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# The Effects of Outdoor Activity on Concentration

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The Effects of Outdoor Activity on Concentration

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A handwritten signature in cursive script, appearing to read "Suzanne Parth", is displayed on a light-colored rectangular background.

Date: 5-13-19

Abstract

This action research project examined how the incorporation of outdoor activities impacted the concentration of children in a primary Montessori classroom. Twenty-one children, between the ages of three and six years old, participated in the research for six weeks. The researcher facilitated daily morning nature walks for the whole group, as well as, invited children to participate in individual and small group presentations on outdoor work. The researcher collected data using daily observational notes and observational tally sheets, a self-reflection journal, and a post-implementation student survey. The data numbers reflect an increase in concentration during the study. Pre-intervention, 72% of children showed signs of concentration and the average weekly percentage of children concentrating throughout the study was 87%. At a 13-17% increase, the change was substantial and reflects a positive outcome. The action plan concludes future researchers may consider incorporating fewer outdoor activities at once or extend the time frame of the intervention.

*Keywords: Montessori, concentration, outdoor activity*

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I have vivid childhood memories of afternoons playing by a stream catching crayfish, walking with bare feet in the grass while listening to the rustling of leaves on windy summer days, and digging in the dirt to search for critters. These experiences made lasting impressions on my mind as each encapsulates a time when my innate curiosity and fascination with nature were uninhibited. Though I still find myself drawn to the great outdoors, admittedly, far too often I get caught up in the hustle and bustle of life and must consciously acknowledge the life-enhancing stimuli of nature that once was central to my childhood life. It seems that in today's society, collectively, experiences in nature are lost, and individuals lack the opportunity to explore a world of natural stimuli freely and consistently. As a Montessori educator, I often wonder about this increasing disconnection to nature and its effects on children.

For many children, media such as television, the Internet, music, and video games consume their daily lives and replaces enriching experiences in the natural world (Kellert 2015; Louv, 2008). Additionally, urban landscapes may offer limited access to green space, gardens, and parks to the community making a connection with nature hard to come by. Considering the present circumstances, one might conclude that media influence and lack of contact with nature could be affecting attention and cognitive functioning in children (Louv, 2008). This research explores the connection between contact with nature and concentration in children while in a school setting.

The study examined the concentration of 21 children, between the ages of three and six years old, in one primary classroom at a private, Association Montessori International (AMI) accredited Montessori school nestled in a busy suburban neighborhood located in a southeastern state. The school was established in 1972 and serves children between the ages of 15 months to 12 years with two toddler classrooms,

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three primary classrooms, and one combined lower-upper elementary classroom. The school is currently constructing a middle school building; the construction site was active during the research and adjacent to part of the wooded outdoor space of the school. The school sits on 3 acres of wooded landscape and is completely fenced in and tucked away in isolation from a busy highway lined with local businesses. Having spent ten years teaching in various Montessori educational settings with limited green space, I was delighted to discover that each primary classroom on campus can easily access the outdoors. Due to the accessibility of the outdoors, the primary classroom frequently utilized the wooded areas on campus and an enclosed patio area connected to the indoor environment during this study.

At the onset of the school year, I observed that many children in the classroom demonstrated a lack of concentration and struggled to maintain attention during the morning work period, between 8:30 am and 11:00 am. The students often wandered around the room, distracting others from their work, and demonstrated restlessness, which led to disruptive behaviors. I found myself continually redirecting children to choose purposeful work, which led to exhaustion and discouragement in my pursuit of a peaceful and productive classroom. In addition to these early observations, I also came to acknowledge that my preparation of the outdoor patio area was lacking; the outdoor area was underutilized yet the children were effortlessly attentive and stimulated by any outdoor activity made available.

Based on my observations, I set out to conduct an action research study focused on connecting children to nature through the intentional incorporation of outdoor experiences within our daily work cycle. I hoped that children, who were given opportunity to gain experience in the natural world through purposeful work and daily

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nature walks, would become more self-directed, attentive, and engaged in purposeful activity. The study addressed the question: what effect does outdoor activity have on student concentration? During the research period, children were invited to participate in daily nature walks around the school campus and were given presentations on outdoor activities during a six-week intervention period. An analysis of the effects of outdoor work and nature connection on concentration was conducted. Through observation, and data collection methods such as observational concentration tally sheets, a student survey, and a teacher's journal, results of the effects of outdoor activity on concentration were examined.

### **Theoretical Framework**

Collectively, there is a large body of research on the benefits of interacting with nature. Attention Restoration Theory is a widely cited theoretical account, which posits that by connecting with nature, individuals will experience positive psychological benefits. Based on research (Faber Taylor & Kuo 2009; Schutte, Torquati, & Beattie, 2017) supported by Attention Restoration Theory, mental fatigue, which can occur from prolonged maintenance of cognitive tasks, can be relieved by contact with nature as it promotes psychological restoration.

Attention Restoration Theory was developed by Kaplan and Kaplan (1995) and asserts that nature positively enhances an individual's capacity to maintain attention. Kaplan and Kaplan described two types of attention: directed attention and effortless attention. Directed attention is intentionally focused attention. Complex mental processes such as inferring meaning, evaluating risks, completing multi-step tasks, and making decisions are examples of functions that require directed attention. According to research by Kaplan and Kaplan (1995), too much directed attention and repeated complex mental

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processing leads to mental fatigue, lack of focus, and reduced concentration. In children, this kind of mental fatigue may be observed as restlessness and poor cognitive functioning.

Conversely, Kaplan and Kaplan found that effortless attention occurs when individuals are exposed to environmental stimuli found in nature. Natural environments offer opportunities for restoration of mental fatigue by eliciting feelings of “being away” from activities which require prolonged mental attention. Often, the engrossing characteristics of nature such as clouds, the movement of leaves on a tree, or a sunset evokes a response to the natural world that is described as fascination. The beauty and subtleties of the natural world offer a restorative experience allowing for a period of mental relaxation.

Attention Restoration Theory applies to numerous studies that have examined ways in which exposure to nature can alleviate mental exhaustion. The researchers Dadvand et al., (2015) examined the correlation between exposure to green space in neighborhood, commuting, and school environments where participants dwelled. The study claims (2015),

“Natural environments including green spaces provide children with unique opportunities such as inciting engagement, risk taking, discovery, creativity, mastery and control, strengthening sense of self, inspiring basic emotional states including sense of wonder, and enhancing psychological restoration, which are suggested to influence positively different aspects of cognitive development.”

Additionally, studies by Faber, Taylor and Kuo (2009), as well as Schutte, Torquati, and Beattie (2017) have shown that regular exposure to outdoor environments offer relief from mental fatigue and increase directed attention. Both of these studies found that

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children and adolescents who interacted with nature daily were able to maintain focus and demonstrated higher cognitive functions while in the classroom. Doses of nature enhance student productivity, directed attention, focus, and overall concentration in the classroom. Details regarding duration, frequency, and effects of contact with nature environments vary from study to study, but the overriding message supports nature as a tool for psychological restoration.

### **Review of Literature**

An essential component of the holistic development of children is to have contact with nature. Holistic development involves the physical, emotional, spiritual, and intellectual aspects of learning all of which can be supported by interacting with and connecting to the outdoors. For the young child, frequent and accessible contact with nature provides an enriching kinesthetic, aural, visual, and tactile sensorial experience. According to Montessori (1967), "The development of the senses precedes that of the higher intellectual faculties, and in a child between the ages of three and six constitutes his formative period" (p. 143). The central aim in the primary classroom is to support the development of the child in a prepared environment where conditions are optimal for learning. An ideal environment for the young child incorporates life experience with the natural world. Such experiences incarnate within the child, allowing the child to develop, progress, and create.

Time spent in the outdoors rejuvenates the mind and body, promotes curiosity, observation, creativity, and enhances problem-solving skills (Kellert, 2015). Contact with nature at an early age influences and improves children's cognitive, social, physical, spiritual, and emotional skills (Louv, 2008; Maller, 2009). Furthermore, a child who is free to experience life richly connected to nature may exhibit characteristics of

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joyfulness, self-discipline, obedience, and attentiveness (Louv, 2008; Montessori, 1972).

Regarding the positive effects of nature, Richard Louv (2008) wrote, "When children have regular contact with nature, in an unstructured way, they are more attentive, observant, creative and self-content," (p.49). This review of literature examines how nature positively impacts the holistic development of children, increases cognitive functioning, and boosts mental restoration.

### **Effects of Minimal Contact with Nature**

Evidence points to a link between the lack of connection to nature and rising rates of obesity, attention disorders, and poor emotional health (Kellert 2015; Louv, 2008). In today's technology-driven culture outdoor play is often replaced with media and electronics usage. Stephen Kellert, senior research scholar and professor emeritus at Yale School of Forestry and Environmental Studies, asserts that children in the United States now spend less than 10% of free time outdoors. Kellert found that children between the ages of two and five years old interact with electronic media for an average of 30 hours per week. Furthermore, children ages eight to eighteen spend nearly 52 hours per week engaging with electronic media (Kellert, 2015). These statistics point to a growing disconnectedness to nature, and this threatens the overall health and development of children. In the book *The Last Child in The Woods*, Richard Louv (2008) referred to this apparent disassociation with nature as a phenomenon named "nature-deficit disorder." Louv (2008) said, "Nature deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses" (Louv, 2008, p. 36). In general terms, cognitive functioning disorders, hyperactivity, diabetes, and attention difficulties are examples of health-related illnesses that are aggravated by nature deficiency.

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Another striking potential consequence of minimal contact with nature is that it may contribute to poor sensory development in children. Louv defines this occurrence as a rise in atrophy of the senses called “cultural autism” (Louv 2008). A loss of connection to nature may deprive the child of an enriching personal experience that supports holistic development. Moreover, recent research, from the Center of Disease Control, reported that one out of seven children in the United States ages two to eight years old suffer from a behavioral, mental, or developmental disorder (Bitsko et al., 2016). As many children suffer from such disorders the use of nature as an additional or alternative therapy proves to be beneficial (Faber Taylor, & Kuo, 2009; Louv, 2008).

### **Intentional Incorporation of Nature in Early Childhood Education**

While nature-deficit disorder and cultural autism become more evident in American culture, health professionals, teachers, and researchers seek a deeper understanding of the connection between nature and childhood development. As such, many studies have introduced "green time" and nature work initiatives to improve children's health (Johnson, 2013; Chawla, Keena, Pevec, & Stanley, 2014). Researchers have implemented interventions to enhance children's connectedness to nature, which has led to physical and mental restoration (Faber Taylor, & Kuo, 2009; Johnson, 2013, Chawla, Keena, Pevec, and Stanley, 2014).

Lerma (2018) found that by including "Nature Work," daily lessons involving direct contact with dirt, students were very interested in the nature-themed material. This curiosity and interest led to observable characteristics of calmness, peace, and concentration while working with natural materials such as dirt. Furthermore, Faber Taylor, and Kuo (2009) found that "doses of nature" enhanced cognitive functioning and attention for children among the general population as well as children who have been

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diagnosed with ADHD. The data collected demonstrated that children's attention was best enhanced after participating in a 20-minute walk in a park.

Additionally, in both early and middle school-aged children, Schutte, Torquati, and Beattie (2017) found similar effects of walking in nature as a catalyst to restore on-task attention and improved executive functioning skills. Likewise, one qualitative study recorded the responses of children who had access to natural habitats, school gardens, and forested playgrounds in Maryland and Colorado. Chawla, Keena, Pevac, & Stanley (2014) found the children experienced relief from stress and had improved focus. 98% of the participants stated that gardening activities improved focus and positively impacted cognitive functioning (Chawla, Keena, Pevac, & Stanley, 2014).

Lastly, as evidence demonstrates the benefits of access to nature, a new standard for design is needed; biophilic design. Kellert describes biophilic design as the intentional incorporation of nature that ranges from subtle enhancements such as an outdoor view, indoor and outdoor plants, nature-inspired artwork to architectural design that mimics natural forms (Kellert, 2015). Correspondingly, urban planning interventions and initiatives, such as gardens and outdoor areas in schools are on the rise (McCormick, 2017).

### **Nature in The Primary Classroom**

Montessori felt strongly about the need for children to freely and regularly interact with nature long before society became heavily influenced by the technological and media advances of today. While developing her philosophy on education, Montessori unwaveringly advocated for children to spend time outdoors. Montessori wrote about the all-encompassing need for intentional incorporation of nature,

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There is no description, no image in any book that is capable of replacing the sight of real trees, and all the life to be found around them, in a real forest.

Something emanates from those trees which speaks to the soul, something no book, no museum is capable of giving. The wood reveals that it is not only the trees that exist but a whole, interrelated collection of lives. And this earth, this climate, this cosmic power are necessary for the development of these lives. The myriad of lives around the trees, the majesty, the variety are things one must hunt for, and which no one can bring into the school. How often is the soul of man - especially that of the child - deprived because one does not put him in contact with nature? (Montessori, 1994, pp. 19-20).

In any Montessori environment, one might notice free-flowing spaces wherein children work indoors and outdoors alike. Children are encouraged to bring indoor materials to explore out of doors, as well as engage in intentional “green work” such as gardening or composting. Natural materials, plants, and frequent access to the outdoors are components of an ideal primary classroom. Though there are different levels of access to the outdoors depending on each school location and culture, ideally, children encounter a variety of activities that encourage experience with the natural world. Regarding the incorporation of nature during childhood Montessori wrote,

Let the children be free; encourage them; let them run outside when it is raining; let them remove their shoes when they find a puddle of water; and, when the grass of the meadows is damp with dew, let them run on it and trample it with their bare feet; let them rest peacefully when a tree invites them to sleep beneath its shade; let them shout and laugh when the sun wakes them in the morning

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as it wakes every living creature that divides its day between waking and sleeping.

(Montessori, 1967, p. 68-69)

## **Conclusion**

The evidence and literature overwhelmingly suggest that children need to remain in contact with nature to lead healthy developing lives. Furthermore, the intentional incorporation of nature is of paramount importance in today's time as children are increasingly losing contact with the natural world. A prepared environment, filled with outdoor experiences, will offer rich sensorial experiences for the child. The collected literature also establishes that contact with nature prepares the child's mind for ideal cognitive engagement with daily tasks that require directed attention and focus. Contact with nature can be presented to the child in a variety of ways; from gardening work to walking in a park. Connecting to the natural world is varied yet continually provides fascination and restoration for the mind and body.

## **Methodology**

The study on the effects of outdoor activity on concentration began the week of January 22, 2019, in a Montessori primary classroom. Before the start of the intervention I informed the school administration, school staff, and parents of the participating children of my plans to conduct the action research study for a total of six weeks. In the first week of the study, I collected baseline data on children who were concentrating during the morning work cycle. The morning work cycle, between 8:30 am and 11:00 am, is a time in which children freely move about the classroom, choosing materials of interest. In a Montessori environment, the instructor presents materials to the child based on each child's interests and developmental appropriateness. After the initial presentation of a particular material, children are free to repeat activity as their internal directives

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dictate. In the context of this research, concentration was recognized as the child engaging with a single activity or material. Therefore, a wandering child or a child taking a bathroom break was not considered to be concentrating. The baseline data reflects the number of children concentrating in the indoor space of the classroom. Each morning of the first week, I tallied the total number of children concentrating. The total number of children concentrating was counted at 9:00 am, 9:30 am, and 10:00 am.

In the second week of the study, I began the intervention implementation. I integrated whole-group nature walks at the beginning of the work cycle. Generally, the children arrived in the primary classroom at approximately 8:30 am and began their morning routine. For the first day of the intervention, I rang a chime and invited children to meet me at our collective meeting space. I explained to the children that we would be going on morning walks on our school campus at the beginning of each day. After our initial whole-group meeting, every morning as weather permitted, children were invited to participate in a nature walk. Children were dismissed to line up individually or with a partner. Children were also given an option to decline participation in the nature walks, but all of the children participated on the walks throughout the study. For each walk, two teachers accompanied the children. Nature walks began at approximately 8:40 am and concluded after 10 to 15-minute sessions. During our walks, the children were encouraged to notice the patterns of leaves on trees, observe birds and nests seen high on treetops, and walk through natural structures such as tree stumps. Occasionally, the peaceful tranquility of the wooded walking areas of the school were influenced by construction work. On a few mornings, the buzz of a bulldozer and pouring of a cement mixer took precedence over the natural elements at play, but the spectacle was entertaining to the children, nonetheless. At the end of each walk, children returned to the

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classroom and regrouped at the collective meeting space. One by one, children were invited to choose an activity to begin their morning work cycle.

In addition to daily nature walks, I also introduced five new outdoor activities over the next five weeks. The presentations of outdoor activities were as follows: Raking, Sweeping, Window Washing, Hammering, and Egg Shell Crushing. The first week, I made two child-sized rakes available to the children, as well as a basket with garden gloves. These materials were housed in the outdoor patio area. Children were invited individually or in small groups of two for a presentation. First, children were shown how to don a pair of garden gloves. Second, the rake was retrieved from its storage place, and children were shown how to rake leaves into a pile. After the pile of leaves was created, the children were shown how to dispose of the leaves in a composting space adjacent to the patio area. Just as the raking work was completed, I also demonstrated how to sweep the concrete slabs on the patio using a broom, following the same process as with raking leaves.

The third week of the study, I introduced Window Washing. On the Outdoor Activity shelf located in the classroom, I prepared a cleaning caddy with the following items: an apron, a spray bottle filled with water and vinegar solution, a child-sized squeegee, sponge, and drying cloth. Children were invited individually or in a small group for a presentation on how to clean the exterior windows of the primary classroom. Children were shown how to retrieve the caddy, put on an apron, and choose a window for cleaning. Once a window was chosen, I sprayed three sprays of water and vinegar solution onto the surface of the window, used the squeegee to remove the water, and dried any remaining water with the sponge and drying cloth. After the presentation, the children were invited to repeat the process.

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The fourth week of the study, I introduced Hammering. Materials for the Hammering work were housed on the Outdoor Activity shelf in the classroom and include a tray with a hammer, nails, and safety goggles. This presentation was given individually to ensure that each child understood how to handle the materials with care and safety in mind. I showed the children how to carry the tray to the patio area and set up the materials next to a large tree stump specifically purposed for Hammering. The first step of the presentation was to put on the safety goggles. Children were shown how to carefully place a nail in vertical position on the top surface of the log, and gently tap the hammerhead onto the head of the nail. The point of interest was that the nail must be flush to the top surface of the log before hammering the next nail. After the presentation, children were invited to repeat the process.

The fifth week of the study, I introduced Egg Shell Crushing. The crushed eggshells were meant to fertilize the soil of our garden in preparation for planting in the spring. The materials for the Egg Shell Crushing work were also housed on the Outdoor Activity shelf in the classroom. I prepared a tray that included a bowl with eggshells, a child-sized mortar and pestle, and a soft bristle brush. This presentation was presented individually. Children were shown how to crush the shells in the mortar and pestle until the shells were pulsed to a powdery consistency. Next, the children were shown how to transfer the crushed shells into the soil of a garden planter. Unfortunately, after only two days the mortar and pestle were broken as they were dropped while being transferred back indoors. Considering our mortar and pestle was made of ceramic material, its fragility was not ideal.

After baseline data was collected during the first week, the remaining five weeks of the study I kept a daily tally on children concentrating during the morning work cycle.

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Additionally, I was able to count how many children who were working on indoor versus outdoor materials. The method for record keeping was the same as the tally system used during the first week of baseline data collection. Three times a day, I counted the number of children concentrating; at 9:00 am, 9:30 am, and 10:00 am. In addition to the whole class concentration tally, I also recorded the names of children who chose to engage with an outdoor activity and the name of the particular activity used.

Along with the whole group observation notes, 4-6 children from each age group represented in the classroom were randomly selected each week to be observed. My original intention was to record detailed data involving the kinds of material the children chose to work with (indoor and outdoor material), their responses to the work, and the time spent on-task during the work cycle between 9:00 am and 10:00 am. Due to the challenges presented and difficulty in recording the scope of this data, I only recorded data on such details when the children chose outdoor work. By collecting this data, I had hoped to gather more information from which to examine outdoor activities effect on concentration. Information such as, the frequency of outdoor work being chosen, time of sustained concentration, and details on work chosen after completing an outdoor activity. Lastly, I formulated another data tool; a self-reflection journal. This data tool was meant to keep my thoughts organized, document daily changes in the classroom environment, and record any notable progress made. The self-reflection journal was utilized throughout the study.

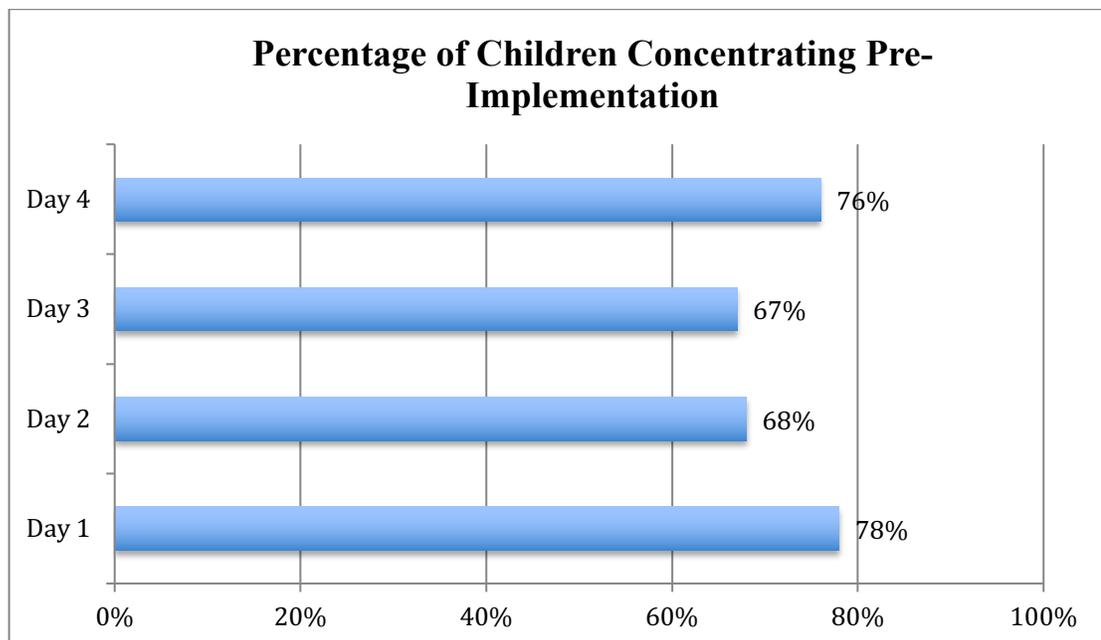
Lastly, on the last Thursday and Friday of the study, I asked the children to individually complete a survey. Before being given the paper survey, I had a brief conversation about concentration with each child. Then, the 21 participants were asked two questions: Do you enjoy outdoor work? and Do you feel outdoor work helps you

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concentrate? The participants were also asked to draw or write about their favorite outdoor activity and what helps them concentrate. The student-assessment provided insight into the students' perceptions of outdoor activities and if they had an effect on their concentration.

### Analysis of Data

Prior to implementing the intervention, I collected baseline data during the first week of the study. Concentration levels of the classroom of 21 children were tallied during an hour period at 9:00 am, 9:30 am, and 10:00 am. The concentration tally reflects the total number of children concentrating prior to the incorporation of outdoor activities. The levels of concentration were reviewed, and the percentage of children concentrating during the first week was calculated. Figure 1 shows the percentage of children concentrating during the first week, pre-implementation. The percentage of children concentrating was calculated by dividing the daily average number of children concentrating by the total number of children in the class on each day. The average percentage of children concentrating during week one of the study was 72%.



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Figure 1. Percentage of children concentrating pre-implementation

With the average daily number of children concentrating calculated, I determined the average weekly percentage of children concentrating during the study. The chart below shows the weekly percentages; the percentage was found by dividing the weekly average number of children concentrating by the average total number of children in the class during each week. When analyzing the average percentage of children concentrating during the pre-implementation (Week 1) and the average percentage of children concentrating during implementation (Weeks 2-6), I determined there was an increase of 13-17% in the overall percentage of children concentrating (see Figure 2).

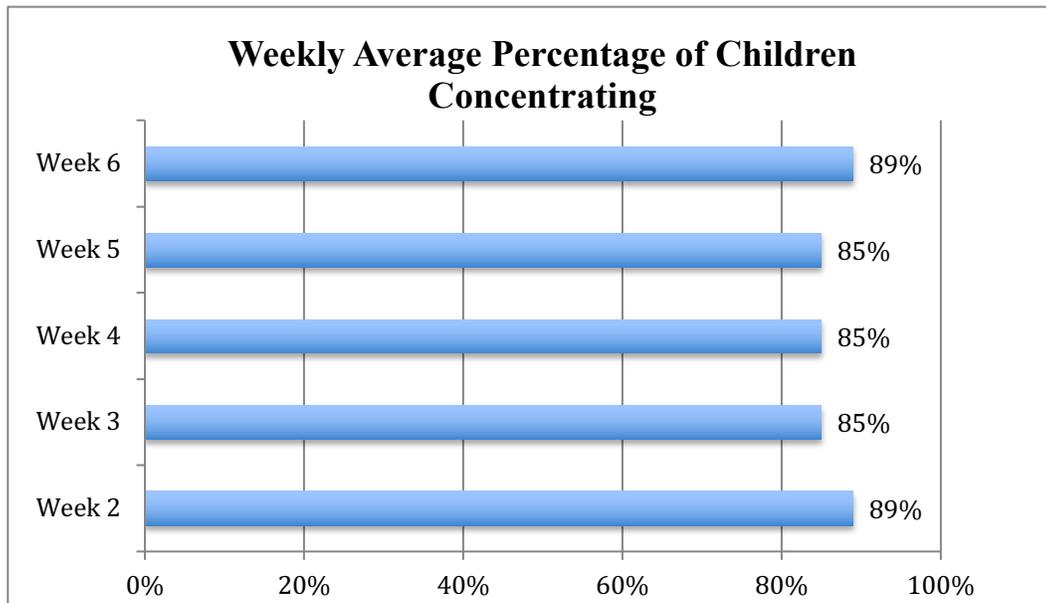


Figure 2. Weekly average of children concentrating: Week 2 through Week 6

Throughout the study, children were invited to participate in daily nature walks and outdoor presentations were introduced on a weekly basis. The outdoor work was introduced as follows; Week 2: Raking and Sweeping, Week 3: Window Washing, Week 4: Hammering, Week 5: Egg-Crushing. In addition to recording data on the whole class level of concentration I also kept a tally of children who worked on outdoor activities. I

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counted the number of children working with outdoor materials three times a morning at 9:00 am, 9:30 am, and 10:00 am. As the weeks progressed, not only did the outdoor materials increase, but also the number of children using outdoor materials and concentration levels increased. Beginning with Week 2, up to 3 children were allowed to use outdoor work at the same time, during Week 3 up to 4 children at a time, Week 4 up to 5 children at a time, and during Week 5 and 6 up to 6 children at a time were able to work with outdoor materials. The line graph shows the increase of outdoor materials introduced to children and the total number of children who concentrated with outdoor material from Week 2 to Week 6. The blue line on the graph shows the maximum number of outdoor materials available for children to use at the same time. The red line shows the daily total number of children that chose to work with the outdoor material offered. Of the total 20 days of outdoor material incorporation, there were 2 days of inclement weather. On these days, children did not go on a nature walk and had no or limited access to the outdoor materials. The two days of restricted access to the outdoors is shown on the graph on days 10 and 11.

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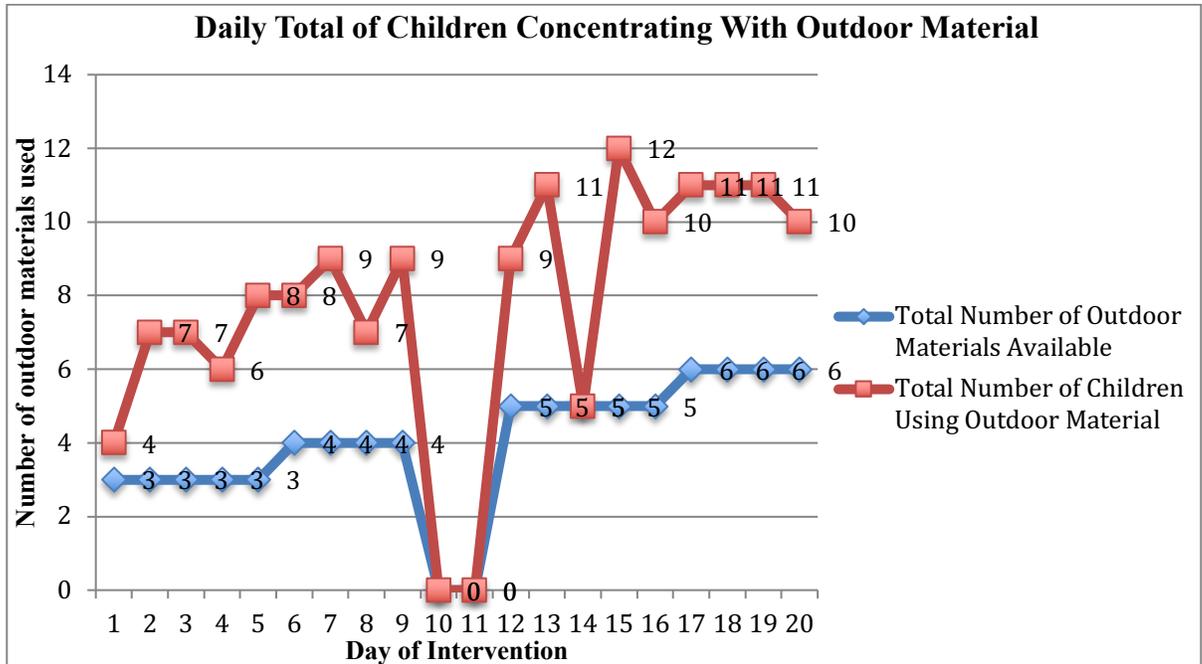


Figure 3. Children concentrating with outdoor materials offered

Each week, 4-6 children were observed, between 9 am and 10 am, and details were recorded on signs of concentration the children exhibited. This task was very challenging as it became near impossible to keep track of all the work the children chose throughout the week. Thus, as this method of data collection posed challenges much of the notes collected reflect details about the manner in which the children engaged with outdoor material specifically. The observational notes collectively detail positive attitudes, enthusiasm, and eagerness to engage with the outdoor material. Additionally, I kept a daily journal that highlighted personal interpretations and reflections about the intervention process. After reviewing the bulk of the observation notes and personal journal, several patterns emerged that are worth noting.

### Spontaneous Interest and Engagement

At the beginning of the study, I had a conversation with the children about how outdoor activities would be incorporated into our daily routine. Children were elated to

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hear about the plan for daily nature walks and were eager for invitations for presentations on outdoor work. After reviewing my journal entries, I noticed similarities in my descriptions of the children's reactions and excitement towards outdoor activities. A few examples of the written records of the children's enthusiasm and interest with the outdoor activities include, "The children were excited for our morning nature walk today." and "I observed the child completely immersed in activity while raking leaves." An example of the children's spontaneous interest is also evident in my notes that read, "The children shouted, 'Look at the bird's nest in the trees!'" and "I often observe the children, who are working outside, enjoy putting their hands in the dirt." Overall, the observational notes show that the children were interested by the sensorial experiences the nature walks and outdoor materials offered, as well, as engaged in outdoor activity.

### **Repetition**

There were many instances recorded when children repeated an outdoor activity. This was evident when children refilled the spray bottle to continue working with the Window Washing, continued to hammer nails in the stump one after another, or when the children checked the patio daily for leaves and debris to begin Raking. In a Montessori primary classroom, signs of repetition of work are a hallmark indication that the child is absorbed in an activity and refining skills. Regarding the benefits of repetition of work, Montessori (1972) wrote,

A child who has become master of his acts through long and repeated exercises, and who has been encouraged by the pleasant and interesting activities in which he has been engaged, is a child filled with health and joy and remarkable for his calmness and discipline. (p. 92)

### **Outdoor Work Before Challenging Work**

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For many of the children ages 5 and 6, it was observed that the outdoor activities were often chosen prior to working with a Math or Language material. Often times, the children in this age group engage with materials that challenge mental skills, as the child writes, reads, and solves problems. Though the observations may not be directly linked to the usage of outdoor material, it is possible that the outdoor experiences allowed for sensorial and physical release, which helped the children then concentrate with academic material.

Lastly, the 21 children were given a student survey at the end of the intervention during Week 6. Prior to completing the survey the students had a brief conversation with the teacher about concentration. Then, students were told that the survey would ask questions about the outdoor work and concentration in the classroom. The students were given a choice of answering the questions with Yes, Ok (noting a feeling of indifference), and No. When students were asked, “Do you enjoy nature work?”, 86% of the children answered ‘Yes’, 0% answered ‘Ok’, and 14% answered ‘No’.

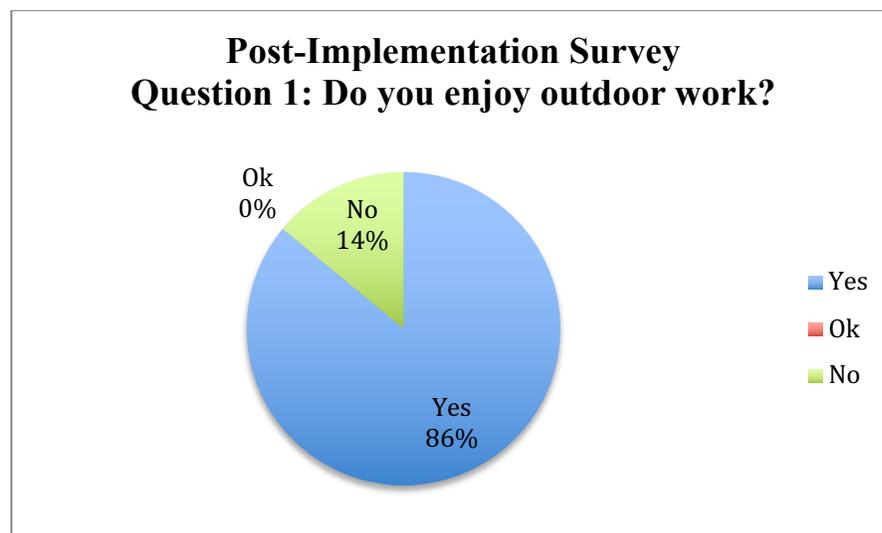


Figure 4. Responses to the post-implementation survey Question 1

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Second, the participants were asked, “Do you feel outdoor work helps you concentrate?”.

71% of participants answered ‘Yes’, 10% answered ‘Ok’, and 19% answered ‘No’.

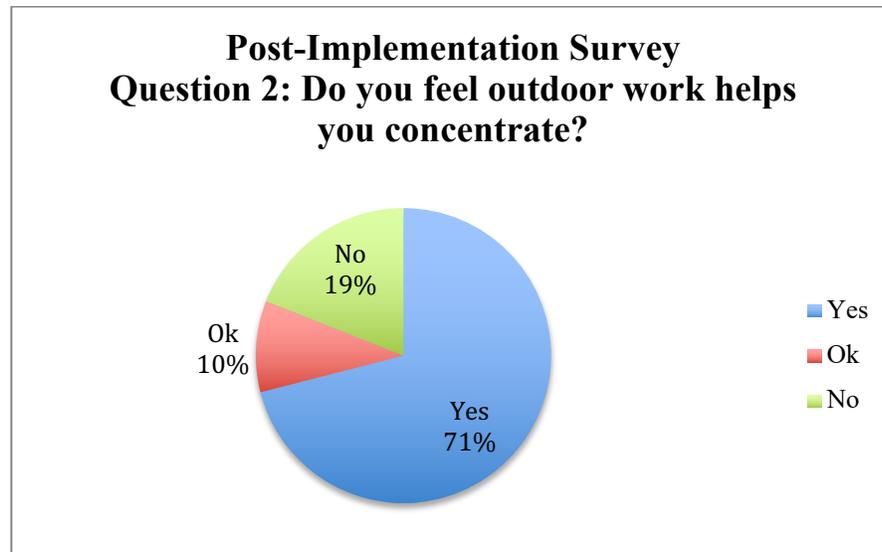


Figure 5. Responses to the post-implementation survey Question 2

The last section of this survey asked the participants to draw or write in response to the prompt. The first prompt said, “Draw or write about your favorite outdoor activity”. The children’s responses included Raking, Hammering Work, Bird Watching, Window Washing, Nature Walk, Sweeping, as well as two blank responses (see Figure 6). The second prompt said, “Draw or write about what helps you concentrate”. The images and writings collected show that some children associated an outdoor activity as something that helped them concentrate. Five children responded to the prompt with a drawing of a challenging activity, for example, a drawing of the Thousand Chain and Stamp Game. This evidence shows that these students may understand that concentration is required when working on challenging tasks. Moreover, these responses also support the observational data regarding children who chose to complete outdoor activities prior to working with a Math or Language material. The other children responded by drawing outdoor activities or didn’t respond.

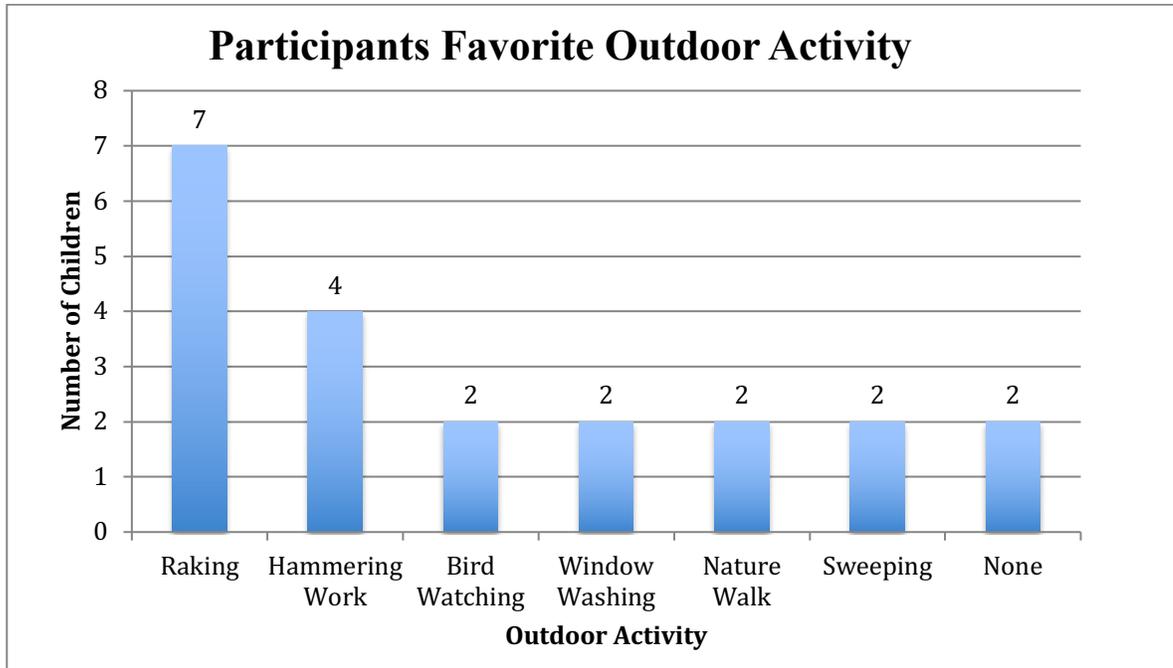


Figure 6. Responses to the post-implementation survey writing and drawing prompt

#### **Action Plan**

This research examined how intentional incorporation of outdoor activity affected concentration while at school. The intervention was two-fold; children were invited to participate in daily nature walks and were shown one new outdoor activity per week. Due to the consistency of interest in the outdoor activities and the positive increase of concentration levels, I plan to continue incorporating outdoor experiences in my classroom. Though the research supports the notion that outdoor work can positively enhance concentration in the classroom, future researchers may consider other ways in which to include outdoor activities in the classroom to promote on-task attention and concentration.

Throughout the study, children remained enthusiastic about nature walks and were excited to be invited to work with outdoor materials. The evidence collected from this research demonstrates that children were naturally curious about the outdoor

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activities. The research suggested that by including outdoor activities into our daily routine, the children were motivated and engaged. Specifically, the data points to motivation and engagement with outdoor materials, as well as an overall indication of an increase in concentration indoors, too. I am encouraged by the results of this study. The introduction of new outdoor work each week did allow for more outdoor opportunities, and more children chose this work as the intervention progressed. Additionally, when comparing the overall classroom concentration levels before the intervention and throughout its implementation, concentration increased.

The scope of intentional incorporation of outdoor activities is broad, and this study narrowed the focus to two methods of implementation. Both daily nature walks and outdoor work were implemented, but facilitating each activity simultaneously was challenging. Future researchers may want to narrow the intervention down to either daily nature walks or outdoor activities (not both). Though the children seemed to benefit from the nature walks, incorporating the activity into our daily routine was time-consuming. In the future, I think nature walks could be implemented in a variety of ways and not limited to being a whole group activity. I believe the children could still benefit from nature walks if structured as a small group activity or presented as a nature exploration time wherein in small groups of children are invited to walk through wooded areas freely. In regards to the individual or small group presentations on outdoor activities, I suggest amending the current intervention by introducing these activities on a monthly or bi-weekly basis. In this proposed format, children would have more time to engage with outdoor activities before being shown a new presentation. In this study, the children were consistently shown a new outdoor activity each week. Typically, whenever any new presentation is shown, no matter the subject area, interest in the activity is high.

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Considering this, the intervention timeframe in this study did not show whether or not the interest in outdoor activities would lessen over time.

The data collected does reflect an increase in concentrating children, but the observational period does not reflect the concentration levels in totality as the observational tally shows concentration levels for only one hour of the work period. Thus, the data indicated in this study is limited. Future researchers may want to extend the timeframe for observational tallying across the entire work cycle to get a broader picture of overall concentration levels. With a longer observational tally period, a researcher may be able to determine if children would continue to choose outdoor material towards the end of the morning work cycle. Another observational tool suggestion would be a data tool that records information about children's sustained concentration with particular materials. It would be interesting for future researchers to examine the kinds of academic material children use before or after spending time outdoors. I was not able to consistently gather enough observational data on all the materials children chose before or after working outside. However, I did notice that 5 to 6-year-olds did choose Math and Language work after working outdoors frequently.

Based on this research, it is possible that the integration of outdoor activities can promote concentration with indoor and outdoor material. This study demonstrated how interacting with the outdoors can help reconnect children to nature and restore concentration. The outdoor activities implemented in this study were developed to offer rich experiences for the children. Though outdoor spaces may be minimal and often hard to create due to lack of space, time, or resources, educators are encouraged to integrate outdoor materials however possible. Lovely additions to any outdoor area could include bird feeders, wind chimes and a sandbox with sand tools. All of which would promote

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connection with the natural elements (birds, sand, and wind) and could include sensorial engagement such as pouring, digging, watching, and listening. A garden for growing vegetables, herbs, fruit, flowers or shrubs would also make a wonderful contribution in an outdoor space accessible to children. As a Montessori guide, one of my main goals is to prepare a classroom with materials that spark a child's interest and supports each child's developmental needs. Montessori (1989) felt the primary teacher should lead the child to concentration. She wrote,

The work of the teacher is to guide the children to normalization, to concentration. She is like the sheepdog who goes after the sheep when they stray, who conducts all the sheep inside. The teacher has two tasks: to lead the children to concentration and to help them in their development afterwards.

(p.16)

By preparing an environment unified with nature, children may begin to reap the benefits of rich sensorial experiences that will impress upon their minds, urging creativity, restoring concentration, and connection to the greater world.

References

- Bitsko, J. Holbrook, J. Kaminski, L. Robinson, R. Ghandour, C. Smith, G. Peacock (2016). Health-care, family and community factors associated with mental, behavioral and developmental disorders in early childhood - United States, 2011–2012. *Morbidity and Mortality Weekly Report*, 65(9), 221-226.
- Dadvand, Sunyer, Alvarez-Pedrerol, Dalmau-Bueno, Esnaola, Gascon, . . . Nieuwenhuijsen. (2017). Green spaces and spectacles use in schoolchildren in Barcelona. *Environmental Research*, 152, 256-262.
- Faber Taylor, A., & Kuo, F. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, 12(5), 402-409.
- Johnson, K. (2013). Montessori and nature study: preserving wonder through school gardens. *Montessori Life*, 25(3), 36-40,42-44.
- Kaplan, S. (1995). The restorative benefits of nature: toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169-182.
- Kellert, S. (2015). Stephen Kellert: Build nature into education. *Nature*, 523(7560), 288.
- Lerma, Dorothy R.. (2018). The effect of nature work in a primary-aged montessori environment. Retrieved Sophia, the St. Catherine University repository website: <https://sophia.stkate.edu/maed/261>
- Louv, R. (2008). *Last Child in the Woods : Saving Our Children from Nature-Deficit Disorder*. New York: Algonquin Books of Chapel Hill.
- Maller, C. (2009). Promoting children's mental, emotional and social health through contact with nature: A model. *Health Education*, 109(6), 522-543.
- Mccormick, R. (2017). Does access to green space impact the mental well-being of children: A Systematic Review. *Journal of Pediatric Nursing*, 37, 3-7.

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Montessori, M. (1994). *From childhood to adolescence*. Oxford, England: Clio Press.

Montessori, M. (1989). *The child, society and the world : Unpublished speeches and writings / Maria Montessori ; translated, where necessary, from the original manuscripts by Caroline Juler and Heather Yesson, and with introductory texts by Günter Schulz-Benesch*. (The Clio Montessori series ; v. 7). Oxford: Clio..

Montessori, M. (1972). *The discovery of the child / Maria Montessori ; translated by M. Joseph Costelloe*. (1st Ballantine Books ed.). New York: Ballantine

Montessori, M. (1967). *The Discovery of the Child*. New York: The Random House Publishing Group.

Schutte, A., Torquati, J., & Beattie, H. (2017). Impact of urban nature on executive functioning in early and middle childhood. *Environment and Behavior*, 49(1), 3-30.

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Appendix A

**Daily Observation- Whole Class Concentration and Outdoor Activity Tally**

Date:	Weather: Y/N	Nature Walk:	# of Children Present:
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Work Period Whole Class Concentration:

Outdoor Activity:

24	*	*	*
22	*	*	*
20	*	*	*
18	*	*	*
16	*	*	*
14	*	*	*
12	*	*	*
10	*	*	*
8	*	*	*
6	*	*	*
4	*	*	*
2	*	*	*

9:00 am  
# of Children using outdoor work:  
Names of outdoor work being used:

9:30 am  
# of Children using outdoor work:  
Names of outdoor work being used:

10:00 am  
# of Children using outdoor work:  
Names of outdoor work being used:

Time:	9:00 am	9:30 am	10:30 am
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Date:	Weather:	Nature Walk: Y/N	# of Children Present:
-------	----------	------------------	------------------------

Work Period Whole Class Concentration:

Outdoor Activity:

24	*	*	*
22	*	*	*
20	*	*	*
18	*	*	*
16	*	*	*
14	*	*	*
12	*	*	*
10	*	*	*
8	*	*	*
6	*	*	*
4	*	*	*
2	*	*	*

9:00 am  
# of Children using outdoor work:  
Names of outdoor work being used:

9:30 am  
# of Children using outdoor work:  
Names of outdoor work being used:

10:00 am  
# of Children using outdoor work:  
Names of outdoor work being used:

Time:	9:00 am	9:30 am	10:30 am
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Appendix B

**Observation Notes on Individual Children**  
(Weekly observation of 6 children working in the environment)

Date: \_\_\_\_\_ Student Name/Age: \_\_\_\_\_ Outdoor Work: Y/N If yes, what activity?  
Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

Date: \_\_\_\_\_ Student Name/Age: \_\_\_\_\_ Outdoor Work: Y/N If yes, what activity?  
Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

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Appendix C

**Daily Reflective Journal**

(Note any schedule changes, disruptions, or anything out of the ordinary)

Date:

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**Daily Reflective Journal**

(Note any schedule changes, disruptions, or anything out of the ordinary)

Date:

