# Positive Impact of Outdoor Learning in Kindergarten

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## Abstract

Children are not getting outdoors as much as they need to for educational, health and social/emotional benefits. Research shows that children do not spend as much time outdoors as children of past generations. This appears to have an adverse effect on their educational well-being. The present research attempted to prove that there are positive impacts on children when they are exposed to learning in nature on a daily basis. The study focused on the learning habits of 8 kindergarten students in a Montessori classroom by recording how many times they chose appropriate and meaningful work without the help of a teacher. The objective was to find out if spending time in an outdoor learning environment would cause an increase in the number of times these students chose appropriate work over the course of the seven week study. The research did not provide conclusive results; however, it did provide the researcher with information that will increase the potential success of a similar future research focus. Two factors were identified as potential barriers to the success of the project: A short data gathering period and a broad spectrum of data focus. This research implies that further related research is necessary and important for children to succeed in school and in their futures.


*Keywords:* Montessori, outdoor learning environment, nature

## Introduction

In today's world children often do not have the opportunity to explore nature and learn from their experiences. While this may not be true for all children, sadly, it is a reality for many. Places where children once played and learned while exploring forests and prairies have been turned into shopping malls, housing developments and parking lots. In many cases parents are too busy to bring children outside and too afraid of strangers, abduction and traffic to allow them to go outdoors and play on their own. The world of technology has many children searching for the nearest outlet to charge their gadgets instead of the door to the world outside. In the society we live in it seems almost necessary to know about technology and how to use it to be a functioning member but I believe we can say the same thing about nature. How can we teach children how to use nature and enjoy its many benefits? Not all schools are fortunate enough to enjoy a natural setting, and even those that do are not always able or perhaps willing to take advantage of this opportunity. We cannot expect children who have not explored, experienced and learned about nature while being outdoors, to grow up to be empathetic to their outdoor environment. It is not impossible, of course, but it is less likely to occur. For this and many other reasons it is imperative that we find ways to get children outside, not only to play but also to learn from listening, touching, hearing, seeing and tasting what the wonders of being outside have to offer.

## Literature Review

### Physical and Social/Emotional Health Benefits of Getting Children Outdoors Every Day

The growing disconnection between children and nature has been in the radar of researchers for some time. Benefits of outdoor activities that are being discovered have great impacts on children. Parsons' (2011) research paper shows a correlation between young children's outdoor activity in greener school yards and increased balance and coordination. Her research and that of others has also shown that less outdoor activity leads to more obesity and more outdoor activity leads to less obesity in children. Parsons 'research also indicated that increased outdoor activity increased coordination, balance and motor skills, as well as social activity. Those with less coordination and poor balance and motor skills were less socially active.

A study conducted by Taylor and Kuo (2008) found that children with ADHD had higher levels of concentration after a walk in a park than after a walk in an urban setting. Also, there is some evidence to show that children with ADHD show more fatigue after indoor activities as opposed to outdoor activities. Although this study did not find that there was a lasting effect after children had experienced a walk in the park, it does open up the question of whether outdoor nature activities are a possible treatment for ADHD. In a separate article by Taylor, Kuo, and Sullivan (2001), there is much discussion on the effects of ADD in children. These effects range from not having good social relationships to not being able to concentrate on their school work. Various types of treatment have been tried including medications and changes in diet. Little

thought has been given to what effect being outdoors might have on children with ADD. In her research on playground design Parsons (2011) found that play helps develop basic learning skills as well as developing social and problem solving skills. Play also helps children develop knowledge about real life. Her research refers to children's outdoor play as contributing to overall health and increased attention span, as it relates to children in general and those with ADD/ADHD in particular. A number of other researchers have arrived at the same conclusion. Bohling, Saarela and Miller's (2012) study further supported the link of outdoor learning to health and concentration. Parents identified the benefits of "improved sleep habits, cardiovascular health, increased physical strength, a sense of calm and focus and improved mood" in their children due to being outdoors more often (p. 12). Parents also described their children as being happier, calmer, respectful of nature, and showing improvement in skills such as independence, creative thinking, coordination, and leadership. Coordination and independence are two early skills fostered in a Montessori environment. In Richard Louv's (2008) book *Last Child in the Woods* there is much discussion about the health benefits of being outdoors. This book informs the reader of obesity, sleep deprivation, and even increased cases of high blood pressure in children due to lack of outdoor activity. Statements in this book suggest that it is not enough that children become more active. The number of children who are involved in organized sports has increased over the past few years but so has the percentage of children who are obese. Erik Mygind (2007) shares information in his study, *A comparison between children's physical activity levels in school and learning in an outdoor environment),* that shows children's health in Denmark has changed for the worse over the last 10 to 15 years. The reasons given for the decline in good health are that schools do not offer enough time for students to have physical

activity and not all children participate in voluntary sports and physical activity programs. Mygind's (2007) study found that two overweight children were more active on the days when lessons were presented outdoors, adding to the data that shows outdoor activity is a health benefit to children. Maynard (2007) discusses how being outdoors allows children to move with greater freedom. Movement is an important aspect of the physical development in children. It allows them to have coordination and control over their bodies which gives them confidence. Active outdoor play also creates opportunities to problem solve as well as take risks in play. Through risk taking children develop independence. Physical challenges help children develop confidence to go forth in making independent decisions in thinking and learning. (Bohling et al. 2012) also mentioned increased coordination and balance and increased skill in creative thinking.

**Benefits of Incorporating Time Outdoors at School**

Social interaction is a benefit of getting students outdoors according to many studies. Fagerstam (2012) found that teachers believed students collaborated and participated more actively in an outdoor learning space. Improved student to teacher and student to student relationships were observed. Also, students who normally did not participate in class showed a higher percentage of participation as a result of learning outdoors. Louv's (2008) book mentions that green spaces allow for more social interaction. American Institutes for Research (2005) found that students who participated in the outdoor classroom showed significant gains in social skills such as leadership, conflict resolution and cooperation. They also showed sustained interest in the environment and science after six to ten weeks of the program's end date.

From a social point, as it pertains to a child being at school, Parsons' (2011) paper suggests that the best place for children to learn about nature is in nature itself, as opposed to books or electronic sources. Exposure to nature could benefit emotional, physical and social health in children. It is important for children to have experiences in nature in order to create a consciousness towards the natural environment. It is also beneficial for children to have interaction with environmentally social groups in nature since they become more likely to follow that trend as a result.

The study by (Bohling et al. 2012) shows that parents noticed development of social skills such as sharing and initiating play with others. In a similar study performed by Bohling, Saarela, and Miller (2015) teachers observed more skill development in toddlers in the areas of thoughtfulness, cooperation, problem solving, and social interaction. Teachers also noted language development as a skill that was enhanced by getting the children outdoors. Children who did not talk much when they were indoors opened up and talked about the things they saw outdoors. Children were more creative while using the natural materials. Parsons (2011) discovered that numerous researchers agree that creating a greener play area improves social skills, especially if the children help with the process of creating the greener space.

Another benefit, as found by researchers, of using the outdoors as a learning space is the improvement of academic performance in students. In a study conducted by Maria M. Ferreira, David Grueber, and Sandra Yarema (2012) the researchers found that children are more motivated to write in their journals when they have had hands on experience with the outdoors. They are also more likely to retain information such as environmental data they have collected as a result of learning outdoors. Teachers in the Fagerstam (2012) study found urban children to be

afraid of being in nature and that more time in nature would help them develop more positive feelings toward it. Students in another school in the study enjoyed the outdoor experience, even though they did find it hard to hear the teacher at times, due to noise. The same students had more detailed memories of what they learned than did students who learned in an indoor setting. Fagerstam (2012) also found that teachers who took students outdoors on a regular basis observed a greater ability, in these students, to learn a second language than students who had not been taken outdoors as often. Abilities of low achievers became closer to those of high achievers after use of outdoor classrooms was implemented.

According to American Institutes for Research in an article titled, Effects of Outdoor Education Programs for Children in California (2005), the science scores of students who attended a 5 day science school were raised by 27 percent. Furthermore, the students retained information for six to ten weeks. Teachers involved in this study found that students with special needs were on a more even keel with students not having special needs when they were in the outdoor classroom. They also believed that all students showed more interest in learning about the content when they were in an outdoor setting. Students perceptions of their experience included being more independent in their work, making new friends, caring more for the environment, and being less bored.

> Parsons' (2011) research led her to state: Increased academic demands have resulted in the lessening of recess time spent at school. Recess time has a positive correlation with attention levels suggesting that children need recess in order to learn more attentively. By allowing children consistently spaced breaks throughout the day they will be more likely to refocus on learning throughout the day. (p. 55)

Louv (2008) makes reference to studies indicating how important getting outdoors is to learning. Even though research findings underline the connection of learning to spending time outdoors, many in education have not paid heed to it. As a result, an increasing number of children are spending more time indoors. Louv (2008) suggests that, although some schools in the United States are trending in the direction of not having recess, schools in Finland are adding recesses and breaks to the children's schedules. Fagerstam (2012) found that students were more engaged and showed more interest after partaking in an outdoor experience. Students had more positive views, which created a more enjoyable climate in the classroom as a result of getting outdoors during the school day. Nelson (2012) writes that like the indoor environment, the outdoor environment needs to be carefully designed so children can learn in it. He believes that children should be able to play and learn equally in both environments. Nelson (2012) also writes about the things that affect early learning such as too much media, not enough time outside and not getting physical exercise. These things are key elements to early childhood education. Nelson (2012) found that kindergarten teachers were able to identify children on the playground who had attended a program with an outdoor emphasis. Those students were more likely to solve their own problems instead of going to a teacher to get help. In this respect the outdoor classroom helps prepare children for success in school. Using the outdoors for learning contributes to increased activity in children. It also helps them learn how to be safe while taking risks that are involved in outdoor play. Children that get outside enjoy the benefit of connecting to nature and connecting nature to their learning.

A recent study by Dowdell, Gray and Malone (2011), conducted at two separate child care centers showed significant evidence of nature based play areas having an impact on

children's interaction among each other and with nature. At the center with an outdoor play area created with materials found in nature, children were more likely to use natural objects and ideas for imaginative play. An example of this is pretending to be animals found in nature. Children at the center in which the play area was indoors and used human made materials were still imaginative in their play but used human made objects and ideas. An example of this is pretending they were driving cars, boats and other human made modes of transportation. Children at the center with the play area made from human made materials were more likely to engage in risky or dangerous play while children at the other center were not observed in this type of play. Conflict was solved by a teacher removing the object of conflict in the center of the human made play area while teachers at the natural play area center encouraged child problem solving during conflicts. Children at the nature based center had more opportunity to learn about nature such as animals and weather. Adults at this center were more supportive of outdoor learning and the potential for carry over to the indoor classroom. Maynard's (2007) research includes references to children learning through play in an outdoor classroom setting. This learning has elements of language, mathematics, communication and literacy as well as other academic areas. Mygind (2007) discusses that children who are able to spend more time in nature have a higher ability to concentrate. The article further discusses that some people in Denmark, who have experience with outdoor activities, are of the belief that outdoor classrooms promote both physical activity and abstract thinking, although, research has not yet been done on this subject in Denmark. Mygind's (2007) case study attempted to find out if school students were more active on days when lessons were presented outdoors than on days when they were not and on days when they had physical education. He concluded that while students should have some

lessons outdoors those lessons should not be exclusive. Both the indoor classroom and outdoor classroom offer elements that support learning for children. Trisha Maynard (2007) conducted research based on information that a team of British visitors to Denmark brought back to Britain. Being outdoors helps children discover things about themselves and their world. When outside, children are able to explore sound by using loud voices; they are able to discover such things as shadows. Outdoor classrooms, referred to as 'forest schools' in the article, should be attended or implemented for at least a year to reap the full benefit. Forest schools help children develop self-confidence which in turn helps them achieve success in school. Independence is also a goal of forest schools as this leads to being competent learners. There is also the idea of the practicality of learning that takes place in an outdoor classroom. There are real life lessons that happen outdoors.

One of the ideas that came forth from the Fagerstam (2012) study was that the introductory period for the outdoor classroom was long, due to certain discipline problems, but it was worth it. In a different section of the study Fagerstam (2012) found that after a ten week math program, students who utilized the outdoor classroom showed an increase in intrinsic motivation, while those utilizing the indoor classroom did not. The reasons for the varying motivation might have been due to teachers and teaching styles as well as the fact that the children enjoyed learning math outdoors. Fagerstam's (2012) study also revealed that students were better able to make a connection between scientific theory and real life situations. The students also discovered that being outdoors and taking part in the hands on lessons, instead of just getting information from books, was important to the experience of learning.

Two ideas explored in this literature review are physical and emotional health benefits and educational benefits of getting children outdoors and using the outdoor classroom. Both are important aspects of how children perform academically and socially in school. The purpose of this study is to prove that spending time in nature has a positive effect on children. To give children additional opportunities to get outdoors in a learning environment and to explore many of the ways to learn about nature while enjoying nature is a benefit of this study. It is interesting that independence, coordination and practicality are important elements of both the outdoor classroom and the Montessori classroom.

## Research Questions

The present research attempted to answer the question of what effect daily learning experiences in nature would have on the researcher's Montessori kindergarten students. Related to the central research question are subsidiary questions. The hypotheses was that spending time outdoors would have a positive effect on the students work habits and social skills.

1. In what ways can the natural learning environment be used to benefit the students?
2. Will the students be more motivated to learn, through engagement and completion of classroom work, if they are allowed to learn independently in nature?
3. Will this type of experience improve the student's social skills, particularly empathy and kindness?

## Research Design and Methodology

This is a qualitative study comparing five and six year olds' behavior at the beginning of the study to their behavior at the end of the study. The study took place over a 7 week period during the months of January and February. Data was collected each morning during the two and a half hour Great Period. The first week of the study the students had a normal week with no additional time outdoors. The second week had one planned outdoor activity in addition to recess. During the third week there were two additional learning periods outdoors. The fourth week included an outdoor experience every day. The fifth week decreased to two days of extra outdoor time and the sixth week had only one day of additional outdoor learning. The seventh week included no additional time outdoors, as in week one. All outdoor activities were designed around elements found in nature. Outdoor activities for the study took place on the grounds of the school, including but not limited to the playground area. All additional outdoor time took place in the afternoon. After each outdoor lesson the children drew pictures and wrote in their journals about the outdoor experiences. The outdoor lessons were based on what the children's learning needs were at the time. For our first lesson we went outside to find the horizon. The students used their new knowledge to create line art featuring horizontal lines. Other lessons were related to the five senses. We took nature walks to see what was on our school grounds and to find out what we could hear depending on what side of the building we were on. The children also learned about geometric solids and went outside to find things in nature that are shaped like a sphere, a cylinder a cube and a cone. Early in the study the children made birdfeeders out of pinecones. Unfortunately no birds found the feeders during the time frame of the study. These activities and lessons do answer the question of what ways the natural learning environment can be used to benefit students. I was able to connect the indoor environment to the outdoor

environment through activities such as making the birdfeeders, using the geometric solids from the sensorial shelf as models for the children to find those shapes outdoors and by reading a book about shadows before going outside to discover our own shadows as well as many other activities used during the study. (For all activities and lessons see Appendix A).

Data was collected through keeping record of the number of times during the structured work period that students chose appropriate work independently of the teacher or para professional in the classroom. Appropriate work was deemed work that had been presented to them, was multi stepped and was of sufficient challenge to keep them learning. Another aspect of this data was whether the learners were completing the work in an appropriate amount of time as per the work being done (see Appendix B).

Although data was collected on how often students chose work that was at an appropriate level to keep them learning, data was also kept on how often the same students chose any work independently.

The participants were also observed during their recess time in an attempt to find out whether their choices of play changed over the seven week period and whether or not they were more apt to include other children in their play (see Appendix C).

## Participants, Setting and Materials

The participants were 8 kindergarten children from a Montessori Children's House in a rural Minnesota school. The school has a population of 155 children serving students from preschool through grade six. There were 16 kindergarten students in the class but only 9 parents

consented for their child to be part of the research. Week one of the study began with 5 children. One child was dropped from the study after the second day due to the strong possibility of moving from the school. On the same day three children were added as a result of late consent forms being brought in. After the first week no changes took place as to the number of students participating. The subjects of the study were all kindergarten age students. There were two boys and six girls. All sixteen kindergarten students in the class took part in the outdoor learning activities; however, data was collected on only the participants involved in the study.

Materials used in the study were record keeping forms designed by the researcher, Montessori geometrical solids, journals for the students to write and draw about their discoveries, story books, pinecones, peanut butter, birdseed and a camera.

## Findings, Implications and Limitations

While the purpose of this study was to help the researcher find out if children would be impacted in a positive manner by having outdoor lessons each day, it is important to note that lessons and activities for this study also needed to fit the curricular and content guidelines of a Minnesota public charter school with environmental as well as Montessori goals.

Not all weeks were equal in days or length of time due to holidays, teacher work days and late start days that were scheduled by the school district or caused by inclement weather. Cold or unfavorable weather was a direct cause of some of the lessons being shorter than others during the outdoor aspect of the lesson.

I found that during week one the eight students chose work independently 23 times with 21 of those times choosing work that was appropriate. Appropriate work is that which the students can do multiple things with such as putting numbers on the hundred boards and then

writing the numbers or writing words with the moveable alphabet, writing them on paper and reading them to a teacher. Doing such work as reading a list of high frequency words or a simple book, to a teacher while not inappropriate, did not provide data relevant to the study. Particularly referring to work that was chosen independently and was sufficient to keep them learning. During week two the students chose work independently 97 times with the work being appropriate choices 41 times. Week three of the study showed that the children chose work independently 58 times with 36 of those times being appropriate work. The number of times children chose work independently in week four was 64 with 45 of the times being appropriate work. During week five the students chose work independently 51 times with 32 times being appropriate. Week six of the study showed the students choosing work independently 23 times with 22 times being appropriate. The final week, week seven, showed the students choosing work independently 59 times with 43 of those times being labeled as appropriate work (Table 1). With the exception of week one and six it appears that each consecutive week shows the number of times the students chose work that was appropriate to the work that was not, increases. This is encouraging regardless of the reasons for a Montessori teacher since it shows the students are being responsible with the freedom that they have to make choices. I also looked at work done by each student on a weekly basis. This data showed that during weeks two, four and seven the students were the most productive over all. All students during these weeks chose appropriate work at least 4 times during the week. During the other weeks the range went from one to nine times that the students chose appropriate work. Two other behaviors that I recorded data on were whether or not the children set up and stored the work in the manner that had been shown to

them and whether or not the children completed the work in an appropriate amount of time. The data collected in those areas did not prove to be of value to this study.

Although data from the research shows that the students chose appropriate work, independently, more times during weeks 2 through 5, and again in week 7, there are factors other than getting outdoors that might have been the reason, at least, in part for the increase. The factors that could have led to increased choice of appropriate work, other than spending additional time outdoors, are: maturity of the students, lessons presented to them that were of more interest than previous lessons, and different classroom management systems than at the beginning of the research. Also, the weeks showing fewer times when students chose appropriate work, might have been a result of the work they were doing being a bigger work that took more time. In addition, there were days when the students were out of the room, in the morning, taking standardized tests.

**Table 1**

| Week | Chose Work Independently | Chose Appropriate Work |
|---|---|---|
| Week 1 | 23 | 21 |
| Week 2 | 97 | 41 |
| Week 3 | 58 | 36 |
| Week 4 | 64 | 45 |
| Week 5 | 51 | 32 |
| Week 6 | 23 | 22 |
| Week 7 | 59 | 43 |

The results from data taken during recess showed that there was not much change in the number of times children chose to play using the natural materials as opposed to just playing on the playground equipment.

During weeks one and two the children chose natural play materials 11 times but during only 8 of those times was the play sustained for at least ten minutes each week. In week three they chose natural materials 7 times with zero of those times being sustained for at least ten minutes. During week four they peaked in using natural materials with 23 times but only 18 were sustained for at least 10 minutes. Week five again showed 7 as the number of times the students chose natural materials over playground equipment but only 1 time was sustained for ten minutes. Week six was 9 times with 5 being sustained for ten minutes and week seven was 10 times with 5 being sustained for ten minutes using natural materials (Table 2). One limitation for this part of the study was that there were a number of days when it was too cold for the children to have outdoor recess. Another factor in their choices was fresh snow. On the days that we had fresh snow more children chose to play in the snow as opposed to playing on the slides and swings. Criteria for what constituted natural materials were that their choices were creative in using the natural materials and space that was available to make play spaces. They were required to be engaged in the play for at least ten minutes (see Appendix C). The activities or games the children chose to play when being creative and using the natural materials included things such as pretending to be kitties or snow tigers, building snowmen or snow nests or shelters. They also played at being families and built shelters with pieces of ice that they broke out of the frozen water puddles on the playground.

**Table 2**

| Week | Number of Times Creative Play was Displayed Using Available Natural Materials | Number of Times Play was Sustained for Ten Minutes or Longer |
|---|---|---|
| **Week 1** | **11** | **8** |
| **Week 2** | **11** | **8** |
| **Week 3** | **7** | **0** |
| **Week 4** | **23** | **18** |
| **Week 5** | **7** | **1** |
| **Week 6** | **9** | **5** |
| **Week 7** | **10** | **5** |

To answer the question of whether or not having more time outside would improve social skills I kept data on the number of times the children chose to include others in their play. They chose to include other children in their play in the following progression through the weeks. During week one the children included other children 8 times. In week two the children included other children 7 times. The children included other children 4 times in week three. During week four the children included other children in their play 18 times. In week five other children were included in play 3 times. The children included other children in their play 7 times in week six. During week seven other children were included in the play 10 times (Table 3).

Limitations to this part of the study are that some weeks had fewer days due to no outdoor recess because of cold temperatures or rain and what they were doing just naturally needed to include others. For example, it is almost necessary to include other children if the game you are playing involves being part of human or animal families.

**Table 3**

| Week | Number of Times Others Included in Creative Play |
|---|---|

| | |
|---|---|
| **Week 1** | **8** |
| **Week 2** | **7** |
| **Week 3** | **4** |
| **Week 4** | **18** |
| **Week 5** | **3** |
| **Week 6** | **7** |
| **Week 7** | **10** |

The focus of this study is an important topic that we need to keep revisiting for the children and for our society in general. We must support getting children outside, and we must use the outdoor classroom in ways that will benefit them. If we want children to understand and reap the benefits and wonders that nature has to offer it is imperative to continue researching this topic and reading what current research has to say.

## Reflection and Plan for Future

As I reflect on my research, the data I have collected and the results, I realize there is so much more to discover about this interesting and important topic. After having a good experience using the outdoors as an extension of my classroom I want to continue with this trend. The biggest question I have come away with is one of how to get the answers I desire. For me that will mean further reading of relevant literature to find possible ways to collect and record data that will give me a more substantial result. I also wonder what I can do with my results. In what ways can I share them with other teachers and the public in general? First and foremost, though, will be to make sure that as I answer these questions I do so in a manner that will give my students the highest benefits of being outdoors and learning in an outdoor classroom. With this as my goal I will continue to take my students outdoors this year so they can enjoy more of the outdoor classroom experience. This will also give me an opportunity to further explore the

many ways to use outside space for learning and play. I believe the remainder of this school year should be one of reflection, thought and planning as to how I want to set up further research on this topic.

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Appendix A

| Outdoor Activity | Indoor Activity |
|---|---|
| Looked for the Horizon | We looked at pictures of the horizon projected on our smart board. The children learned how to draw horizontal lines and they created pictures of line art. |
| 5 Senses – What can we see outside? | The children drew pictures and wrote in their journals about what they saw outside. |
| 5 Senses – What can we touch outside? | The children drew pictures and wrote in their journals about what they touched outside. |
| We hung our birdfeeders outside | We made birdfeeders out of pinecones, peanut butter and birdseed. We watched, daily to see if any birds would find our feeders. |
| 5 Senses – What can we hear outside? | In the morning the children listened to a story and played a listening game. In the afternoon the children drew and wrote about what they heard outside. |
| We went outside to see our shadows | I shared the ground hog legend with the children, and read a book about shadows to them before we went outside to see our shadows. When we came in the children drew shadows and wrote in their journals. |
| 5 Senses – What can we smell outside? | The children drew and wrote in their journals about what they smelled outside. |
| Nature walk around the school grounds/property | The children drew and wrote in their journals about what they observed on our walk. |
| We searched for things in nature that are shaped like a sphere. | We had a presentation on the geometric solids prior to going outside. When we came in the children drew and wrote in their journals about what they found. |
| We searched for things in nature that are shaped like a cylinder. | We reviewed what a cylinder looks like before going outside. When we came in the children drew and wrote in their journals about what they found. |
| We searched for things in nature that are shaped like cones and cubes. | We reviewed what cones and cubes look like before going outside. When we came in the children drew and wrote in their journals about what they found. |

Appendix B

Behavior Chart for Research

Effects on work time from increasing use of outdoor classroom on Montessori kindergarten students

Week _____

Time of day/length of observation time _____

Tally Marks = number of times observed in the observation period

| Student | During the structured work time, learner makes independent and appropriate work choices that have been presented to them and are of sufficient challenge to keep them learning. | During structured work time, learner sets up and stores work in a manner appropriate to what he or she has been shown by the guide. | During structured work time, learner satisfactorily completes work in an appropriate amount of time as per the work he or she is doing. | Notes |
|---|---|---|---|---|
| 1a | | | | |
| 2a | | | | |
| 3a | | | | |
| 4a | | | | |

| | | | | |
|---|---|---|---|---|
| 4a | | | | |
| 5a | | | | |
| 6a | | | | |
| 7a | | | | |
| 8a | | | | |

Appendix C

Behavior Chart for Research

Effects on work time from increasing use of outdoor classroom on Montessori kindergarten students

Week _____

Time of day/length of observation time

_____

Tally Marks = number of times observed in the observation period

| Student | During structured or unstructured time spent outdoors the learner makes choices that are creative, in nature, using the natural materials that are available to them to make play spaces. | During structured or unstructured time spent outdoors the learner makes choices that are cooperative, in nature, choosing to include others in activities. | During structured or unstructured time spent outdoors the learner makes choices that engage the learner in sustained play for at least ten minutes. | Notes |
|---|---|---|---|---|
| 1a | | | | |
| 2a | | | | |
| 3a | | | | |

| | | | | |
|---|---|---|---|---|
| 4a | | | | |
| 5a | | | | |
| 6a | | | | |
| 7a | | | | |
| 8a | | | | |