the work of the famed scientist and provides indoor classroom space for garden activities. From garden plots that promote the importance of fresh fruits and vegetables to cooperative programs that teach valuable life skills, Wonderland embraces groups and individuals of all ages and cultures.

On Friday morning, symposium attendees will travel to Wonderland Gardens where staff and volunteers will be on hand to provide an overview of the garden, its programs and facilities.

AWARDS CEREMONY

Growing Good Kids – Excellence in Children’s Literature Awards

Presented by the Junior Master Gardener program and the American Horticultural Society, the new “Growing Good Kids – Excellence in Children’s Literature” awards program honors engaging and inspiring works of garden- and ecology-themed children’s literature. Symposium attendees will have the opportunity to experience the debut of this exciting new program. To celebrate its charter year, the winners of a special one-time designation of “Classics” will be announced at the Atlanta Botanical Garden on Thursday evening.

The AHS Recognizes Outstanding Achievement in Children & Youth Gardening

In 1999, the Board of Directors of the American Horticultural Society established the Jane L. Taylor Award to recognize a person, community, or organization committed to the advancement of youth gardens and gardening.

The 2005 winner of the Jane L. Taylor Award is Marcia Eames-Shevy. An extension educator at Cornell University in Ithaca, New York, Marcia is well known for her work in youth, adult, and community horticulture. We are pleased and honored to have Marcia join us for this year’s symposium as our closing keynote on Saturday.
**Schedule**

**Wednesday**

**July 27**
4:00 pm - 6:00 pm Symposium Registration and On-Campus Lodging Check-In
- Hospitality Desk to help with questions and directions

**Thursday**

**July 28**
8:00 am - 11:00 am Symposium Registration
8:00 am - 9:00 am Continental Breakfast
9:00 am - 9:30 am Welcome and Symposium Opening
9:30 am - 10:30 am General Session
- Keynote Speaker: Sharon Lovejoy
- "Mother Nature's Classroom"
10:30 am - 11:00 am Break and Walk to Sessions
11:00 am - 12:30 pm Educational Sessions
- "Branching Out: Formal and Informal Learning in the Life Lab Garden Classroom" Erika Perfett
- "Growing Good Kids with Junior Master Gardener!" Randy Seagraves / Melissa Williams
- "Learning-Informed Design of Children's Gardens: A New Zealand Experience" Sue Wake
- "The Power of Plants: Medicinal Plants in the Classroom and on the School Site" Anne Shenk / Deborah Bailey Mitchell
12:30 pm - 1:30 pm Lunch
2:00 pm - 5:30 pm Garden Explorations at Atlanta Botanical Garden
6:00 pm - 9:00 pm Reception and Dinner at Atlanta Botanical Garden
- "Growing Good Kids-Excellence In Literature" Awards Ceremony

**Friday**

**July 29**
7:30 am - 9:30 am Symposium Registration
7:30 am - 8:30 am Continental Breakfast
8:30 am - 9:30 am General Session
- Keynote Speaker: Tim O'Keefe
- "Learning Science Through Inquiry: Doing What Scientists Do"
10:15 am - 1:00 pm Garden Explorations and 1 stop at Wonderland Gardens
1:45 pm - 3:15 pm Educational Sessions
- "Cedar Shoals High School Rain Garden: Changing the Vision of a School" Ann English / Barbara Bloom-Fisher / Stella Guerrero and students
- "First Steps in Creating a Class Herbarium: Going Beyond Leaf Collections" David Hedgepeth
- "Gardening by the Book" Jane Taylor
1:45 pm - 5:00 pm Educational Sessions
- "B2-Pollination (Bees and Butterflies)" Karen Garland
- "Planning First to Make School Gardens Last" Amanda Kail

3:15 pm - 3:30 pm Break and Walk to Sessions
3:30 pm - 5:00 pm Educational Sessions
- "Environmental Discovery Gardens - Connecting Kids to Their Community" Heather Merchant
- "Habitat Gardens: A System-Wide Cultural Change in Milton Public Schools" Virginia Sullivan / Ruth Parnell / Janet MacNeil

Evening on Your Own

**Saturday**

**July 30**
7:30 am - 11:00 am Symposium Registration
7:30 am - 8:30 am Continental Breakfast
8:30 am - 10:00 am Educational Sessions
- "Desert to Paradise: Connecting to the Environment One Garden and Habitats at a Time" Ann English / Lauren Zeichner
- "In Full Bloom: An Award Winning Outdoor Classroom" Mary Beth Cary / Diane Shaw
- "Seeds and Science: The Growing Connection" Suzanne Bellflower / Charlotte Albers / Molly Philbin
8:30 am - 11:45 am Educational Sessions
- "Creating Outdoor Classrooms Using Problem-Based Learning" Shirley Farrell
- "Get Milkweed?" Susan Myers / Laura Quist
10:00 am - 10:15 am Break and Walk to Sessions
10:15 am - 11:45 am Educational Sessions
- "Connections Through Curiosity" Jayne Timms / Patricia Collins
- "Get Hummingbirds? - Attracting and Studying Hummingbirds in the Outdoor Classroom" Kim Bailey
- "The Dirt on Grassroots Fund Raising" June Taylor
11:45 am - 1:15 pm Lunch and Closing General Session
- Keynote Speaker: Marcia Eames-Shervin
- "What Children and Youth Really Need: How Gardening Can Provide It"
1:45 pm Optional Trip to Callaway Gardens
- Expected return time to Emory University is 11:00 pm

**Callaway Gardens**

Following the conclusion of the program on Saturday afternoon, symposium attendees are invited to take advantage of an optional trip to Callaway Gardens in Pine Mountain, Georgia. Approximately 90 miles southwest of Atlanta, Callaway is a 14,000 acre garden, resort, and preserve nestled in the southernmost foothills of the Appalachian Mountains. Known for its naturalistic gardens and extensive azalea collection, Callaway is also home to the Cecil B. Day Butterfly Center, an enclosed 7,000 square foot conservatory, and the state of the art Virginia Hand Callaway Discovery Center. Returning to Emory University late Saturday night, this trip will include dinner and offers attendees the opportunity to experience a sampling of this regional treasure has to offer.
**Concurrent Sessions**

**KEY:** On Friday and Saturday you have the choice of selecting one 5 hour session or two 1½ hour sessions. 1½ hour sessions are coded as "A" or "B", 5 hour sessions are coded as "C". Please select an "A" and a "B" session or a "C" session. The "C" sessions will have a 15 minute break.

**Thursday, July 28**

**Pick One**

11:00 am – 12:30 pm

A1 “Branching Out: Formal and Informal Learning in the Life Lab Garden Classroom” Errika Fortell
See how the Life Lab Garden Classroom provides programs for both formal and informal learning.

A2 “Growing Good Kids with Junior Master Gardeners!” Randy Soghrade / Melissa Williams
This session will provide an overview of the JMG program, how to get involved, and will feature literature in the garden. Learn how to make literature come alive with very novel and hands-on garden-related lessons.

A3 “Learning-Informed Design of Children’s Gardens – A New Zealand Experience” Sue Wade
See how ‘learning-informed design of children’s gardens’ was developed in a children’s garden in Auckland, New Zealand.

A4 “The Power of Plants: Medicinal Plants in the Classroom and on the School Site” Anne Shaw / Deborah Bailey Mitchell
In this fast-paced presentation, the presenters will demonstrate a variety of interdisciplinary activities that incorporate medicinal plants as teaching tools while addressing state and national standards.

1:45 pm – 5:00 pm

C11 “B2 – Pollination (Bees and Butterflies)” Karen Gurnick
Gain hands-on activities exploring the life of butterflies and honeybees including the important role they play in nature. Step by step information on creating a pollinator garden, with numerous resources provided.

C12 “Planning First to Make School Gardens Last” Amanda Kall
Find out how to plan for school habitat gardens that withstand the test of time, plus get help troubleshooting your own school garden projects.

**Saturday, July 30**

**Pick One A and One B Session, or One C Session**

8:30 am – 10:00 am

A13 “Desert to Paradise: Connecting to the Environment One Garden and Habitat at a Time” Anne English / Lauren Zeichner
Find out how generating respect and responsibility for our world (G.R.O.W.) at Barnett Shoals High School in Athens, Georgia has been creating an environmentally healthy and garden-rich schoolyard, while promoting environmental stewardship and meeting curriculum goals.

A14 “In Full Bloom: An Award Winning Outdoor Classroom” Mary Beth Cary / Diane Shew
A virtual tour of the national award winning Worth County Primary School’s Outdoor Classroom which provides hands-on inquiry-based environmental instruction, cross-curricular instruction and innovative use of community resources and partners.

A15 “Seeds and Science: The Growing Connection” Suzanne Stieffmeier / Charlotte Albert / Molly Phillips
A student panel shares their experiences growing vegetables as part of The Growing Connection project, co-sponsored by the American Horticultural Society and The Food and Agriculture Organization of the United Nations.

10:15 am – 11:45 am

B16 “Connections Through Curiosity” Jayme Toms / Patricia Collins
Explore the subject of successful environmental education programs and find out why professional horticulturists are taking dirty vegetables, silk flowers, and live butterfly larvae indoors to peak curiosity and connect our youth to the world that we live in.

B17 “Got Hummingbirds? – Attracting and Studying Hummingbirds in the Outdoor Classroom” Kim Bailey
Learn all about hummingbirds’ habitat needs, migration, and adaptations through engaging hands-on activities, inquiries, and active games. Discover how to attract hummingbirds to the schoolyard.

B18 “The Dirt on Grassroots Fund Raising” Jane Taylor
How to get funding when the big grant door closes.

8:30 am – 11:45 am

C19 “Creating Outdoor Classrooms Using Problem-Based Learning” Stacie Parrott
See how students at two schools created, funded, built and maintained butterfly and theme gardens, frog and fish ponds, track and fossil dig boxes, and hosted a bird festival.

C20 “Got Milkweed?” Susan Meyers / Laura Quist
Through hands-on activities and a garden walk, learn how monarchs and native butterflies can be used to engage students and families for lessons in conservation, ecology and education.

Friday, July 29

**Pick One A and One B Session, or One C Session**

1:45 pm – 3:15 pm

Find out how in a short period of time a muddy detention basin has been transformed into an outdoor garden education based classroom.

A6 “First Steps in Creating a Class Herbarium: Going Beyond Leaf Collections” David Hedgepeth
Focus on using herbarium techniques to preserve and study plant material in the school classroom. This includes the educational value of the process and the product.

A7 “Gardening by the Book” Jane Taylor
Incorporating children’s literature into the garden.

3:30 pm – 5:00 pm

B8 “Environmental Discovery Gardens — Connecting Kids to Their Community” Heather Meredith
Teach children to practice environmental stewardship within their community. Specific programs, materials, methodologies, unique garden features and transferable ideas will be highlighted.

A parent, landscape architect and curriculum specialist share the on-going participatory design process involving children, parents, community members, teachers and administrators.
SYMPOSIUM DETAILS

Air Transportation
The William B. Hartsfield International Airport (ATL) is a 25-minute drive to Emory University. Limousine service and rental cars are available at the airport. Gwinnett Shuttle Company is available for transportation to and from the airport. To make a shuttle reservation call 770-648-0666. The MARTA rail and bus system offers public transportation to destinations throughout the metropolitan Atlanta area. The closest rail stations to the Emory University campus are Lindbergh Center and Arts Center. Visit www.itsmarta.com for information on routes, schedules, and fares.

Attire and Weather
Casual attire and comfortable shoes are recommended. Some activities will be held outside, so sunscreen and hats are encouraged. It is very warm in Atlanta in late July, with the high 80's being the norm and the low 70's at night. You may want to bring a sweater or light jacket for cooler evenings and air-conditioned rooms. A raincoat or umbrella is always helpful (all events are rain or shine).

Cancellations and Refunds
A full refund, less a $50 processing fee, will be made if requested in writing prior to July 10, 2005. No refunds will be made after July 10, 2005.

Guests
For those wishing to bring a guest to Thursday evening at the Atlanta Botanical Garden, a guest registration is available for $40.

Local Information
Emory Village, a collection of small shops and restaurants, is within walking distance of the Emory University campus. The Midtown and Virginia Highlands neighborhoods are a short drive away, offering many diverse shopping and dining options. A twenty-minute drive will get you to Lenox Square and Phipps Plaza featuring hundreds of upscale, glitzy shops. For a complete listing of activities, restaurants, hotels and other local information, please visit www.atlanta.net/visitors.

Lodging
A block of rooms has been reserved in Emory University's McTyeire & Trimbile Residence Halls. McTyeire and Trimbile Halls are conveniently located adjacent to the symposium meeting facilities and offer single and double air-conditioned rooms, with shared bathrooms. The residence hall rooms are available at either a three or four night package rate. The three-night package is available at $110 per person double or $140 per person single. The four-night package is $145 per person double or $190 per person single. Reservations for the Residence Halls are made on the Symposium Registration Form. The deadline for requesting McTyeire & Trimbile Hall lodging is July 10th.

The Emory Inn, adjacent to the Emory campus and within walking distance of our meeting facilities, is offering a special rate of $99 per night single/double occupancy for symposium attendees. To assure this rate, reservations must be made by June 12, 2005. After June 12, reservations at this special rate are not guaranteed and subject to availability. Reservations for the Emory Inn can be made by calling the Inn at 404-712-6000. Complimentary parking is available for all Emory Inn guests. Atlanta Superior Shuttle serves the Emory Inn. Advance reservations are required for this service. To make a reservation for transportation, please contact Emory Inn directly at 404-712-6000.

Meeting Facilities
All symposium sessions will take place on the Emory University campus. We will start each morning in Cox Hall. Concurrent sessions will be held in nearby buildings within easy walking distance from Cox Hall and the Residence Halls. Registrants will receive a campus map and directions to check-in and registration locations with their symposium confirmation.

Membership
AHS members receive a discount on symposium registration. If you are not a member, take advantage of a special offer for symposium attendees. See registration form for details.

Parking
Parking permits are required to park on the Emory University campus. Commuter parking permits are $3 per day and may be requested with your registration or purchased on site. For those staying in Emory Residence Halls the parking is included in your room costs and your permit will be in your registration packet at check-in. For those staying at the Emory Inn, complimentary parking is available at the Inn.

Registration
The regular full registration fee is $300. AHS members receive a discounted rate of $275. Full registration includes admission to all programs, continental breakfast and lunch each day, and dinner on Thursday. Daily registrations are available. The optional tour to Callaway Gardens will be $75 and includes transportation, admission, and dinner. Registrations received after July 1 will be charged the on-site rate of $320, if available. Register early — space is limited.

Registration Confirmation
Registrations received by July 1 will be confirmed by e-mail unless otherwise requested. Registrations after July 1 will be confirmed by phone or e-mail.

Special Needs
Please indicate any special services needed on your registration form.

Sponsorship Opportunities
Show your support for children and youth gardening by becoming a symposium sponsor. Please call the AHS at 703-768-5700 x132 or e-mail youthprograms@ahs.org for details.

Have questions or need more information?
Visit www.ahs.org, e-mail youthprograms@ahs.org, or call 703-768-5700 x132.
**2005 AHS National Children & Youth Garden Symposium**  
**July 28-30, 2005 — Atlanta, Georgia**

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### PARKING (required if not staying in the Residence Halls or at the Emory Inn)

<table>
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### PAYMENT

- [ ] Check (payable to AHS)
- [ ] Credit Card □ VISA □ MasterCard □ American Express
- Card Number: 
- Exp. Date: 
- Signature: 
- Total Enclosed: $

### EDUCATIONAL SESSIONS

**KEY:** On Friday and Saturday, you have the choice of selecting one 3 hour session or two 1 1/2 hour sessions. 1 1/2 hour sessions are coded as "A" or "B". 3 hour sessions are coded as "C". Please select an "A" and a "B" session or a "C" session.

<table>
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### SPECIAL NEEDS: [ ] Vegetarian Meals [ ] Other:

### THREE WAYS TO REGISTER:

1. Online:  
   Visit www.ahs.org
2. FAX:   703-768-8700
3. Mail to: American Horticultural Society  
   Attention YGS  
   7951 East Boulevard Drive  
   Alexandria, VA  22308
Space is Limited!
Register Early

The American Horticultural Society (AHS) is a nonprofit national membership organization (founded in 1922). The Society’s mission is to open the eyes of all Americans to the vital connection between people and plants, to inspire all Americans to become responsible custodians of the Earth, to celebrate America’s diversity through the art and science of horticulture, and to lead this effort by sharing the Society’s unique national resources with all Americans.

Making Connections

NATIONAL CHILDREN & YOUTH GARDEN SYMPOSIUM 2005

ATLANTA, GEORGIA
JULY 28 - 30, 2005
Sharon Lovejoy

Sharon is a nationally recognized garden writer, illustrator, and naturalist. Her award-winning books include "Sunflower Houses: Inspiration from the Garden - A Book for Children and Their Grown-Ups" and "Roots, Shoots, Buckets & Boots: Gardening Together with Children." Known for her gentle spirit and passion for all things green and growing, she is a frequent guest on HGTV, PBS, and the Discovery Channel. Sharon will offer encouragement and inspiration as well as some playful ideas for introducing children to nature through gardening.

Tim O'Keefe

Tim is an exemplary second-grade teacher from the Center for Inquiry in Columbia, South Carolina. His classroom has been featured in a number of professional development videos, including the PBS Scienceline series. Through stories, videos, and samples of children's work, Tim will illuminate the power of making connections across disciplines, between learners, and with the world. He will also highlight children's investigations as botanists and biologists and show how educators can foster authentic inquiry.

Marcia Eames-Sheavly

Marcia is widely recognized for her innovative work with the New York State Cooperative Extension system and Cornell University's Department of Horticulture. She has developed many successful garden-based programs for extension educators, teachers, 4-H leaders, and others. Often her work focuses on engaging young people in learning about plants by way of art, culture, or other interdisciplinary avenues. Marcia will give us reason to think about what children really want to get out of our programs, and how we can better address what's important - to them.
Today’s Announcements

- Visit the AHS Marketplace located in Cox Hall. A variety of wonderful youth gardening reference books are available as well as autographed copies of the symposium poster created by our very own Sharon Lovejoy.
- Please remember that parking on campus is by permit only. A bar coded hang tag is required to gain access to symposium parking in the Peavine Parking Deck. Please remember to return your hang tag at the end of the symposium!
- Be sure to stop by and mark your hometown on the AHS Heat Zone Map in the foyer of Cox Hall.
- National Children & Youth Garden Advisory Panel Members please tell us if you will be able to attend Friday evening’s dinner meeting via the message board.

Reminders
- If you are staying in the residence halls, please remember to turn in your key when you depart.
- There will be a shuttle from the Emory Inn to Cox Hall at 7:30 am and 8:00 am on Friday.
- Please wear your nametag throughout the symposium – it will help others get to know you!

Afternoon Highlights

Tonight’s dinner and awards presentation will be at the Atlanta Botanical Garden, one of the most dynamic public gardens in the southeast. There will be plenty of time this afternoon to explore the world-class gardens of ABG. Here are a few of the many highlights that should not be missed:

- Full Steam Ahead! “Locomotion in the Garden – Trains Across Georgia” is a special garden railway exhibit that opened in May and runs through October. The model trains travel from old time Atlanta to today through recognizable landmarks made from natural materials.
- The Children’s Garden – be sure to visit this favorite family attraction. After you explore the garden, don’t miss your chance to hear from Tracy McClendon, Director of Education at ABG, and Cindy Tyler, the garden’s designer, at a special Q & A session at 4:00 pm in the Georgia Pacific Classroom.
- The Dorothy Chapman Fuqua Conservatory and the Fuqua Orchid Center offer tropical delights and unique insights into botanical research.

Bus departures start at 2:00 pm and will continue every 15 minutes until 2:45 pm.

New Awards Program Makes Its Debut Tonight!

The new “Growing Good Kids – Excellence in Children’s Literature” awards will make their debut tonight at the Atlanta Botanical Garden. Presented by the Junior Master Gardener Program and the American Horticultural Society, this brand new program will celebrate its charter year with the announcement of the winners of a special one-time designation of “Classics.”
About Emory University...

- Emory’s 631-acre campus has over 11,600 students from all 50 states and 105 nations
- The university’s 5 libraries hold over 2 million volumes
- Emory’s Michael C. Carlos Museum was designed by noted architect Michael Graves and features a 35,000 sq. ft. exhibit with items from 5 continents as early as 7th millennium B.C.

**FUN!**

What does the letter “A” have in common with a flower?

What do you call a mushroom who buys everyone drinks and is the life of the party?

What do you call it when worms take over the world?

Answers: They both have B’s coming after them; a fun-gi, global warming.

"Thank You"

To our sponsors: Monrovia, Marshall*Tyler*Rausch, NaturalLawn of America, & VIVA! Garden for Schools

**Sponsor Highlight:**

**Monrovia**

Since 1926, Monrovia has been providing "Distinctively Better" plants to the gardening community. Offering more than 2,000 varieties and producing over 22 million plants each year, they have become one of the largest container-plant producers in the world. To learn more about Monrovia, please visit www.monrovia.com.

AHS & Youth Gardening...

The American Horticultural Society held its first Youth Garden Symposium in 1993, and it has increased its reach ever since. In 1998, the AHS National Children & Youth Garden Advisory Panel was formed to connect individuals across the country and to allow them to further the goals established by the Symposium. This is the 13th year of the Symposium.

"Out of gardens grow fleeting flowers but lasting friendships."

-- Beverly Rose Hopper

"Dr. Purple" Retires from the AHS

AHS President Emeritus Dr. H. Marc Cathey retired June 23, 2005 after over 50 years of service to the Society. His passion for horticulture and color (particularly the color purple!) is legendary across the nation. Although he has cleaned out his office at the Society’s River Farm headquarters, his work lives on through his many research projects and publications which are well respected throughout the horticultural world.

**Looking Ahead...**

Friday

-- Hear about “Learning Science Through Inquiry: Doing What Scientists Do” with keynote Tim O’Keefe
-- Listen to Jane Taylor share her thoughts on integrating children’s literature into the garden
-- and, much more!

"Making Connections" is written and edited by Annie Crockett, Emily Feagan, and Jessica Rozmus.
Today's Announcements

- Room Changes!
  - Session A5 “Cedar Shoals High School Rain Garden” will meet in White Hall Room 103.
  - Session C11 “B³ = Pollination” will meet in White Hall 111.
- You will find a program evaluation in the back of your symposium binder. Feel free to make notes as the program progresses and while things are fresh in your mind. We value your feedback!
- We encourage you to support research in the field of children and youth gardening by completing Mark Miller’s doctoral thesis questionnaire. Stop by the registration desk to pick up a copy.
- Signed copies of our first-ever symposium poster featuring Sharon Lovejoy’s wonderful artwork are available at the AHS Marketplace table.
- A literature table is now available in Cox Hall. Be sure to stop by and check out all the great information!
- Due to another event scheduled for Cox Hall on Friday evening, our symposium headquarters will temporarily relocate to the Dobbs University Center, Room 250 for the afternoon.

Reminders

- Please remember that all parking hang tags and on-campus residence hall keys need to be turned in before you depart.
- There will be a shuttle from the Emory Inn to Cox Hall at 7:30 am and 8:00 am on Saturday.

Today’s Garden Exploration...

Seven years ago the land that is now Wonderland Gardens was only known as “the Old Mathis Dairy Farm.” Thanks to the remarkable vision of Sheldon Fleming, Wonderland’s Founder and Executive Director, this 21 acre site is a botanical jewel in the heart of urban Decatur, Georgia.

Today you will see for yourself how Wonderland works to achieve its mission to develop a self-sustaining, hands-on green space destination and community resource that connects people with nature. Be sure to spend some time exploring each of the stations set up throughout the garden.

All buses for Wonderland Gardens depart at 9:45 am.

Dinner Tonight...

Dinner is on your own tonight. A list of local restaurants may be found in your symposium binder. For those looking for close-by options, the Emory Village is a short walk from campus.

Be sure to ask around if you are looking for company – keep making those connections!
Some Moments in Atlanta History…

- 1877 -- Atlanta became the capital of Georgia
- 1886 -- John S. Pemberton introduced Coca-Cola
- 1917 -- Fire destroyed 73 square blocks of the city
- 1936 -- Margaret Mitchell’s *Gone with the Wind* was published
- 1964 -- Atlanta native Martin Luther King Jr. wins the Nobel Peace Prize
- 1979 -- MARTA opened
- 1996 -- Atlanta hosted the Centennial Olympics

Who said this on Thursday?

“Not everything that counts can be counted, not everything that can be counted counts” -- a favorite quote from Albert Einstein.

Multidisciplinary and interactive learning in a children’s discovery garden should be fun while empowering kids with a sense of ownership.

“Thank You”

To our sponsors: Monrovia, Marshall*Tyler*Rausch, NaturalLawn of America, & VIVA! Garden for Schools

Sponsor Highlight:

**Marshall*Tyler*Rausch**

Based in Pittsburgh, Pennsylvania, this nationally recognized landscape architecture firm is well known for its 25 years of work with public gardens and children’s garden design.

A special thank you to Cindy Tyler for participating in the Q & A yesterday at the Atlanta Botanical Garden!

“Since new developments are the products of a curious mind, we must therefore stimulate and encourage that type of mind in every way possible.”

-- George Washington Carver

AHS Insider…

The AHS and the Food and Agriculture Organization (FAO) have teamed up for The Growing Connection. This project teaches middle school age kids about growing food and helps them explore issues such as nutrition and water conservation.

Schools and communities in both the U.S. and abroad are involved in this innovative program. River Farm, the national headquarters of the AHS, is home to a demonstration garden showcasing The Growing Connection.

Learn more about the program on Saturday at the session titled “Seeds and Science: The Growing Connection.”

**Looking Ahead**

At tomorrow’s educational sessions you will be able to…
-- find out what G.R.O.W. means at Barnett Shoals High School in Athens, Georgia
-- discover how to attract hummingbirds to your school yard or garden
-- learn how monarchs and native butterflies can be incorporated into lessons on conservation, ecology, and education.

“Making Connections” is written and edited by Annie Crockett, Emily Feagan, and Jessica Rozman.

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Today’s Announcements

- Residence Hall check-out – please be sure to turn in all keys and parking hang tags. The Conference Services Office in Alabama Hall is available for check-out beginning at 9:00 am on Saturday and Sunday. In addition, a special table will be set up in McTyeire Hall for check-outs on Sunday morning from 8:00 am to 11:00 am.
- We value your thoughts -- please take a few moments to complete the symposium evaluation found in the back of your symposium binder. Completed evaluation forms may be turned in at the registration table in Cox Hall or mailed to Stephanie Jutila at AHS.
- For those going on the optional trip to Callaway Gardens this afternoon, the bus will depart at 1:45 pm from the roundabout near Cox Hall.
- Interested in being considered as a presenter at next year’s symposium? If so, we’d like to hear from you. A presentation proposal form may be found in your symposium binder. The deadline for submitting proposals is December 1, 2005.

Reminders

- For those needing transportation to the Airport, please remember to call in advance to schedule your service. Call the Gwinnett Shuttle Company at 770-638-0666.
- The AHS Marketplace will close following today’s General Session.

The AHS National Children & Youth Garden Symposium Travels to St. Louis, Missouri, in 2006!

The world renowned Missouri Botanical Garden will be our host for our 14th annual symposium next year. Among the exciting activities being planned is a visit to the garden’s new children’s garden which opens in the spring of 2006. Mark your calendars – July 27 – 29, 2006!

AHS Great American Gardener Awards
Call for Nominations!

Help the AHS recognize individuals and institutions that have made significant contributions to horticulture in America. Every year the AHS recognizes outstanding achievements through its Great American Gardener Awards. Awards will be presented in Alexandria, Virginia, in June 2006.

The Jane L. Taylor Award recognizes a person, community, or organization committed to the advancement of youth gardens and gardening. Who will be the 2006 winner? Maybe someone you know! Look for the nomination form in your symposium binder or visit www.ahs.org to learn more about these awards and access an online nomination form.
Local Insights...

If you will be staying in the Atlanta area after the symposium, consider checking out these local sights...

✓ Underground Atlanta – historic entertainment complex with restaurants and shops
✓ The World of Coca-Cola – for a taste of “the real thing” from 20 different countries
✓ Centennial Olympic Park – this “town square” featuring artwork, pools, and fountains is a dramatic monument to the ’96 Summer Games
✓ CNN Center – take a studio tour and see the home of CNN and Headline News

All of these are conveniently located in downtown Atlanta and are accessible by MARTA.

“Thank You”

To our sponsors: Monrovia, Marshall*Tyler*Rausch, NaturalLawn of America, & VIVA! Garden for Schools

Today’s Sponsor Highlights:

NaturalLawn of America

Since 1991, NaturalLawn of America continues to be the environmentally sound choice in natural organic-based lawn care services and products. To learn more about NaturalLawn of America, visit www.nl-amer.com.

VIVA! Garden for Schools

The VIVA! Garden for Schools program, developed by VIVA! Garden and the Home Depot®, helps to introduce children to gardening through a school garden contest and donations of plants and supplies. Look for the flyer in your binder or visit www.vivagarden.com/schools for all the details.

Notes from Friday’s Keynote...


-- Book titles mentioned include: Creating Classrooms for Authors and Inquirers; From the Ground Up: Creating a Culture of Inquiry; Looking Closely and Listening Carefully; Learning Literacy Through Inquiry

-- Source for more information on inquiry learning: The Exploratorium Institute for Inquiry www.exploratorium.edu

-- To obtain a CD copy of the song made to benefit the tsunami relief efforts, please send a donation to:

Tim O’Keefe
Center for Inquiry
200 ½ Summit Parkway
Columbia, SC 29233

-- To learn more about Tim’s school, visit www.richland2.org/cfi

-- If you wish to contact Tim directly, write to him at the address above or e-mail him at tokeefe@spm.richland2.org

We at the American Horticultural Society thank you for being a part of our 13th annual National Children & Youth Garden Symposium!

“Making Connections” is written and edited by Annie Crockett, Emily Feagan, and Jessica Rozmus.
Mark Miller at Day Butterfly Center, Callaway Gardens – July 30, 2005

(Photograph by Marcia Eames-Sheavly)
July 12, 2005

Mark A. Miller
4655 Rustic Bridge Road
Columbus, OH 43214

Via Fax: 614-292-2485

Dear Mark:

Thank you for your inquiry regarding our upcoming 2005 AHS National Children & Youth Garden Symposium in Atlanta. We are always interested in expanding the base of knowledge related to gardening with children and we would welcome your collecting data at the symposium for your research.

As you are aware, the symposium is one of our signature American Horticultural Society programs. In its 13th year, the symposium meets in a different part of the country each year and attracts more than 200 participants. Attendees include teachers, informal educators, landscape architects, community program leaders, and extension educators. Our 2004 symposium at Cornell University attracted attendees from 29 different states as well as Australia and Canada. It seems like a very appropriate group to include in your research at OSU.

Stephanie Jutila, our AHS Education Programs Manager, is coordinating the details of the symposium. Please feel free to work directly with Stephanie as you finalize your plans.

Looking forward to seeing you in Atlanta and hearing more about your work.

Sincerely,

Tom Underwood
Director, Horticultural Programs

Making America a Nation of Gardeners, a Land of Gardens
July 27, 2005

To: Mark Miller, Doctoral Candidate, The Ohio State University

From: Brian Holley, Executive Director, Cleveland Botanical Garden

Mark, Cleveland Botanical Garden is very pleased to participate in your research about children’s gardens. As you know I have been involved with creating garden-based programs and gardens for children for well over 20 years and have witnessed over and over the curiosity, joy and sense of nurturing that well designed gardens can engender in young people. The role of research such as yours will hopefully create a broader base of knowledge for those who are creating new gardens.

All the best Mark.

[Signature]
Michigan 4-H Children’s Garden

July 19, 2005

To whom it may concern:

It is my pleasure to write this letter in support of Mark Miller’s research project and to offer the Michigan 4-H Children’s Gardens as a data collection site. We are excited to be included in this research and look forward to working with Mark to collect the necessary data.

Following is the contact information for the 4-H Children’s Gardens.

Dr. Norm Lownds, Curator
4-H Children’s Gardens
Department of Horticulture
Michigan State University
East Lansing, MI 48823

Phone: 517-355-5191 ext. 349
Email: lownds@msu.edu
FAX: 517-353-0890

If you have any questions or need additional information please feel free to contact me.

Sincerely,

Norman Lownds
Associate Professor
Curator, 4-H Children’s Gardens
29 July 2005

Mark A. Miller
4655 Rustic Bridge Rd.
Columbus, OH 43214

Dear Mark:

It is with enthusiasm that we provide you full approval and support to collect data in the Children’s Garden at The Huntington Library, Art Collections and Botanical Gardens. We wish you all the best in your dissertation research, and look forward to the results of your study.

With regards,

Susan K. Lafferty
Nadine and Robert A. Skotheim Director, Education
Ph: (626) 405-2105
Email: slafferty@huntington.org
FAX: (626) 793-9522
APPENDIX C

PRESENTATION AND INTERVIEW NOTES FROM THE CORNELL UNIVERSITY
WORKSHOP FOR CHILDREN’S GARDEN YOUTH CONSULTANTS
Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.

Design and Planning Team

Georgianna Doepper
Abby Ingraham
Renee’ St. Jacques
Mallory Sweet
A Children’s Garden is:

-Children’s gardens are a learning environment that is safe and secure, that opens the minds of children to nature by combining hands on activities and fun exercises that help make them better aware of their environment.

Creativity  Generosity
Hands on    Adventure
Intelligence Respect (to nature)
Literature  Discovery
Diversity   Environment
Responsibility
Enthusiasm
Necessities
Satisfaction
Nature
Senses

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
The **Essential** Elements of a Children’s Garden

- Smaller Scale objects used by children. (water fountains, chairs, tunnels. Etc)
- Child safe areas
- Secure boundaries around areas.
- Safe accessible pathways
- Educational activities and areas
- Good location of site

**Children’s Garden Consultants**

Defining a Children’s Garden. What it is. What it should be.
Great Children’s Garden Designs include the following:

- Tall Mazes
- Slides
- Sense of enclosure
- Sculptures
- Animals
- Waterfalls
- Fountains
- Butterfly Gardens
- Play areas and natural structures
- Trees or covered structures for shade.

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
Things that don’t work in Children’s Garden Designs include the following:

- Bad location (by major roadways)
- Concrete pathways
- Hazardous plants
- Picnic tables
- A lot of metal (benches, swings, etc.)
- Fences holding people back
- Honey Bees (unless controlled)
- Products unrelated to gardens
- Nude statues
- Fake figures

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
What’s Missing?
Here’s what we didn’t see that we wish we had:

• Transportation (trains, boats etc.)
• Stage for programs or activities
• Natural pathways (no concrete)
  Ex: cobblestone pathways
• Hanging vines
• Wading pools (some water features)
• “Freedom Areas” (grass)
• Fish ponds
• Granite or grass furniture
• Bridges over waterways or gardens
• Pictures/words in grass

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
Recommendations for Improvement

- Stay away from theme park atmosphere.
- Pick good locations ex. Stay away from roadways or buildings.
- Enclose areas with out using metal fencing
- Interesting atmosphere
- Shady places
- Stage areas where children can express themselves to an audience.

Children’s Garden Consultants

Defining a Children’s Garden. What it is. What it should be.
Do you have any questions for us about the Planning and Design of Children’s Gardens?

Children’s Garden Consultants

Defining a Children’s Garden. What it is. What it should be.
Children's Garden Consultants
Defining a Children’s Garden. What it is. What it should be.

Educational Programming Team

Abby Foster
Elise Martin
Stephanie Carminati
A Children’s Garden...

Exciting
X marking the spot
Participating
Learning
Observing nature at its best
Recreation
Empowering

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
The Essential Elements of a Children’s Garden

- Inviting environment
- Both educational and fun
- Information center
- Interactive website
- Passionate staff

Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
Great Things in a Children’s Garden

- Incorporating wildlife
- Wide variety of programs
- Product-Crop association
- Undisturbed nature
- Community sponsors

Children's Garden Consultants
Defining a Children's Garden. What it is. What it should be.
Things that don’t work in a Children’s Garden

- Talking Tours
- Charging admission
- Strictly educational focus
- Activities only for young children

Children's Garden Consultants
Defining a Children's Garden. What it is. What it should be.
What’s Missing?
Here’s what we didn’t see that we wish we had:

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Children’s Garden Consultants
Defining a Children’s Garden. What it is. What it should be.
Questions?

Children's Garden Consultants
Defining a Children's Garden. What it is. What it should be.