

Bringing the Outdoors In:
Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in
Elementary Schools

by

MORGAN KATHLEEN TAYLOR

A Report

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture/Regional & Community Planning

College of Architecture, Planning and Design

KANSAS STATE UNIVERSITY

Manhattan, Kansas

2017

Approved by:

Major Professor

Dr. Anne Beamish

Copyright

MORGAN KATHLEEN TAYLOR

2017

ABSTRACT

The purpose of this research was to develop a mobile sensory garden to help children with Sensory Integration Disorders. Sensory Integration (SI) is how an individual processes sensory information. Issues with sensory integration can lead to behavioral disorders, which can cause difficulties with social-emotional skills, gross motor skills, fine motor skills, play skills, and self-help skills. The goal of the project was to develop a mobile sensory garden to help alleviate or reduce the negative aspects of Sensory Integration Disorders.

The research involved qualitative research, projective design, and evaluative research on a mobile sensory cart that was used in an elementary school in Topeka, Kansas. Methods included: interviews, design/build, and observation. The current sensory room was inventoried in Williams Science & Fine Arts Elementary Magnet School in Topeka, Kansas, and the children who used were observed. The faculty at the school, including the principal, teachers whose students use the current sensory room, counselors, and other support faculty, were interviewed. Once the observations were analyzed, a mobile sensory garden cart was designed and built. The new cart was brought to the elementary school and placed in the sensory room. A second phase of observation assessed how the children interacted with the new mobile sensory garden cart.

During the second phase of observation the children showed intense interest in the mobile sensory garden cart. Some of this can be attributed to it being a new item in the sensory room. Some of the most popular items included the zen garden, wood slices on the wooden dowel, and the plants. In the second week children transitioned to using both the sensory garden cart and the original items in the sensory room. When an item on the sensory garden cart best suited their needs, that item was chosen and when their needs were best suited by other items in the room then that item was chosen.

Overall the mobile sensory garden cart was beneficial to the school and the children. It can be easily replicated and modified to fit the individual needs of the children and school.

Key Words: Sensory Integration, Sensory Integration Disorders, Sensory Processing Disorders, Sensory Gardens, Horticulture Therapy, Mobile Cart.



Bringing the Outdoors In:
Designing a Mobile Sensory Garden for Children
with Sensory Integration Disorders in Elementary
Schools

Bringing the Outdoors In:

Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

Morgan K. Taylor

Copyright 2017

Masters Report Submitted in partial fulfillment of the requirements for the degree of:
Master of Landscape Architecture (MLA)

Major Professor: Dr. Anne Beamish

Supervisory Committee: Professor Chip Winslow and Dr. Gregory Davis

Kansas State University

College of Architecture, Planning, and Design

Department of Landscape Architecture and Regional and Community Planning

Abstract

The purpose of this research was to develop a mobile sensory garden to help children with Sensory Integration Disorders. Sensory Integration (SI) is how an individual processes sensory information. Issues with sensory integration can lead to behavioral disorders, which can cause difficulties with social-emotional skills, gross motor skills, fine motor skills, play skills, and self-help skills. The goal of the project was to develop a mobile sensory garden to help alleviate or reduce the negative aspects of Sensory Integration Disorders.

The research involved qualitative research, projective design, and evaluative research on a mobile sensory cart that was used in an elementary school in Topeka, Kansas. Methods included: interviews, design/build, and observation. The current sensory room was inventoried in Williams Science & Fine Arts Elementary Magnet School in Topeka, Kansas, and the children who used were observed. The faculty at the school, including the principal, teachers whose students use the current sensory room, counselors, and other support faculty, were interviewed. Once the observations were analyzed, a mobile sensory garden cart was designed and built. The new cart was brought to the elementary school and placed in the sensory room. A second phase of observation assessed how the children interacted with the new mobile sensory garden cart.

During the second phase of observation the children showed intense interest in the mobile sensory garden cart. Some of this can be attributed to it being a new item in the sensory room. Some of the most popular items included the zen garden, wood slices on the wooden dowel, and the plants. In the second week children transitioned to using both the sensory garden cart and the original

items in the sensory room. When an item on the sensory garden cart best suited their needs, that item was chosen and when their needs were best suited by other items in the room then that item was chosen.

Overall the mobile sensory garden cart was beneficial to the school and the children. It can be easily replicated and modified to fit the individual needs of the children and school.

Key Words: Sensory Integration, Sensory Integration Disorders, Sensory Processing Disorders, Sensory Gardens, Horticulture Therapy, Mobile Cart.

Table of Contents

Chapter 1: Introduction.....	1
Driving Forces.....	2
Project Objectives.....	2
Project Dilemma.....	2
Location.....	2
Relevance to Landscape Architecture.....	3
Chapter 2: Background.....	6
Introduction.....	7
Sensory Integration.....	8
Solutions.....	10
Sensory-Smart Equipment.....	11
Access to Nature.....	11
Horticulture Therapy.....	12
Landscape Architecture.....	12
Sensory Gardens.....	12
Chapter 3: Methods.....	18
Introduction.....	19
Procedure.....	20
Sensory Room Inventory.....	20
First Sensory Room Observation.....	20
Interviews with Faculty.....	20

Interview Questions.....	21
Design/Build of Mobile Sensory Garden Cart.....	22
Second Sensory Room Observation with Mobile Sensory Garden Cart.....	22
Analysis of Data.....	22
Devices.....	22
Map of Sensory Room.....	22

Chapter 4: Observations & Design.....	28
Introduction.....	29
Sensory Room.....	30
Sensory Room Inventory.....	30
Sensory Room Map.....	36
Interviews: Use of the Sensory Room.....	36
Findings During the First Observation of the Sensory Room.....	38
Observation Statistics.....	41
Engagement Level.....	41
Charts.....	42
Creating the Cart.....	50
Overall Cart Design.....	50
Findings During the Second Observation of the Sensory Room.....	57
Observation Statistics.....	60
Engagement Level.....	60
Charts.....	61

Table of Contents

Chapter 5: Conclusions.....	68
Introduction.....	69
Sensory Room.....	70
Sensory Garden Cart.....	70
Benefits.....	70
Spring Break.....	71
Challenges.....	71
Design Recommendations.....	72
Landscape Architecture	73
Future Research.....	73
Final Thoughts.....	74
References.....	76
Appendix.....	78

List of Figures

All images and charts were created and designed by author.

Chapter One

Figure 1.1 Project Timeline.....	4
----------------------------------	---

Chapter Two

Figure 2.1 Literature Map.....	16
--------------------------------	----

Chapter Three

Figure 3.1 Sensory Room.....	21
Figure 3.2 Sensory Room main door.....	21
Figure 3.3 Sensory Room Map.....	24
Figure 3.4 Sensory Room with Mobile Sensory Garden Cart.....	25
Figure 3.5 Methods Timeline.....	26

Chapter Four

Figure 4.1 Yoga Mat.....	30
Figure 4.2 Pea Pod.....	30
Figure 4.3 Desk.....	30
Figure 4.4 Board with Charts.....	30
Figure 4.5 Blue Chair.....	30
Figure 4.6 Sensory Room Diagram.....	31
Figure 4.7 Yoga Ball.....	32
Figure 4.8 Red Cart.....	32
Figure 4.9 Trampoline.....	32
Figure 4.10 Balancing Block.....	33

Figure 4.11 Therapy Putty.....	33
Figure 4.12 Stress Balls.....	34
Figure 4.13 Body Sock.....	34
Figure 4.14 Fidget Toy.....	34
Figure 4.15 Star Master.....	34
Figure 4.16 Magnetic Blocks.....	34
Figure 4.17 Etch-A-Sketch.....	34
Figure 4.18 Bubble Hourglass.....	34
Figure 4.19 Coggy.....	34
Figure 4.20 Charts.....	35
Figure 4.21 Fish Bubble.....	35
Figure 4.22 Red Charts.....	39
Figure 4.23 Yellow Charts.....	39
Figure 4.24 Green Charts.....	39
Figure 4.25 Sample Observation Morning.....	44
Figure 4.26 Sample Observation Afternoon.....	45
Figure 4.27 Number of Times Each Child was Observed during the first observation.....	46
Figure 4.28 Average Time Spent in the Sensory Room during the first Observation.....	46
Figure 4.29 Engagement Level of top five items used and how many times they were used during the first observation period.....	47
Figure 4.30 Items each child used during the first observation.....	48
Figure 4.31 Sensory Cart After Assembly.....	50

Figure 4.32 Top Shelf of Cart.....	51
Figure 4.33 Middle Shelf.....	51
Figure 4.34 Base Cart.....	51
Figure 4.35 Metal Panel.....	51
Figure 4.36 Bottom Shelf.....	52
Figure 4.37 Pumpkin Gourds before drying.....	52
Figure 4.38 Pumpkin Gourds after drying.....	52
Figure 4.39 Pumpkin Gourds.....	52
Figure 4.40 Birdhouse Gourds.....	53
Figure 4.41 Blanket.....	53
Figure 4.42 Blanket.....	53
Figure 4.43 Catmint and Chocolate Mint.....	53
Figure 4.44 Panda Plant and Aloe.....	54
Figure 4.45 Christmas Cactus.....	54
Figure 4.46 Lemon Balm and Thyme.....	54
Figure 4.47 Spider Plant and Ivy.....	54
Figure 4.48 Lavender and Rosemary.....	54
Figure 4.49 Plant Lights.....	55
Figure 4.50 Wood Circles.....	55
Figure 4.51 Wood Circles on Wood Dowel.....	55
Figure 4.52 Wood Slices.....	55
Figure 4.53 Drift Wood.....	55
Figure 4.54 Bark Slices.....	56
Figure 4.55 Foam Handle.....	56
Figure 4.56 Netting.....	56
Figure 4.57 Fabric Tent.....	56

Figure 4.58 Zen Garden.....	56
Figure 4.59 Artificial Grass.....	57
Figure 4.60 Tile.....	57
Figure 4.61 Large Rough Carpet.....	57
Figure 4.62 Large Rough Carpet.....	57
Figure 4.63 Small Soft Carpet.....	57
Figure 4.64 Small Rough Carpet.....	58
Figure 4.65 Top Shelf.....	58
Figure 4.66 Middle Shelf.....	58
Figure 4.67 Rock Seating Tile.....	58
Figure 4.68 Rough Tile.....	58
Figure 4.69 Bottom Shelf.....	58
Figure 4.70 Cart.....	58
Figure 4.71 Observation Two with little activity.....	62
Figure 4.72 Observation Two with high activity.....	62
Figure 4.73 Number of times a child was observed during the second observation.....	64
Figure 4.74 Average time in sensory room during second observation.....	62
Figure 4.75 Engagement Level of the top five items used and how many times they were observed.....	63
Figure 4.76 Items Used in Sensory Observation.....	64

Chapter Five

Figure 5.1 Lemon Balm die off after spring break.....	69
Figure 5.2 New sensory garden cart location.....	69

Acknowledgments

This project reflects my six years at Kansas State University five of which were in the College of Architecture Planning and Design. I am grateful for the faculty and staff from LARCP Department, APDesign, and Kansas State University. Without the guidance, challenges, encouragement and many wonderful opportunities I would not be where I am today.

Special thanks to my major professor, Anne Beamish. I appreciate your guidance and endless encouragement as I went forward in my project. I am thankful for every challenge and opportunity you challenged me to make this project a success. I am grateful for all the time and energy you spent to help me make this project a success.

Additionally, I would like to thank my committee members Chip Winslow and Gregory Davis. Your input helped me shape this project and provided irreplaceable expertise as I moved forward with this project. Thank you for your time spent meeting with me, discussions, emails, and presentations.

Thank you to Jon Hunt and Richard Thompson for help with the mobile sensory garden cart concepts and for helping create it in the shop.

Thank you to USD 501 for allowing me to conduct research at Williams Science and Fine Arts Magnet School. Without Williams Science and Fine Arts Magnet Elementary

School this project would not have been possible. A special thanks to Kyrstin Bervert, the school principal who took an interest in the project and welcomed me into her school. Thank you to the faculty and staff who I interviewed, and to the wonderful children who I was able to observe. Without all of you this project would not have been possible.

Thank you to all my friends in studio! It's been a long few years but we made it! It wouldn't have been the same without all of you by my side! I look forward to keeping in touch with all of you as we move forward in our careers.

Finally, I would like to thank my family and friends who have supported me through my college career. Mom and Dad, I am so lucky to be your daughter and I couldn't have asked for better parents to help me through this wild journey. Garrett and Tjay, thank you for always being there when I needed you from moving me across town to half way across the country. To my grandparents, thank you for your constant support and encouragement. Riley I wouldn't have made it through these years if it wasn't for you, your constant smile and jokes when I needed them most. Sarah from early morning swim practices to college you have always been my partner in crime and couldn't ask for a better best friend. Without all of I would not be the strong independent person I am today.

CHAPTER 1: INTRODUCTION

Introduction

This research focused on children with sensory integration disorders including but not limited to attention deficit-hyperactivity disorder (ADHD), autism spectrum, anxiety, learning disabilities, auditory processing and Attention Deficit Disorder (ADD). Many of these disorders are accompanied by sensory integration disorders including sensory processing disorder. Sensory Processing Disorder occurs when an individual has difficulty processing the senses correctly (Isbell & Isbell, 2007). Sensory Processing Disorder includes Sensory Modulation Disorder (SMD), Sensory Discrimination Disorder (SDD), and Sensory-Based Motor Disorder (SBMD) (Isbell & Isbell, 2007). With each of these disorders there are sensory under-responders, and sensory over-responders for each of the senses. For instance, a child could be highly sensitive to touch but under-sensitive to sound (Isbell & Isbell, 2007). These disorders can cause issues including developmental disabilities, and difficulty with social-emotional skills, gross motor skills, fine motor skills, play skills and self-help skills (Isbell & Isbell, 2007). The goal of the project was to develop a mobile sensory garden to help alleviate or reduce the negative aspects of sensory integration disorders for elementary school aged children.

Potential benefits of contact with a sensory garden include increased positive behavior

and an increase in motor skills. Providing an indoor mobile sensory garden inside the school can open many opportunities for access to nature, since most of the school year takes place in winter. Bringing nature inside using a mobile sensory cart will allow more children to have access to nature. Bringing nature indoors is not a new concept. Japanese tray gardens called Bonkei are a way of bringing nature indoors using sculpture (Hirota, 1970). These Bonkei allow the maker to bring a perfect replica of nature inside (Hirota, 1970). Observing children and how they currently use a sensory room has provided valuable information for the design of the mobile sensory garden cart.

An indoor mobile sensory garden cart is a different experience than an outdoor sensory garden, because of different user experiences. In an outdoor sensory garden the user will walk on different textures. In contrast the mobile sensory garden allows the user to walk around the entire cart and experience it from all angles.

Driving Forces

The driving force behind this master's report was to work with elementary school children and sensory gardens to better understand how an indoor sensory garden could help children with sensory integration disorders. Working with the Williams Science & Fine Arts Elementary Magnet School, an attempt was made to bring the traditional outdoor sensory garden indoors to help alleviate the effects of sensory integration disorders.

Project Objectives

Access to nature outdoors has been shown to help children with sensory integration disorders (Etherington, 2012). Consequently the primary goal of this project was to connect children with sensory integration disorders to nature indoors, either in a designated sensory room or in the classroom. The aim was to design and build a mobile sensory garden, and test its viability.

Project Dilemma

Many children suffer from sensory integration disorders, which negatively affects their behavior in school. Taking "sensory breaks" are a way of removing the child from the stressful situation and giving them time to meet their sensory needs. Sensory gardens, and the outdoors have been shown to help children and adults with a variety of issues. However, the inclement weather, and scheduled activities often prevent children

from using outdoor sensory gardens even if the school has one. The question was whether outdoor sensory gardens could be brought indoors to promote accessibility, and reduce the effects of sensory integration disorders.

Location

Research was conducted with USD 501 School District and Williams Science & Fine Arts Elementary Magnet School in Topeka, Kansas. Time considerations included their 18-week semesters, breaks and teacher in-service days, including training, duties, and events.

Kyrstin Bervert, the principal of Williams Science & Fine Arts Elementary Magnet School, responded positively to the proposed research. Misty Kruger, Director of Communications, was contacted to begin the process of getting approval. She forwarded the application to Aaron Kipp the General Director, Assessment & Demographics who gave an approval consent letter, followed by the school principals letter of consent. The occupational therapist was also informed of the project, and her input was taken into consideration. Other stakeholders in the project included teachers and the children who use the room.


Relevance to Landscape Architecture

The design of mobile sensory carts integrated into schools is relevant to contemporary landscape architecture. While the students do not have a direct understanding of landscape architecture this research is valuable to landscape architects, because it can help them better understand how nature and their designs can help those with sensory integration disorders. Integrating the sensory cart into elementary schools allows students, faculty, and staff to become aware of the benefits of bringing the landscape inside.



Figure 1.1 Project Timeline.

CHAPTER 2: LITERATURE REVIEW



Introduction

Healing, sensory, and therapeutic gardens have a long history in many cultures, including monastic gardens, Islamic gardens, and Asian temple gardens, and now modern healing gardens. Monastic gardens grew food; Islamic gardens offered a place of calm repose; Asian temple gardens were aesthetically pleasing; and modern gardens are sensory rich in nature (Souter-Brown, 2015).

Sensory Integration

Sensory Integration (SI) is how an individual processes sensory input. Everyone processes daily sensory inputs, but it is when sensory inputs are processed incorrectly that problems occur. When an individual's sensory integration is not working correctly it can cause behavioral issues (Isbell and Isbell, 2007). Behaviors associated with sensory integration problem include, covering ears during normal classroom activities; rolling over on the floor; refusing to touch playdough, sand or paint; climbing on objects and jumping off; falling often; and refusing to play on playground equipment (Isbell and Isbell, 2007).

Senses start developing in the womb and continue to develop as the child grows (Isbell and Isbell, 2007). Babies can move around in the womb and their hearing starts to develop around 18 weeks (Longhorn, 1988). When the child is approximately twelve hours old, s/he can respond to taste, while vision continues to develop as they grow (Longhorn, 1988). Children learn about the five senses of sight, touch, taste, hearing, and smell early. Our sense of balance and movement (called vestibular sense) is interpreted by our inner ear to determine if our body is moving or not (Isbell and Isbell, 2007). Children can develop a variety of sensory responses, both over- and under-responding to one or every sense, or a combination of over- and under-responding (Longhorn, 1988).

One type of sensory integration disorder is Sensory Processing Disorder (SPD), which is "the difficulty in using the information that is collected through the senses in daily life" (Isbell and Isbell, 2007 page 15). Because the brain cannot process the senses correctly, the individual has difficulty functioning (Isbell & Isbell, 2007). Sensory Processing Disorder includes Sensory Modulation Disorder (SMD), Sensory Discrimination Disorder (SDD), and Sensory-Based Motor Disorder (SBMD) (Isbell and Isbell, 2007). (See Figure 2.1) Teachers and parents usually can easily recognize these disorders once the child starts showing developmental disabilities, including difficulty with social-emotional skills, gross motor skills, fine motor skills, play skills, and self-help skills. Low self-esteem is also common in children with Sensory Processing Disorders (Isbell and Isbell, 2007). Children with these types of sensory disorders can be either under-stimulated or over-stimulated by their environment, which can cause them to exhibit negative behaviors such as being unresponsive or angry (Isbell and Isbell, 2007). When the environment over- or under-stimulates children with sensory integration disorders, there are many ways to improve the symptoms. For instance, children who are visually under-stimulated they can be placed in a very visually stimulating room (Exelby and Isbell, 2001). Children who are over-stimulated by movement can use sand bags on their laps or a weighted blanket (Isbell and

Isbell, 2007). There are also children who are sensory seekers, who seek out high sensory stimulation from one or more sense. These children may crave excessive amounts of touch, movement, taste, sound, and smell. In the classroom, a child who craves a large amount of auditory stimulation may talk to themselves or hum, and benefit from listening to music while working (Isbell and Isbell, 2007).

Sensory Processing Disorder can affect the child's ability to learn because they process and understand information differently than a child without a sensory processing disorder (Isbell and Isbell, 2007). Problems can include: coordination problems; poor attention span or difficulty focusing on tasks; academic related problems including poor handwriting and difficulty cutting with scissors; problems with self-care skills, such as tying shoes and zipping; low self-esteem; over-sensitivity to touch or sounds; and unusually high or low activity levels (Isbell and Isbell, 2007).

Additional sensory processing disorders include Sensory Dysfunction and Sensory Processing Dysfunction, which occur when the part of the brain where sensory integration happens does not function appropriately (Emmons and Anderson 2005). (See Figure 2.1) Some signs of sensory dysfunction include; over-sensitivity to

touch, movements, sights, or sounds; difficulties with coordination or academic achievement; delays in speech or motor skills; or activity levels that are unusually high or low (Emmons and Anderson 2005). These disorders are seen in children with special needs, including autism, ADHD, learning disabilities and bipolar disorder. Sensory dysfunction can impair the learning capabilities of the child if not handled effectively (Emmons and Anderson 2005).

Sensory disorders are fairly common. For example, in Saudi Arabia sensory processing dysfunction has been identified in 84.8% of children with autism and 66.66% of children without autism (Al-Heizan et al., 2015). The most prevalent sensory dysfunction in Saudi Arabia is tactile dysfunction.

Children who under-respond to sensory sensations often find their own ways of meeting their sensory needs (Al-Heizan et al. 2015). Digging in the dirt has been shown to help children with anger, depression, and anxiety as it allows them to connect to nature, which gives them a sense of safety (Etherington, 2012). Plants also offer a calming environment and have shown to help with anxiety, anger, and depression (Etherington, 2012). Many different types of diagnosable disorders can also have sensory integration disorders associated with them, including ADHD, ODD, Specific

Learning disabilities, Autism Spectrum Disorder, Anxiety, ADD, Auditory Processing, and Depression (Lanc UK, 2016). (See Figure 3.1) Sensory Integration Disorders are often treated with sensory integration therapy with the goal being to change the way sensory stimulation is perceived in the brain ("Sensory Integration Disorder" 2016). Like many other neurodevelopmental disorders, the cause of Sensory Processing Disorder is unknown, but is thought to be both genetic and environmental (STAR Institute, 2016).

There are three types of sensory responses: sensory avoiders, sensory seekers and sensory under-responders. Sensory avoiders are over-responsive to sensations affecting the senses, and are the most common type of sensory problem because the child cannot reduce sensations (Isbell and Isbell, 2007). He or she will try and get away from the situation, which can be triggered by loud noises or by a variety of other stimuli (Isbell and Isbell, 2007). Sensory Seekers are children who crave sensory stimulation because they are never satisfied with the amount of sensory stimulation they receive. Some children will move constantly to attempt to satisfy their needs (Isbell and Isbell, 2007). The third type is Sensory Under-Responders. These children will not react to sensory inputs. "Many Under-Responders do not react to other children touching or bumping into them" (Isbell and Isbell, 2007).

These children are the hardest for a teacher to identify as they may just seem quiet or shy. "Sensory Avoiders, the Sensory Seekers and the Sensory Under-Responders react to sensory inputs in an atypical manner. The Sensory Avoider responds too much; the Sensory Seeker craves more and more; and the Sensory Under-Responder responds too little" (Isbell and Isbell, 2007). A child can be a sensory seeker, sensory under-responder or a sensory avoider for each sense.

Solutions

There are many solutions for individuals with sensory integration disorders and their related diagnoses. ADD is often treated with medication, which can have negative side effects (Taylor, Kuo, and Sullivan 2001). With so many diagnosable disorders being associated with sensory integration disorders, there many different ways to treat the symptoms, including sensory-smart equipment, access to nature, horticultural therapy, and outdoor sensory gardens.

Sensory-Smart Equipment

There are many different methods to treat sensory disorders. One is the use of sensory-smart equipment, such as soft balls of all sizes, tire swings, riding toys, climbing structures, wagons, hula hoops, and sandboxes (Isbell and Isbell, 2007). Actively-involved adults can help the child feel safe in participating, and engaging with this equipment and allows the child to feel more at ease while playing (Isbell and Isbell, 2007). Fostering collaboration with adults in the child's life will help ensure the availability of accommodations and understanding the characteristics of sensory disabilities will help the children overcome the sensory disorders (Algozzine & Ysseldyke, 2006).

Access to Nature

Sensory gardens have been shown to improve many aspects of children's and adults' lives (Bruce, 2013). "The relationship between children's ability to learn, our social relations, our productivity at work, our propensity to commit crime and indulge in self-harming lifestyle behaviors, our appreciation and stewardship of the environment and our psychological and physical health, have all been studied in relation to time spent outdoors in nature" (Souter-Brown, 2015, pg. 15). Access to adults has also been shown to help children connect to nature (Taylor et al. 1998).

Regarding individuals with Attention Deficit Disorder, or ADD, outdoor environments have been shown to help their attention span (Taylor, Kuo, and Sullivan 2001). Attention Restoration Theory (ART) often uses the natural environment to promote attention on desired tasks (Taylor, Kuo, and Sullivan 2001). ART argues that exposure to nature benefits cognitive processing, allowing the individual to restore their attention (Kirra 2014). Using nature as a tool has reduced many of the ADD symptoms, allowing children to function more normally. Having access to nature can provide the additional support needed to reduce symptoms. With over two million children in the U.S. suffering from ADD Symptoms, it is hard to ignore the problem (Taylor, Kuo, and Sullivan 2001).

Horticulture Therapy

Anxiety is one of the many disorders that can result in sensory integration disorders (Lanc UK, 2016). Stress is often associated with anxiety, which can have negative effects on children. Tension and anxiety, for instance, have been connected to illnesses including depression and eating disorders (Souter-Brown, 2015). Connecting children to natural outdoor play has shown to help relieve stress (Souter-Brown, 2015). Horticulture therapy can be used to achieve goals including stress reduction and improved health (Etherington, 2012). Connections to nature have been known to help children with their stress levels and improve their quality of life (Souter-Brown, 2015). Stress has been linked to cancer and heart disease (Souter-Brown, 2015). In relation to stress and sensory gardens, individuals have experienced reduced stress and beneficial side effects by exploring sensory gardens as a form of treatment (Adevi and Martensson, 2013).

Landscape Architecture

Landscape architects design outdoor spaces including sensory gardens. When designing a sensory garden it is important to have as many unique sensory experiences as possible (Hussein 2010). This project took elements from an outdoor sensory garden and modified them to create an indoor mobile sensory garden cart. This included plants, textures and as many aspects of nature as a cart can accommodate but does not include

the spatial aspect of an outdoor sensory garden. With a mobile sensory garden cart it is impossible to create the spatial aspects of an outdoor sensory garden, however many other aspects are possible to recreate.

Sensory Gardens

Sensory gardens have shown to improve life for the sick, elderly, children, and individuals with special needs. The young and old are equally and most vulnerable to the benefits of sensory gardens (Souter-Brown, 2015). When designing a sensory garden, the designer focuses primarily on human interactions with the space. As the individual walks through the garden, all the senses can be engaged in multiple ways that could include changing the type of surface the individual walks on, perhaps using gravel and then stone (Hussein 2012). Every garden is sensory. People want to touch and smell it, as well as interact with the garden (Bruce, 2012). Hussein (2012) also considered what sensory elements individuals interacted with the most, and found that pathways, including those that linked parts of the garden areas with easier access, were more utilized by the children. Another connection Hussein made in the study was that teachers observed outside aggressive behavior and bullying decreased (Hussein 2012). Sensory gardens allow children to remain active and have their needs met. Healing gardens, which have a variety of sensory stimulations, have been

known to help individuals with PTSD, stress, depression, and autistic spectrum disorders (Souter-Brown, 2015).

Exposure to sensory gardens can help with many of the behavioral issues associated with sensory disorders (Hussein 2010). Studies from the 1970s and the 1980s show positive findings when sensory curriculum was placed into the classrooms for children with special needs (Longhorn, 1988). This is also true of outdoor learning environments (Hussein 2010). Sensory curriculum is a school wide learning experience that helps children develop their senses and understand them (Longhorn, 1988).

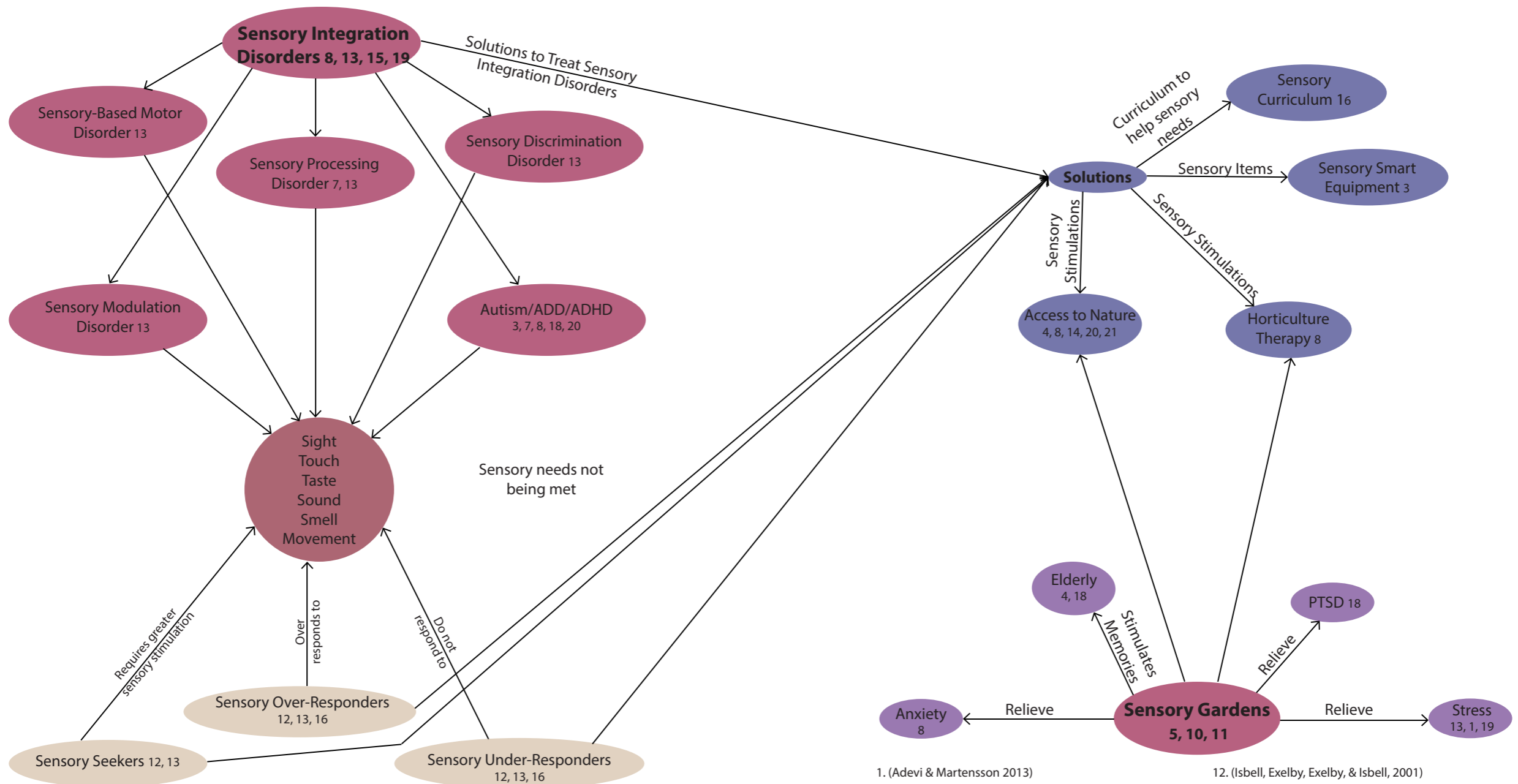
Sensory gardens have also proven to be important in the understanding and treatment of elderly individuals with dementia (Borgen and Guldahl 2010). Benefits have been seen in people suffering from dementia when sensory gardens have been used as a form of therapy. Because sensory gardens stimulate every sense through colors, smells, textures, taste, and sound, they can often invoke memories with the elderly. These memories bring them back to a different point in their life, resurfacing memories long forgotten (Borgen and Guldahl 2010). Access to a sensory garden also helps create a bond between patients and their caregivers. One of the beneficial aspects in this form of therapy is that it can

be done from home or in a long-term care facility (Borgen and Guldahl 2010). Some plants and their cultivars have been handed down through the generations, allowing the patients to have memories associated with them from their childhood (Borgen and Guldahl 2010). The way children and elderly use, and benefit from sensory gardens are similar (Souter-Brown, 2015). While the elderly are not the general focus of sensory integration disorders, both elderly individuals and children are equally affected by sensory gardens, which have shown to help a variety of issues including stress and PTSD (Souter-Brown, 2015).

Gardens do not have to be outside to be effective in treating sensory needs. "The landscape doesn't have to be out there in the yard. The windowsill, a lighted plant stand, the porch, screen room, patio or deck can be a pleasing to the eye plantscape" (Bruce, 2013, pg. 33). Currently many places use horticulture therapy, including grief recovery agencies, group homes, children's advocacy groups, school systems, and early intervention programs (Bruce, 2013).

In summary, there are many different types of sensory integration disorders, including Sensory Processing Disorder and Sensory Processing Dysfunction (Isbell and Isbell, 2007). Individuals with ADHD, ODD, Specific Learning disabilities, Autism

Spectrum Disorder, Anxiety, Tourette's OCS, Developmental Coordination Disorder, Gifted, ADD, Auditory Processing, and Depression can have sensory integration disorders associated with their other diagnosis (Lanc UK 2016).



1. (Adevi & Martensson 2013)
2. (Algozzine & Ysseldyke, 2006)
3. (Al-Heizan, AlAbdulwahab, Kachanathu, & v, 2015)
4. (Borgen & Guldahl, 2010)
5. (Bruce, 2013)
6. (Deans, 2001)
7. (Emmons & Anderson, 2005)
8. (Etherington, 2012)
9. (Hirota 1970)
10. (Hussein, 2012)
11. (Hussein, 2010)
12. (Isbell, Exelby, Exelby, & Isbell, 2001)
13. (Isbell & Isbell, 2007)
14. (Krisch, 2016)
15. (LancUK, n.d.)
16. (Longhorn, 2011)
17. (Marcus & Sachs 2013)
18. (Souter-Brown, 2014)
19. (STAR Institute for Sensory Processing Disorder, n.d.)
20. (Taylor, Kuo, & Sullivan, 2001)
21. (Taylor, Wiley, Kuo, & Sullivan, 1998)

Figure 2.1 Literature Map.



CHAPTER 3: METHODS

Introduction

The research involved qualitative research, projective design, and evaluative research on a sensory room and a mobile sensory garden in an elementary school in Topeka, Kansas.

Methods primarily included interviews, design/build, and observation. The faculty of Williams Science & Fine Arts Elementary Magnet School, including the principal, whose students use the current sensory room, counselors, and other support faculty, were interviewed to assess how the sensory room functions and their desires for an improved sensory room. Inventory of the current sensory room was done as well as observation of how the children interacted with it. Once the observations of the existing sensory room were analyzed, the design/build of a mobile sensory garden cart began. Analysis included the type and frequency of sensory items used (touch, taste, smell, sight, hearing). After the mobile sensory garden cart was completed, it was brought to the elementary school and placed in the sensory room. Then, the second phase of observation began to assess how the children interacted with the new mobile sensory cart.

Procedure

Sensory Room Inventory

The first step involved the documenting the unoccupied sensory room, location, and the type of the quantity of the sensory items. After the sensory room was inventoried a map/floor plan was created, noting the location of each item, and the items' intended use. Photographs were taken without any adults or children in the room. These photographs included pictures of the overall room and of the individual sensory items. The photos were accompanied by a short description detailing the significance of the item, and the intended use of each sensory item. (See Figure 3.1-3.2)

First Sensory Room Observation

The second step was to observe how the children used the sensory room, and mark the activity on the floorplan/map. During this observation, there was no interaction with the children using the room. The children were told the researcher's name, and that she was attempting to make the sensory room better. The children were instructed not to talk to the researcher and to go about their normal activities. No photographs were taken of the children. The adult bringing the children to the room introduced the children to researcher by saying, "This is Morgan. She is here to help make our sensory room better. Please act normally; just do whatever you usually do; you do not need to talk to her." The researcher sat quietly and observed how

the children interacted with the objects in the room. The child's name was not known at any time, and each child was given an identifying letter placed on the top of the form for identification. As the child moved through the room, their location was marked on the map as well as the level of engagement. (See Figure 3.3) The goal was to observe all the children who use the sensory room on a regular basis. Though the exact number of students who use the sensory room varies from day to day, every child on the regular schedule who had a signed consent form and who used the sensory room during the observation days was observed. The first observation lasted three weeks, and was conducted every Wednesday and Thursday based on recommendations of the principal. The sensory room schedule is consistent from Monday-Thursday, but it changes on Fridays due to the schools later start in the morning.

Interviews with Faculty

School faculty were interviewed, including the principal, teachers whose students use the sensory room, and adults who accompany children to the sensory room, such as counselors, and paraprofessionals (paras). The aim of the interviews was to determine how the schools currently uses the sensory room, and how they integrate it into their daily routine. Other questions included the possible support and maintenance of the mobile sensory garden cart, such as how the

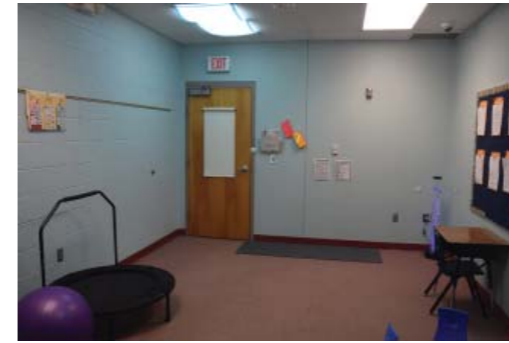


Figure 3.1 Sensory Room



Figure 3.2 Sensory Room main door

school personnel planned to take care of the sensory garden cart.

The faculty and staff were completely briefed on the project and its goals before the interviews began. The interviews took place during the first round of observations in late January and early February.

Interview Questions

Principal Only

- How many students use the sensory room school-wide?
- How many times a day is the sensory room utilized by children with Sensory Integration Disorder?
- How many children are allowed in the sensory room at once?
- What are the most common behavioral issues associated with Sensory Integration Disorders do you see here at the school?
- Is there anything else I should know about the sensory room or the children who use it?

All Faculty

- At what times in the day is the sensory room used the most?
- How is the child selected to use the sensory room?
- Who brings the child to the sensory room?

- What behavioral changes have you seen after a child uses the sensory room?
- What benefits have you see with the sensory room?
- Are there any negative aspects to the current sensory room?
- What would you like to seen with the mobile sensory garden cart?
- What are the most common types of Sensory Integration Disorders do you see at this school?
- How is a child with Sensory Integration Disorders identified at Williams Elementary School?
- Is there anything else I should know about the sensory room or the children who use it?

Design/Build of Mobile Sensory Garden Cart

Once the data was analyzed, the design/build process began for the mobile sensory cart. This included plant selection and building the cart. Information from the observation of the existing sensory room influenced the design. Popular items in the existing sensory room were to be emulated in the mobile sensory garden, allowing for all senses to be engaged and the users to have a variety of experiences. The mobile sensory garden cart was photographed through all stages of design and installment.

Second Sensory Room Observation with Mobile Sensory Garden Cart

The new mobile sensory garden cart was brought into the sensory room to assess the children's reaction to it. Once again, an updated sensory room map was used to track the child's movements through the room and the level of engagement. (See Figure 3.4) The same protocol for observing the children was used; there were no photographs, and the child's name was not known. The children were identified only by a number on the top of the map. In the first observation, a letter identified the children; it was changed to a number in this phase to avoid confusion when discussing the children, as their names were not known. The map was used to identify how the child moved through the

room, where the child went, what items the child used, the level of engagement and the time spent with the cart, and other sensory items in the room. This observation also lasted three weeks long with observation occurring Wednesday and Thursday each week for a total of six days.

Analysis of Data

Data from the first observation was used to design the mobile sensory garden. The items in the sensory room were categorized depending on what sense they stimulated. The data was analyzed to see what overall percentage each sense was used in the observation, and what percentage of the interaction were based on touch, taste, smell, sight, and sound. Data from both observations were compared with the frequency of users, amount of engagement, and length of time spent with an object. Data from the interviews was used to gain background information on the sensory room and the school itself, including the number of students that used the room on a daily basis.

Devices

Map of Sensory Room

The map was on an 8.5 X 11 sheet of paper with a plan view of the sensory room on it. One copy of the map was used for each observation of a child's session. A list of items was included on the map. Information

recorded were the items used, record the items used, length of time the item is used, and the amount of engagement or interaction with the item by the child. The amount of engagement was ranked on a scale of 1-5, with one being little engagement and five being the most amount of engagement. (See Figure 4.25-4.26) Little engagement was defined as picking up an object and putting it right back down, then moving on to the next sensory item. High amount of engagement was defined as playing with an object intensely for over a minute. The items that consistently had high amounts of engagement were incorporated or adapted for inclusion in the mobile sensory garden cart.

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) _____

Date _____ Time Start _____ Time End _____

- ITEMS IN RED CART
 Therapy Putty -TP
 Squishy Ball - SB
 Sock-SK
 Fidget Toys - FT
 Star Master -SM
 Coggy- CG
 Mini Sport Balls -MS
 Magnetic Blocks -MB
 Balance Block -BB
 Etch-A-Sketch -ES
 Bubble Hour Glass- BH
 Charts -CH

Notes:

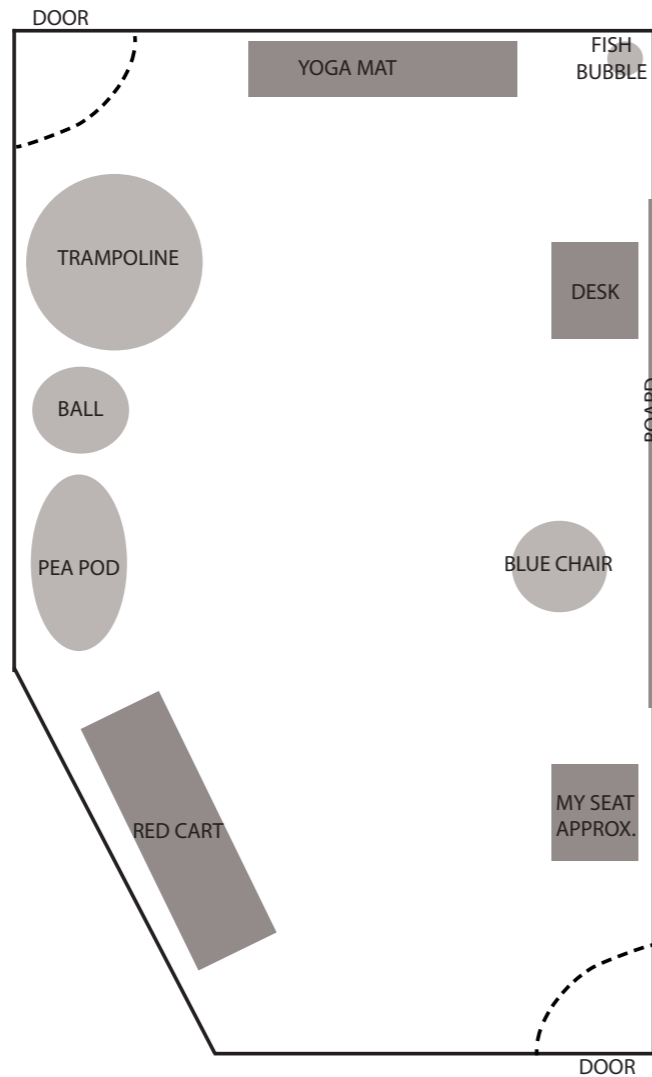


Figure 3.3 Sensory Room Map

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) _____

Date _____ Time Start _____ Time End _____

- ITEMS IN RED CART
 Therapy Putty -TP
 Squishy Ball - SB
 Sock-SK
 Fidget Toys - FT
 Star Master -SM
 Coggy- CG
 Mini Sport Balls -MS
 Magnetic Blocks -MB
 Balance Block -BB
 Etch-A-Sketch -ES
 Bubble Hour Glass- BH
 Charts -CH
- ITEMS IN SENSORY GARDEN CART
 Zen Garden - ZG
 Weighted Blanket - WB
 Wood Slices - WS
 Wood Circles -WC
 Scented Pine Cones -SP
 Foam Handle - FH
 Fabric Wraps - FW
 Pumpkin Gourds - PG
 Birdhouse Gourds - BH
 Plants - PT
 Seed System - SS
 Net/Fabric Tent - TT
 Seating Tiles - ST
 Blocks - BL

Notes:

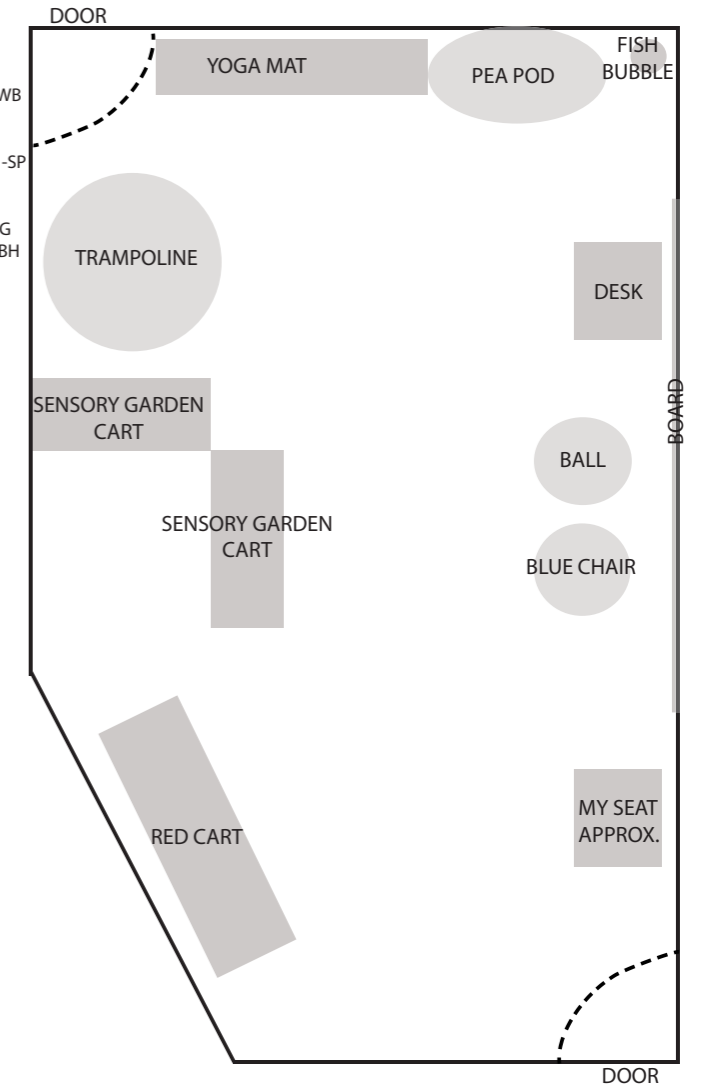


Figure 3.4 Sensory Room Map with Mobile Sensory Garden Cart

Methodology Diagram

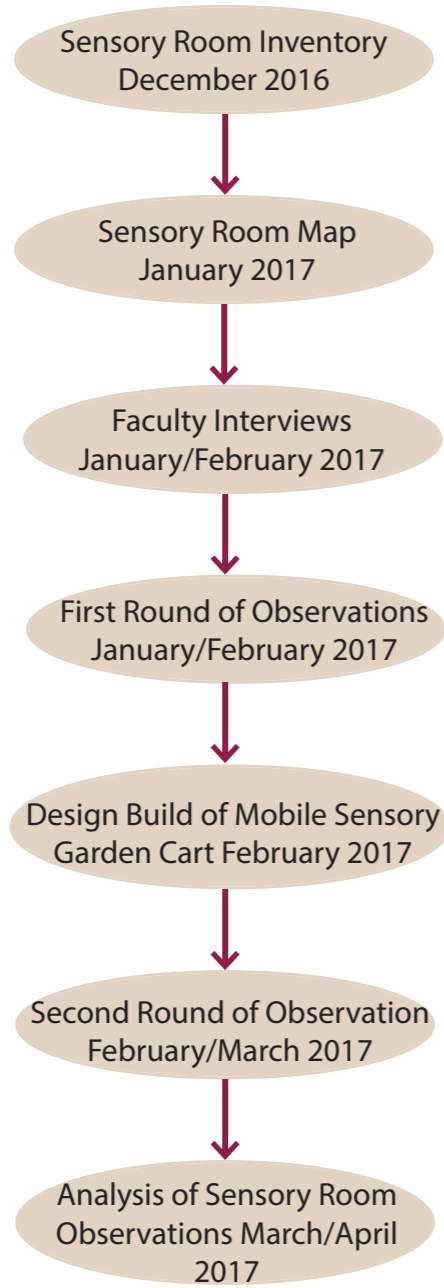


Figure 3.5 Methods Timeline



CHAPTER 4: OBSERVATIONS & DESIGN

Introduction

The mobile sensory garden cart was designed to help students with sensory integration disorders and replicates many features found in an outdoor sensory garden, including different textures, sounds, smells, tastes, and visual interests. The cart holds fourteen different plant species, and a variety of other items such as pumpkin gourds, birdhouse gourds, and different wood textures to help children meet their sensory needs.



Figure 4.1 Yoga Mat



Figure 4.2 Pea Pod

Sensory Room

The sensory room approximately 10 ft by 20 ft and is located on the east side of Williams Elementary School off the library. There are two entrances into the room with the main one from inside the library. Students can go in one and out the other and meet up with their para in the hallway (See Figure 4.6). On the east side of the sensory room are classrooms.

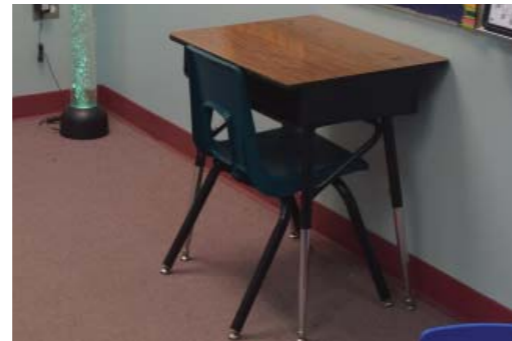


Figure 4.3 Desk

Sensory Room Inventory

The first step was go to take an inventory of the sensory room. Each item was photographed and its location was marked on the sensory room map. Smaller items are kept on the red cart in the sensory room. Every item in the room has several sensory uses, and it is up to the student, para or teacher to designate the use for each item.



Figure 4.4 Board with Charts

Items that are in the room include:

- Yoga Mat (Figure 4.1)
Used for a variety of calming activities including different yoga poses and rolling the child up like a tortilla, or burrito.
- Pea Pod (Figure 4.2)
Used as a calming activity, the child can sit in the pea pod and relax, some use other items like the bubble hour-



Figure 4.5 Blue Chair

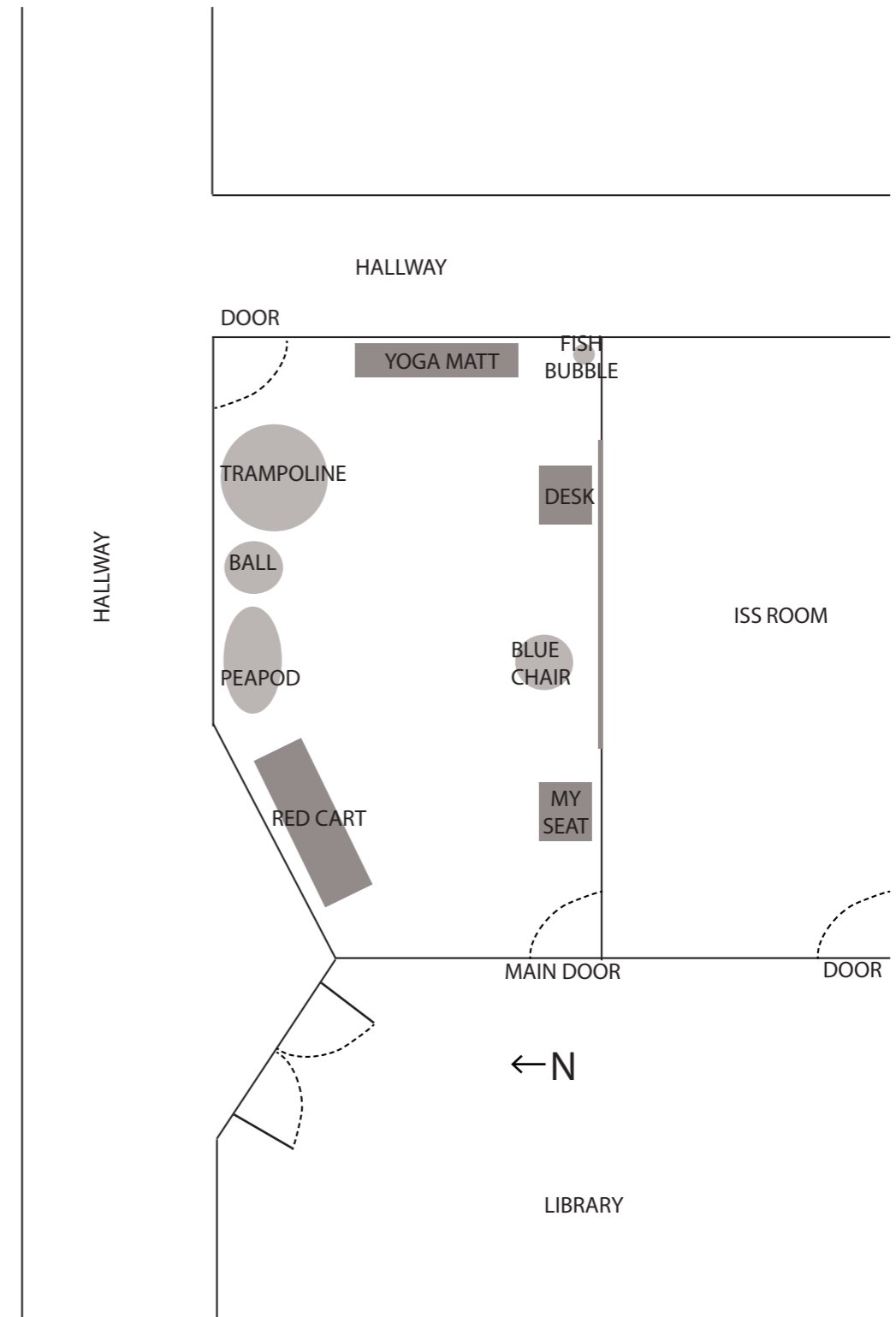


Figure 4.6 Sensory Room Diagram



Figure 4.7 Yoga Ball

glass or the coggy while they are sitting in the pea pod.

- Desk (Figure 4.3)
Used as a place to take items like the therapy putty and get ready to go back to class.
- Charts and Puzzles (Figure 4.4)
Used as last activity to get ready to go back to the classroom. The child could fill one out or trace them on the board.
- Blue Chair (Figure 4.5)
Allows the students to rock while they sit in it.
- Purple yoga ball (Figure 4.7)
Used to do a variety of activities including deep pressure, where the ball is rolled over the child as they lay on their stomach. Sometimes the students would sit on the ball while doing another activity like therapy putty or the coggy.
- Trampoline (Figure 4.9)
Some students use the trampoline to sit on while they are getting ready for another activity and others use it to get some energy out and bounce on.
- Balancing block (Figure 4.10)
The student stands on the balancing block and rocks it back and fourth



Figure 4.8 Red Cart



Figure 4.9 Trampoline



Figure 4.10 Balancing Block

making the child watch their balance. Sometimes the student holds another object in their hand while they balance on the block.

- Fish Bubble (Figure 4.21)
The fish bubble or fish tank gives off light and noise, watching the synthetic fish move up and down can have a calming effect on the child. Some children turn off the lights when they use the fish bubble.
- Red Cart (Figure 4.8)
This cart holds many the smaller items in the room including:
- Therapy Putty (Figure 4.11)
There are three colors of therapy putty with the levels of softness/hardness.
- Squishy Balls (Figure 4.12)
Stress balls are squeezed which provides sensory stimulation.
- Body Sock (Figure 4.13)
Students climb in the body sock and then can be completely enclosed or allow them to have their head out.
- Fidget Toys (Figure 4.14)
Allows the students to hold onto a small mesh object while moving the metal ball trapped inside.
- Star Master (Figure 4.15)



Figure 4.11 Therapy Putty

Shines onto the ceiling and displays stars. This can be used as a calming activity.

- Coggy (Figure 4.19)
A magnetic toy that allows the students to make shapes spelled out on cards. This forces the child to concentrate on the task at hand which calms.
- Magnetic Blocks (Figure 4.16)
Blocks with magnets in them and allow the student to create structures and shapes.
- Etch-A-Sketch (Figure 4.17)
Can be used with the peapod to give a calming effect.
- Bubble Hour Glass (Figure 4.18)
Gives the student a sense of time when using the sensory room. Some of them used it while doing another activity and watched the bubbles fall down.
- Charts (Figure 4.20)



Figure 4.12 Stress Balls

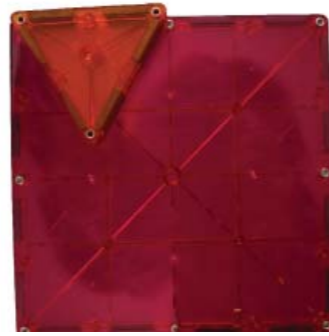


Figure 4.16 Magnetic Blocks



Figure 4.20 Charts



Figure 4.13 Body Sock



Figure 4.17 Etch-A-Sketch



Figure 4.14 Fidget Toy



Figure 4.18 Bubble Hourglass



Figure 4.15 Star Master



Figure 4.19 Coggy



Figure 4.21 Fish Bubble

Sensory Room Map

After the inventory of the sensory room was complete, a map was created to aid in the observation. Locations of each item were marked on the map with approximate size. (See Appendix B). This allowed the children to be recorded where they went in the room, what objects they interacted with and for how long.

After the sensory cart was designed and built, the school occupational therapist was consulted about the best location for the sensory garden cart. She decided that it was best to move the pea pod and the ball to other parts of the room and place the two sensory garden carts (See Appendix B).

Interviews: Use of the Sensory Room

Interviews took place with different staff members at Williams Science and Fine Arts Elementary School, including the principal, occupational therapist, teachers and paras associated with the sensory room at Williams. They were asked about how children are selected to use the sensory room, current benefits of the sensory room, disadvantages of the current sensory room, and what they would like to see with the mobile sensory garden cart.

When the sensory room was opened with grant money in fall of 2016 all staff members

who would be using the sensory room received training. This training included how each item was used and what items would help children demonstrating certain behaviors. The policy stated that if a staff member is not trained, then they cannot bring a child into the sensory room. Regular education teachers were not expected to bring a child to the sensory room because they had to stay with their class. Since the regular education teachers do not bring students into the room it is hard to have enough staff to bring children into the room. Though the school is K-5, typically the students who use the sensory room are kindergarten or first grade, because as the student gets older teachers want the student to be able to regulate their needs in the classroom. Also, the children who use the sensory room are typically male with an approximate ratio of 90% males to 10% females.

When asked about what time of day the sensory room was used most, answers varied because staff use the room at different times of the day. Several people stated that mornings were busier and that students should use the room a few hours into the day but not first thing after school starts. Early afternoons also tend to be a busier time.

The sensory room is used every day, and the time when each child uses the room depends on their behavioral needs. Approximately

five to ten students use the room every day, and sometimes a child uses the room several times a day. The most common type of behavioral issue that prompts a visit to the sensory room is too much energy (that needs to be brought back down to a manageable level); or lethargy (they need more stimulation).

Children are selected to use the sensory room after observation of their behavior by the occupational therapist. All children at Williams Science and Fine Arts Elementary School have an IEP or Individual Education Plan that indicates their need to use the sensory room for one reason or another. The school does not diagnose children with Sensory Integration Disorders; sometimes a child is autistic, ADD, ADHD and/or are sensory seeking in some way. Most people have a sensory tendency but are able to meet their needs and function normally. When children are not able to meet their needs and it manifests in behavioral issues, the question is why? Sometimes they are just naughty or misbehaving, sometimes they are unable to meet their sensory needs because of unknown outside issues including a possible trauma in their life or a sensory processing disorder. Children who need to use the sensory room are identified by their IEP.

The maximum capacity at any given time is two students to one certified staff member. But

typically, the ratio is one student per one certified staff member. Paras are assigned to students based on availability and the master schedule.

Staff have observed behavioral changes in the classroom after a session in the sensory room, including calming, decrease in seeking activities, willingness to communicate, an increase in response sharpness compared to before they enter the room, and readiness to work in the classroom. Sometimes it doesn't work, and when that happens, activities the child uses in the sensory room are evaluated and reconsidered to attempt to get the most out of their time in sensory room. Some children only need a few minutes and some need longer in the room to see a change. Additionally, some just need a break from distractions in the classroom even if they are feeling "just right." When the sensory room is used correctly there are positive outcomes.

One drawback to the sensory room at Williams was that the sensory room was not be formally staffed with one or two people who oversee everything. Additionally better education for staff members to better understand what items to best use for children when they are displaying certain behaviors was desired. Having a larger room would allow for a more cohesive design, which would allow items to be grouped together based on the sensory services they provide.

Drawbacks to the sensory room include: distractions with more than one child in the room. Additionally, there can be some issues when it's time to leave and the child does not want to. Some children respond better to certain items in the sensory room, misusing items such as throwing them at staff or destroying the item.

When asked what objects would be beneficial on a mobile sensory garden cart the staff suggested different types of smells, anything with texture, rocks, calming or soothing items: dried bamboo. There was an overall excitement to see the final product and what would be included in the cart.

Findings During the First Observation of the Sensory Room

These findings are from the first three weeks of observation at Williams Science and Fine Arts Magnet School.

There is a very structured routine when the children use the sensory room. It starts with the student and the staff member walking entering the room. Though there are two doors to the sensory room, the most common entrance is the one connected to the library. It is not uncommon for the student to come in or out of one door and the para to come in or out of the other door

usually at the student's insistence. The doors are close to each other in the hallway and the student and para meet up in the hallway. Once the student is in the sensory room, the student and accompanying staff member pick out the desired activities. How the student is behaving often dictates who picks out the activities. If the child comes into the room and needs to be calmed down, they will pick a different activity than if the child is feeling just right.

Each activity is classified as one of three color categories: red, yellow, and green. Red activities are for children that need to calm down, slow down, and relax. Yellow activities are for children that are "just right", but who need to focus their attention. Green activities are for children that need to get going, perk up and be alert. If the student has been doing well in class they receive less instruction on what activities to pick than a student that has been showing some form of behavioral issue in the classroom.

Red Activities (Calm Down, Slow Down, Relax) • • C

- Cross Over
Crossing arms and legs over their body
- Ear Massage
Rubbing ears
- Fish Tank
Watching the fish tank
- Turtle



Figure 4.22 Red Charts



Figure 4.23 Yellow Charts



Figure 4.24 Green Charts

- Activity was not observed
- Tortilla Time
Wrapped in the yoga mat like a tortilla
- Joint Compressions
Applying soft pressure on joints
- Swaddle
Wrapped in a blanket
- Deep Pressure
Child lays on stomach and the ball is rolled over them with slight pressure
- Velcro
Provides a different texture for the child to rub their hands on
- Shoulder Squeeze
Slight squeezing of the child's shoulders
- Lava Lamp
Child can watch the bubbles
- Dots and Squeeze
Activity was not observed

Yellow Activities (Just Right, Focus, Pay Attention)

- One Foot Balance
Balancing on one foot
- Rolling
Activity was not observed
- Animal Walk
Walks around the room pretending to be a certain animal
- Rocking Toys
To give a rocking motion
- Self Hug
Hugging themselves

- Therapy Putty
Putty they can mold into different shapes with their hands.
- Push ups
Push ups either on the ground or on the wall
- Belly Breathing
Activity was not observed
- Finger Pulls
Pulling fingers providing resistance
- Fidgets
Toys that the child can use to fidget with
- Puzzles
Activity was not observed
- Hands and Knees
Activity was not observed
- Row Boat
Acting like they are rowing a boat
- Belly on Ball
Laying on their belly on the ball

Green Activities (Get Going, Perk Up, Be Alert)

- Hula hoop
Using a hula hoop to get moving
- Log Role
Activity was not observed
- Peanut Rock
Activity was not observed
- Skip
Activity was not observed
- Light Touch
Activity was not observed

- Dancing
Where the child dances around the room
- Spinning
Where the child spins and gets moving
- Action Songs
Activity was not observed
- Gallop
Activity was not observed
- Hop on One Foot
Hopping on one foot
- Jumping
Jumping around the room
- Make the Room Bigger
Pushing the walls trying to make the room bigger
- Face Tapping
Tapping their face with their fingers
- Tummy Time
Laying on their tummy

Once the activities have been selected, they start doing the first activity, which takes about five of the ten minutes depending on how many different activities the child is doing in the sensory room. If the child is doing more activities the time is often less with each activity. During the first three weeks of observation the number of activities done by a child in a session ranged from one to four. Once they have completed the first activity the child moves on to the second. The final activity is intended to help the child get

ready to go back into the classroom. Once they have completed their activities and the timer has gone off they put the equipment back in their designated location, place a “done” sticker on the wall and leave. Most of the time the students return to the classroom in a calmer state. However there have been a few incidents where the child does not want to leave the sensory room, but the student does not get extra time in the sensory room just because they desire it.

During three weeks of the first observation, it became clear that students are allowed to decide if they need to use the sensory room or not. An individual student may be scheduled to go to the sensory room up to four times but if they decide that they are having a “good day” they may not attend the sensory room for one or more of those times. However, if the classroom teacher feels that the student needs to use the sensory room they can override the decision to stay in the classroom. If the student is having a “good day” or a “good week” they may not use the sensory room at all during that day or week. Despite having a schedule for the room, there were several instances when students showed up earlier or later than the time they scheduled for. There can be a variety of reasons for this including changes in the overall schedule that were not recorded on the master schedule, or an accompanying adult is absent for the day.

It is important to note that when there is an illness outbreak in the school, the students are less likely to use the room. During the first week of observations there were many sick adults and children throughout the school and several staff members out sick. It was observed in the main office was very short staffed, with both secretaries out sick and numerous call-ins from parents stating that their child would not be coming in today due to illness.

Observation Statistics

During the first three weeks, six children were observed during 28 observations. Seventeen different types of sensory activities occurred during this time. Children were in the room an average of 12.36 minutes and used an average number of 2.93 sensory items per sessions. The most commonly used items used were the magnetic blocks and the therapy putty.

Engagement Level

The engagement level of every activity was assessed while the child was interacting with the item. Engagement level was based on how long the child spends with the activity and how engaged they seem to be with it. A level one engagement indicated a child who spent very little time with the item and was not engaged when using the item. Level two engagement is a small amount of

engagement but not a lot of time was spent using the item. A level three engagement is when the child spends a moderate amount of time with the object or activity and has a moderate amount of engagement. A level four would be a high amount of engagement for a moderate amount of time. An engagement level of five would be when a child spends a lot of time with it and they are highly engaged while using the item. Engagement level has been abbreviated to EL on the sensory room observation maps.

Charts

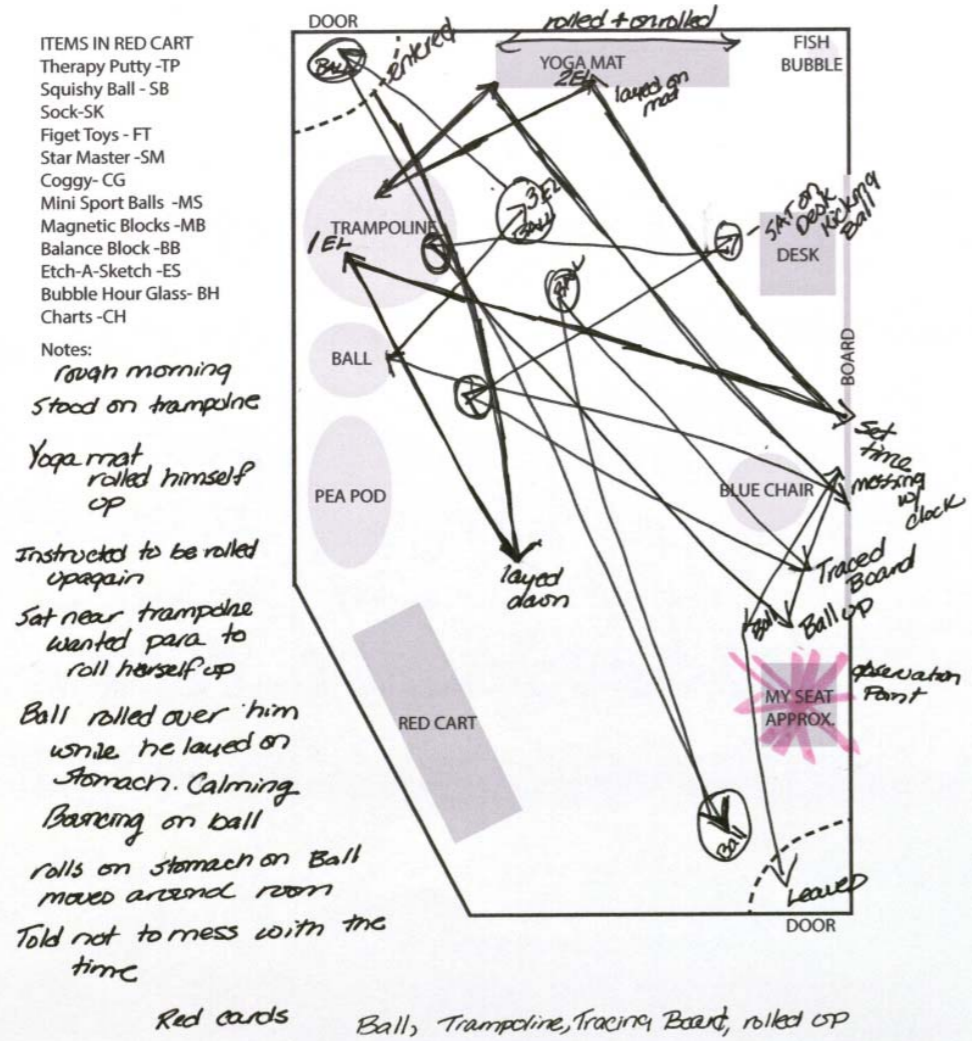
Data taken during the first round of observations was analyzed for length of time spent in the room, and items used during the time in the room. Figure 4.25 and 4.26 are sensory room maps completed during the first round of observation. The unique aspect of these two observations is that they are from the same child. Figure 4.25 was taken during the morning where the child is typically higher energy and figure 4.26 is taken during the afternoon where the child is typically lower energy. This illustrates the diverse sensory needs even one child can have. Figure 4.27 shows how many times each child was observed during the first observation. Figure 4.28 is looking at the how many times each item was used during the first observation. Figure 4.29 shows the engagement levels from the top five used items and their corresponding engagement levels. Figure 4.30 shows how many times each child used the items in relation to the other children.

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) E

Date 2/1/2017 Time Start 10:39 Time End 10:55



Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) S

Date 2/8/17 Time Start 1:27 Time End 1:36

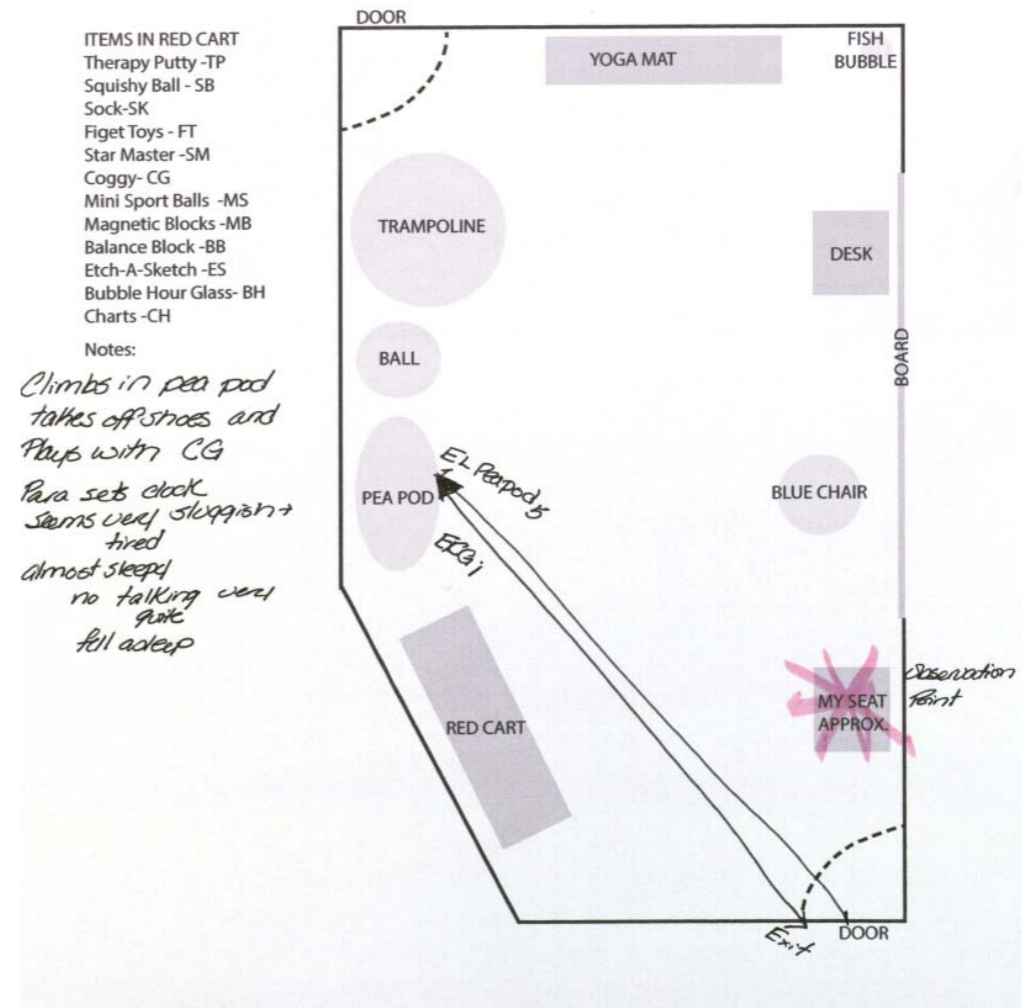


Figure 4.25 Sample Observation morning

Figure 4.26 Sample Observation afternoon

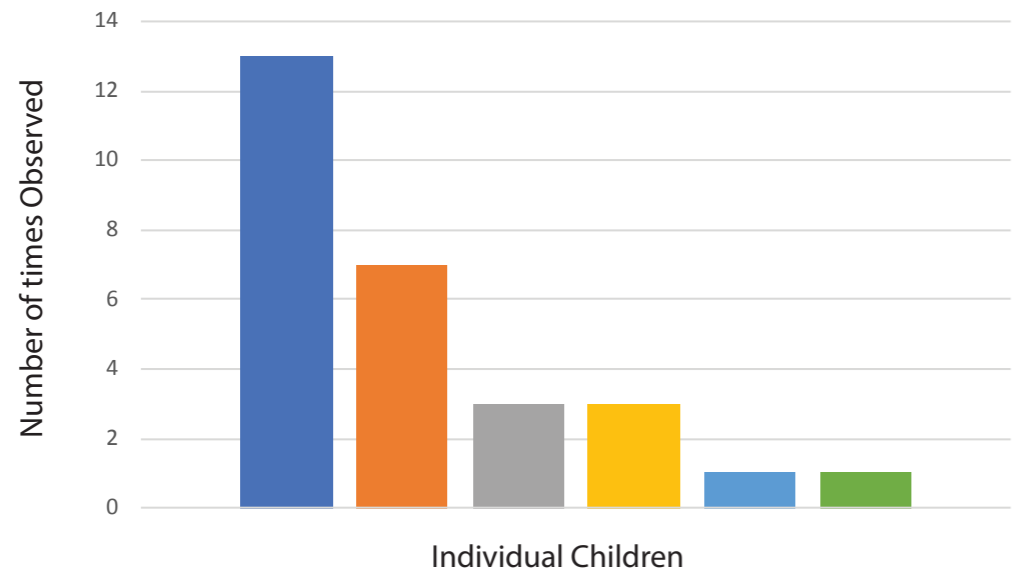


Figure 4.27 Number of times each child was observed during the first observation

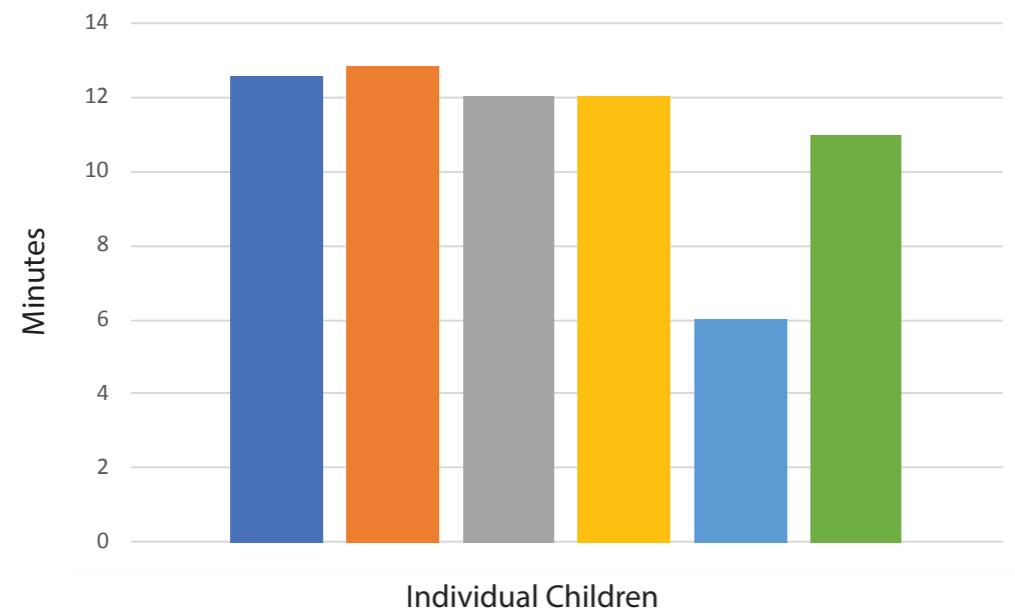


Figure 4.28 Average time spent in the sensory room during the first observation period

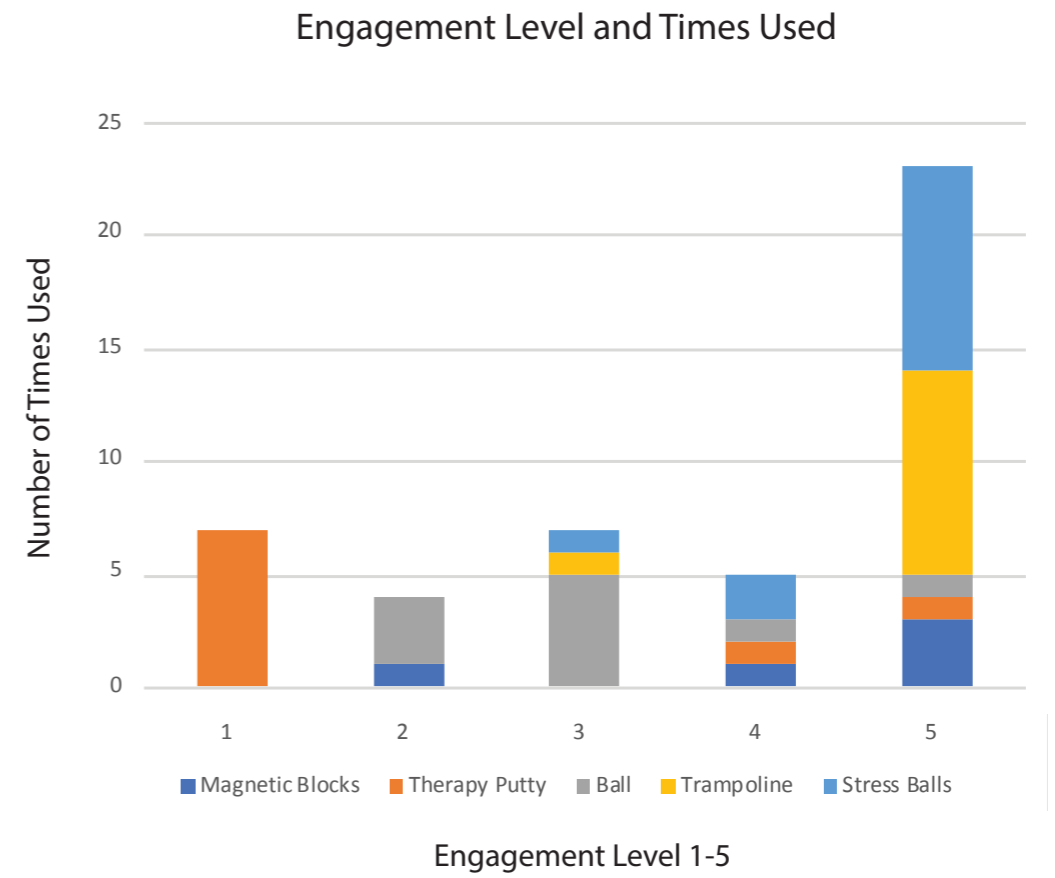
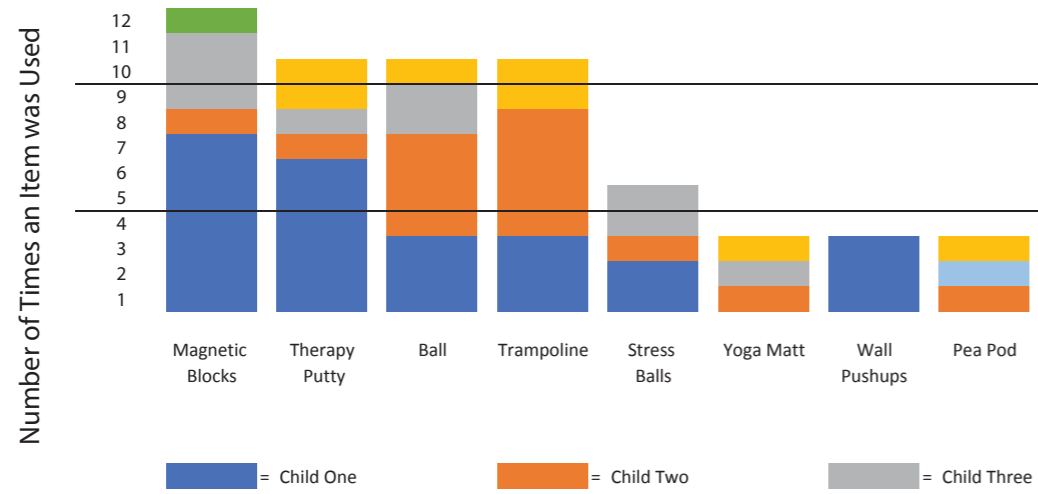


Figure 4.29 Engagement Level of top five items used and how many times they were used during the first observation period

Items Used During the First Observation



Items Used During the First Observation

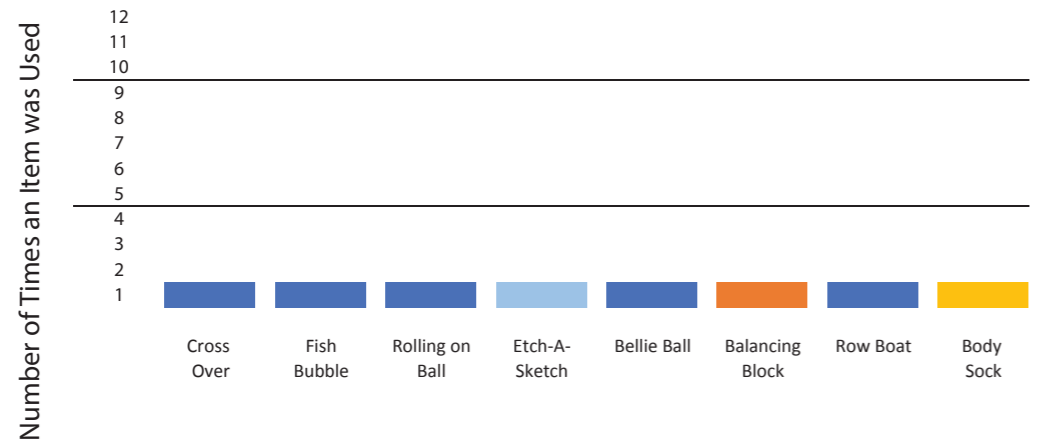
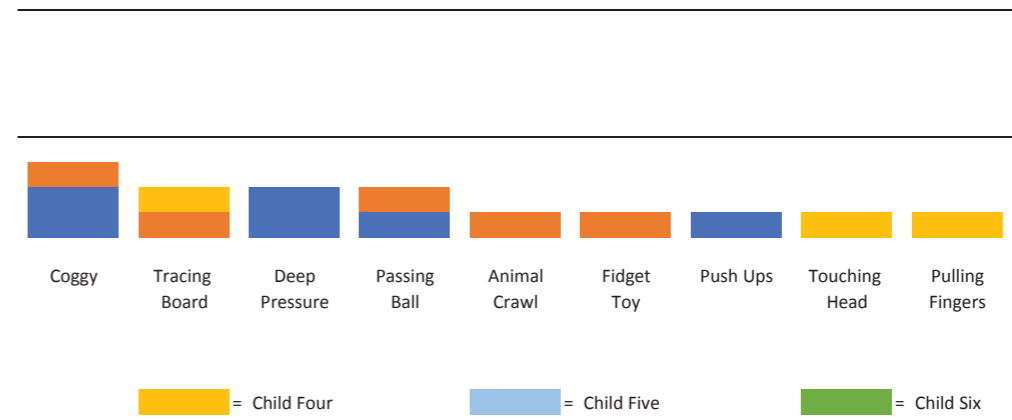


Figure 4.30 Items each child uses during the first observation

Creating the Cart

Buying the Cart

Instead of fabricating a cart, it was decided to purchase and adapt a ready-made cart because it would allow schools to purchase and build their own in the future. The cart that was chosen was the Seville Classics Industrial All-Purpose Utility Cart purchased for \$70. The cart's dimensions were 34 inches by 18 inches by 33.5 high and included three adjustable shelves, removable push-bar handles and locking wheels and a carrying capacity of 500 lbs. (See Figure 4.31) This cart was then modified for the purposes of this project.

Overall Cart Design

After several meetings with faculty to discuss the overall design of the mobile sensory garden cart, it was time to use the CNC machine and cut out a few pieces for a dry run. On the top shelf the wood tray had base height of four inches with waves on top with circles cut out. (See Figure 4.32-4.35) The middle shelf was covered with 1 1/16" pieces of half inch plywood. These were secured with angled pieces, glued together and then nailed together. The bottom tray had a straight edge with patterns and designs etched into the wood. These patterns changed from side to side. The top shelf was divided into six compartments and the bottom into four compartments. Once everything was in place, pictures were taken and a dry fitting was done. Input from my committee members was given and more



Figure 4.31 Sensory Cart After Assembly

concepts were tested.

After the final design recommendations and several test runs, the bottom shelf was changed to mirror the top shelf with circles cut out and waves on top. The height of the bottom shelf was also reduced from a four inches to of two inches (See Figure 4.34).



Figure 4.32 Top Shelf of cart



Figure 4.33 Middle Shelf.



Figure 4.34 Base Cart



Figure 4.35 Metal Panel

Metal Panel

The metal panel on the front of the cart is designed to hold the "seed system;" a series of water bottles that have part of their sides cut out and a magnet glued on one side where the children can pour seeds down the water bottles and watch them slide into a metal bucket. The metal panel is a piece of galvanized metal that was left over in the shop. The metal was cut and folded to make sure there were no rough or sharp sides. Once the metal was folded over, holes were drilled which were also smoothed out to make sure there were no rough edges. Holes were then drilled into the wood so the metal could be bolted in. Once all the holes were drilled bolts were placed to help secure the piece of metal.

Objects

Several different items were selected for the mobile sensory garden cart, for their qualities including texture, smell, taste, sight, and sounds. Objects included those found in nature, as well as some additional items that were either bought or made.

Pumpkin Gourds

Pumpkin gourds were purchased to provide a variety of different textures and sounds when shaken. These gourds were bought at a local market in October, and the drying out process began immediately. This included cleaning the gourds and then dipping them

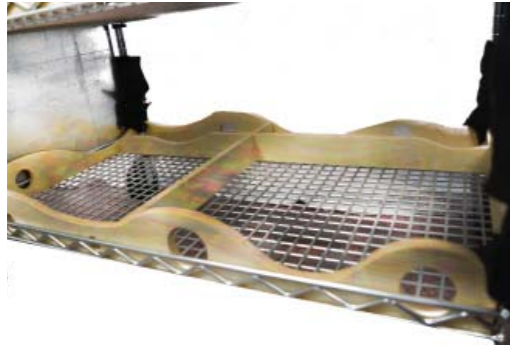


Figure 4.36 Bottom Shelf

in vinegar to kill potential bacteria growth. Once washed, they were placed on a plant stand outside to dry. (See Figure 4.37) Care was taken to ensure that they were not touching, which could cause them to rot. When drying out gourds it is important that they get plenty of air, and sunshine. These gourds were spread out on a metal plant stand on a south facing balcony where they received plenty of sunshine and air.

Once placed outside on the stand they were left largely alone, only periodically moving them to check for rotting and to take progress pictures. They were left outside during all types of weather: heat, cold, rain, ice, and snow, none of which seemed to affect the drying out process. The only exception was the gourds showing signs of flakiness once they started to undergo a series of freeze thaw events. The first noticeable signs of drying out were when the colors started to fade, and the gourds became lighter. Naturally, the smaller gourds started showing signs of drying out earlier than the larger gourds. One of the larger ones that was originally green turned orange and then began to fade to beige. (See Figure 4.38-4.39)



Figure 4.37 Pumpkin gourds before drying



Figure 4.38 Pumpkin gourds after drying



Figure 4.39 Pumpkin Gourds



Figure 4.40 Birdhouse Gourds

Birdhouse Gourds

These gourds were purchased as a "back up plan" in case the pumpkin gourds either rotted or did not fulfill the needs of the project. They were purchased from the same local store as the pumpkin gourds; but these gourds were already dried and made noise when shaken. (See Figure 4.40) One was left with the original texture and the other was sanded down, which lightened the color, and smoothed the surface.

Weighted Blanket

A weighted blanket is used to calm children who are over stimulated by their environment by putting pressure on them. The weighted blanket was made from two yards 40" wide of fleece fabric. One side of the blanket is blue, and the other is black with multicolored music notes. The solid blue side is for children who need less stimulation and the side with the music notes is for children who need more stimulation. First, three sides of the blanket were sewn together, and the columns were sewn into the long side of the blanket. Once this was done a series of pockets were created that hold the poly pellets and the polyfill. Poly pellets add weight to the blanket and can be machine-washed; the polyfill is a light-weight stuffing material and is often used in pillows. The same quantity (1/2 cup) of poly pellets is used to fill each of the pockets. Once a row of pockets was finished they are sewn and



Figure 4.41 Blanket



Figure 4.42 Blanket



Figure 4.43 Catmint and Chocolate Mint



Figure 4.44 Panda plant and Aloe



Figure 4.45 Christmas Cactus



Figure 4.46 Lemon Balm and Thyme



Figure 4.47 Spider Plant and Ivy



Figure 4.48 Lavender and Rosemary

the next row of pockets are finished. The entire blanket took about six hours to make and weighs around seven to eight pounds. (See Figure 4.41-4.42) Weighted blankets could be purchased from a variety of places, however it was much more cost effective to make the blanket.

Pots

Six pots (9"x9"x4" deep) were purchased from a local nursery. Three are blue, two are red, and one is yellow. They fit perfectly on one of the cart's trays. Underneath the pots are a water-catching tray to prevent water from spilling onto the other trays below. Other pots included a circular container and reused candle jars filled with rocks and bulb vases.

Plants

All plants used on the sensory cart were chosen for a variety of reasons including safety; none of the plants could be poisonous or harmful in any way. Some plants were chosen for their sensory qualities. Plants include: Spider Plant, Panda Plant, Paper Whites, Bamboo, Lavender, Rosemary, Thyme, Lemon Balm, Catmint, Chocolate Mint, Christmas cactus, Hyacinth, Swedish Ivy, and Aloe. For example; lavender, rosemary, catmint, chocolate mint, thyme, Swedish ivy, and lemon balm were chosen for their textures and smells. Panda plant, aloe, and spider plant were chosen for their colors and textures. Paper whites and hyacinth were chosen for visual aspects including



Figure 4.49 Plant Lights



Figure 4.50 Wood Circles



Figure 4.51 Wood Circles on Wood Dowel



Figure 4.52 Wood Slices



Figure 4.53 Drift wood

their blooms and root systems. All plants were purchased from local greenhouses or online. These plants have also been selected based on their ability to live in an indoor environment. (See Figure 4.43-4.49)

Plant Lights

Because the plants will be living indoors, with the majority of the time in the sensory room which does not have any windows, plant lights were added to the cart (See Figure 4.46). The clip-on plant lights were purchased online for \$15.99 apiece. These lights were selected because they were adjustable, could be turned on and off as needed, and were preferred by the school's principal.

Wood

Different types of wood were selected for their texture and for their ability to meet different sensory needs, including driftwood, wood slices, bark, and circles of wood. (See Figure 4.50-4.54) Driftwood is smooth, whereas the bark has rough and uneven patterns in a variety of shapes and sizes. The bark was attached with Velcro to fabrics to give the children a chance to move the bark around on the fabric wraps. The fabric was wrapped around the four poles on the cart to make the cart look less industrial and friendlier. The wood slices were placed on a wooden dowel, and can be removed at any time; this allowed the children to play, and make their own combinations to allow for creativity.



Figure 4.54 Bark Slices



Figure 4.55 Foam Handle.

Foam

Foam was wrapped around the handle of the sensory garden cart to create a squishy texture. Around the foam is a fabric cover, that can be removed and washed if needed, or if the student prefers to touch the metal of the cart. (See Figure 4.55)

Netting/Fabric

Netting and fabric intended to create a type of “enclosure” was added. The netting could be attached to the cart and allows the child to decide if they wish to have a degree of enclosure or not. There are several different ways for the students to use different fabrics to create different degrees of enclosure. (See Figure 4.56) If the netting does not create enough “enclosure” then they can attach fabric to the carabiners and create a more enclosed environment. (See Figure 4.57)



Figure 4.56 Netting



Figure 4.57 Fabric Tent

Zen Garden

A Zen Garden was made using a shadow box picture frame. The blank frame was purchased from a local craft store. Everything was taken out of the frame, then the back was put on, then the glass and the paper was glued down. After they were aligned, hot glue was applied to the seams to ensure a sand tight seal. Once the glue cooled and everything was sealed, sand was poured into the frame. A total of six pounds of sand was used. Then the rocks and the Zen Garden



Figure 4.58 Zen Garden



Figure 4.59 Artificial Grass



Figure 4.60 Tile

tools were purchased online and added. The Zen Garden offers both tactile and visual sensory stimulations. Additionally, it allows the student to be creative and move sand around. (See Figure 4.58)

Sitting Squares

Different materials were acquired to allow the students to select the surface texture they would like to sit on while they used the mobile sensory garden cart. The squares included carpet samples, tile, rocks, and artificial grass to provide a variety of textures. (See Figure 4.60-4.64)



Figure 4.61 Large Rough Carpet

Assembly

Once the cart was completed, work began the other items that were attached or placed on the cart. The foam handle was completed by sewing a fabric pillowcase and placing Velcro to attach the pillowcase around the handle.



Figure 4.62 Large Soft Carpet

The next step was planting all the plants. In the 9”x9” pots were planted Spider Plant and Swedish Ivy together, in another Cat Mint, Chocolate Mint, lavender and rosemary, Lemon Balm and Thyme, in the fifth was aloe and Panda plant and the sixth has Christmas Cactus in it. These are all designed to go on the middle shelf (See Figure 4.66).



Figure 4.63 Small Soft Carpet

The bottom shelf was designed specifically to house the Zen Garden (See Figure 4.69),



Figure 4.64 Small Rough Carpet



Figure 4.67 Rock Seating Tile

wooden blocks scented pine cones, and seating tiles. These are all placed into one of four compartments.

The top shelf holds the bamboo, paper whites and the hyacinth, along with the smaller carpet squares, and grass squares, pumpkin gourds, birdhouse gourds, bark, wood circles and wood slices (See Figure 4.66).



Figure 4.68 Rough Tile



Figure 4.65 Top Shelf



Figure 4.69 Bottom Shelf



Figure 4.66 Middle Shelf



Figure 4.70 Cart

Red, Yellow, Green Items on the Cart

The items in the sensory room are broken up largely into three categories: red, green, and yellow. Red activities are to calm down, slow down and relax. Yellow activities are just right, focusing, and pay attention activities. Green activities are get going, perk up, and be alert. In consultation with the occupational therapist each item was given a color to indicate how it might be used. Some fit into more than one category for example some smells are more calming and some are more alerting. This is dependent on the individual smelling them. Different textures can also fit into yellow and green depending on the person.

- All Categories**
- Scented Pine Cones
 - Paper whites
 - Hyacinth
 - Chocolate Mint
 - Lemon Balm
 - Catmint
 - Lavender
 - Thyme
 - Rosemary
 - Swedish Ivy

- Yellow Items**
- Wood Slices
 - Wood Circles
 - Fabric Wraps
 - Pumpkin Gourds
 - Birdhouse gourds
 - Christmas Cactus
 - Panda Plants
 - Aloe
 - Seed System
 - Plant Lights
 - Carpet Swatches
 - Tile

Red Items

- Zen Garden
- Weighted Blanket
- Spider Plant
- Panda Plant
- Net/Fabric
- Carpet Swatches
- Tile

Green Items

- Foam Handle
- Fabric Wraps
- Pumpkin Gourds
- Birdhouse gourds
- Bamboo
- Blocks

Findings During the Second Observation of the Sensory Room

During the first week of observation it was clear that the children were enthralled with the sensory garden cart, though some of their enthusiasm may have stemmed from novelty. Most of the children went directly to the cart and looked at it, and touched different items asking what it was, what it did, and if they could touch it. The most popular items had interactive components: the Seed System; the wooden circles on the wooden dowel, and the Zen Garden. The children were also overwhelmingly curious about the plants but many seemed hesitant to touch them. In many cases the para had to encourage to them to touch the plants, before the children seemed comfortable. There were several instances where the children touched and smelled the different plants including one time when the child,

with the help of the paraprofessional, took the plants off the cart and placed them in a semicircle to get a better look at them. The decision to water the plants on Wednesdays seemed to present a unique set of problems. Some children handle the responsibilities of watering the plants well, while others used the water bottle to get everything and everyone in the room wet.

During the second week of observations the children continued to primarily use the sensory garden cart in the sensory room. There were several instances when either the para or the special education teacher instructed them to use an item not on the cart to meet their sensory needs. This was a good sign that the room was back to normal. Teachers and para sometimes chose the activity to best meet the student's needs depending on how the child was doing.

During the third week, children still used the sensory cart frequently and given the choice students usually gravitated towards them. However, for the first time when a child was given a choice they chose to go back to an activity they did during the first observation. This is important because it showed that much of the novelty had worn off and they were still using it alongside the items that were previously in the room. As with the first round of observations there were times when the sensory room and the sensory cart clearly

helped calm the children and there were times when it was hard to tell if there was any effect. This seemed to depend on how the child came into the room. If they came in highly over stimulated then it was hard to bring them back down. If the child came in "just right" then it was hard to determine how the room affected them.

Observation Statistics

During the three-week observation of the sensory room with the mobile sensory garden cart installed, 45 observations took place with seven children. There was a total of thirty-one items used during the second observation. The average time spent in the room was 11.2 minutes with a range from 6-34 minutes. The average number of sensory items that were used were 3.8 items with a range from one to eight items. The most commonly used items in the room where the Zen Garden and the Seed System.

Engagement Level

The engagement level was again assessed every time a child used an item in the sensory room. With this particular observation it was clear that while some of the items such as pumpkin gourds, birdhouse gourds and wood were touched and picked up often the level of engagement was lower than interactive items like the Zen Garden and the Seed System.

Charts

Data taken during the second round of observations was analyzed for length of time spent in the room, and items used during the time in the room. Figures 4.71 and 4.72 are sensory room maps completed during the second observation from two different children. Figure 4.71 shows the child going straight for the sensory garden cart using the seed system and leaving. Figure 4.72 shows the child using the net and sitting tiles making a tent and creating their own space. Figure 4.73 shows how many times each child was observed during the first observation. Figure 4.74 shows how many times each item was used during the first observation. Figure 4.75 shows the engagement levels from the top five used items and their corresponding engagement levels. Figure 4.75 shows how many times each child used the items in relation to the other children.

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 1

Date 2/22/17 Time Start 8:41 Time End 8:47

- ITEMS IN RED CART
 - Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES
 - Bubble Hour Glass- BH
 - Charts -CH
- ITEMS IN SENSORY GARDEN CART
 - Zen Garden - ZG
 - Weighted Blanket - WB
 - Wood Slices - WS
 - Wood Circles -WC
 - Scented Pine Cones -SP
 - Foam Handle - FH
 - Fabric Wraps - FW
 - Pumpkin Gourds - PG
 - Birdhouse Gourds - BH
 - Plants - PT
 - Seed System - SS
 - Net/Fabric Tent - TT
 - Seating Tiles - ST
 - Blocks - BL

Notes:

Seeds system write playing with the FW
 WC-moving them on top of each other - rolling it across the floor
 Back to SS
 Filling it up and watching the seeds go down
 filling up a bottle waiting for it to be full before filling.

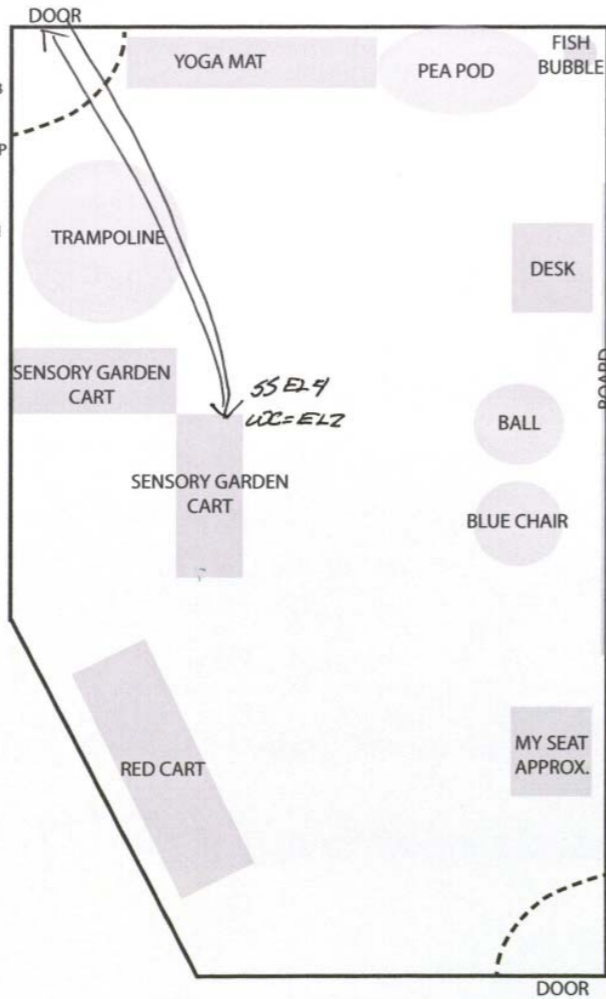


Figure 4.71 Second Observation with little activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 33

Date 2/2/2017 Time Start 2:51 Time End 3:04

- ITEMS IN RED CART
 - Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES
 - Bubble Hour Glass- BH
 - Charts -CH
- ITEMS IN SENSORY GARDEN CART
 - Zen Garden - ZG
 - Weighted Blanket - WB
 - Wood Slices - WS
 - Wood Circles -WC
 - Scented Pine Cones -SP
 - Foam Handle - FH
 - Fabric Wraps - FW
 - Pumpkin Gourds - PG
 - Birdhouse Gourds - BH
 - Plants - PT
 - Seed System - SS
 - Net/Fabric Tent - TT
 - Seating Tiles - ST
 - Blocks - BL

Notes:

ZG, pulled out his three activities
 ZG, grass, SS
 Using the tools to smooth out the tent
 making the seating tiled like a whole new place wants to use blanket
 Tent - using green fabric
 Being quiet and enjoying the garden under the tent
 he seemed to calm him down
 Puts grass

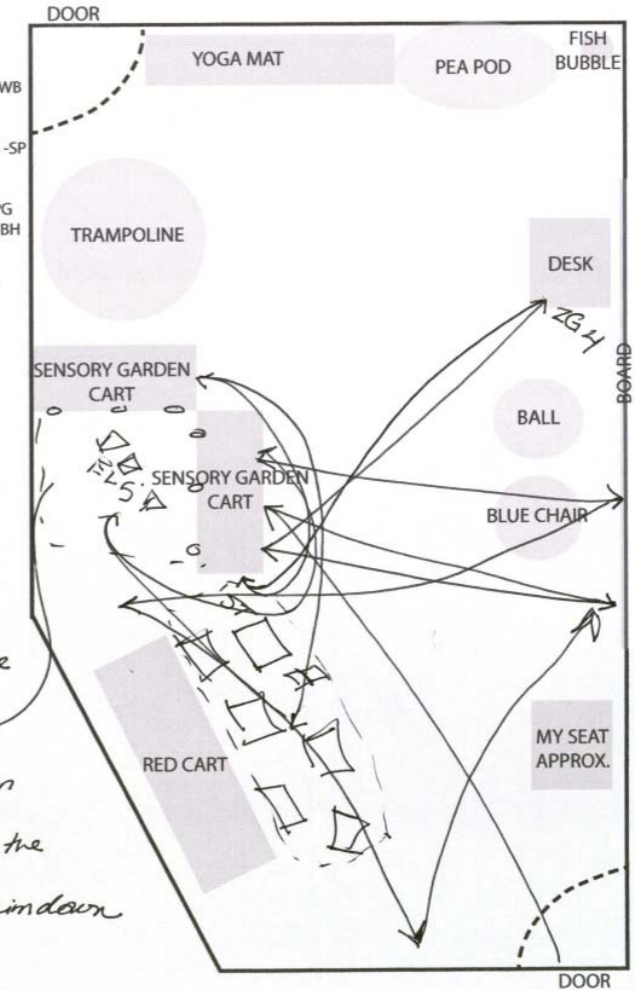


Figure 4.72 Second Observation with high activity

Number of Times a Child was Observed

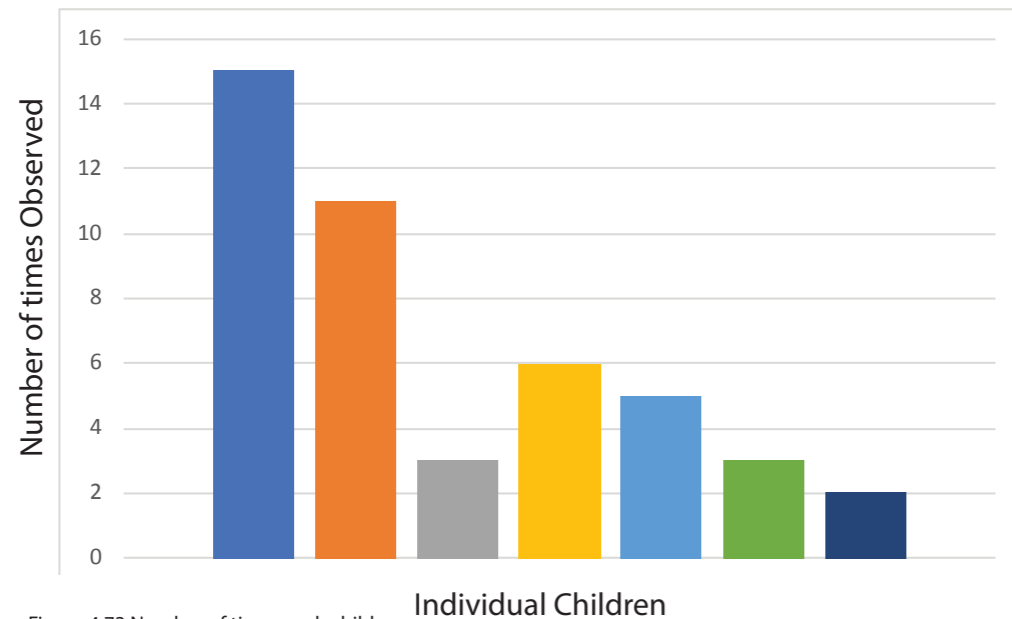


Figure 4.73 Number of times each child was observed during the second observation

Average Time Per Session in Sensory Room During the Second Observation

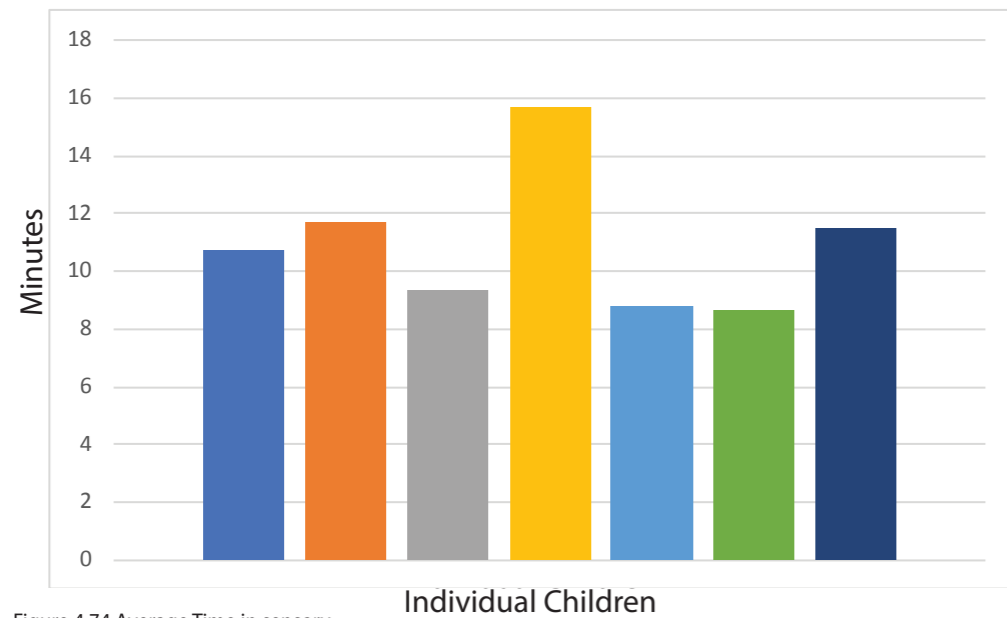


Figure 4.74 Average Time in sensory room during the second observation

Engagement Level and Times Used During Second Observation

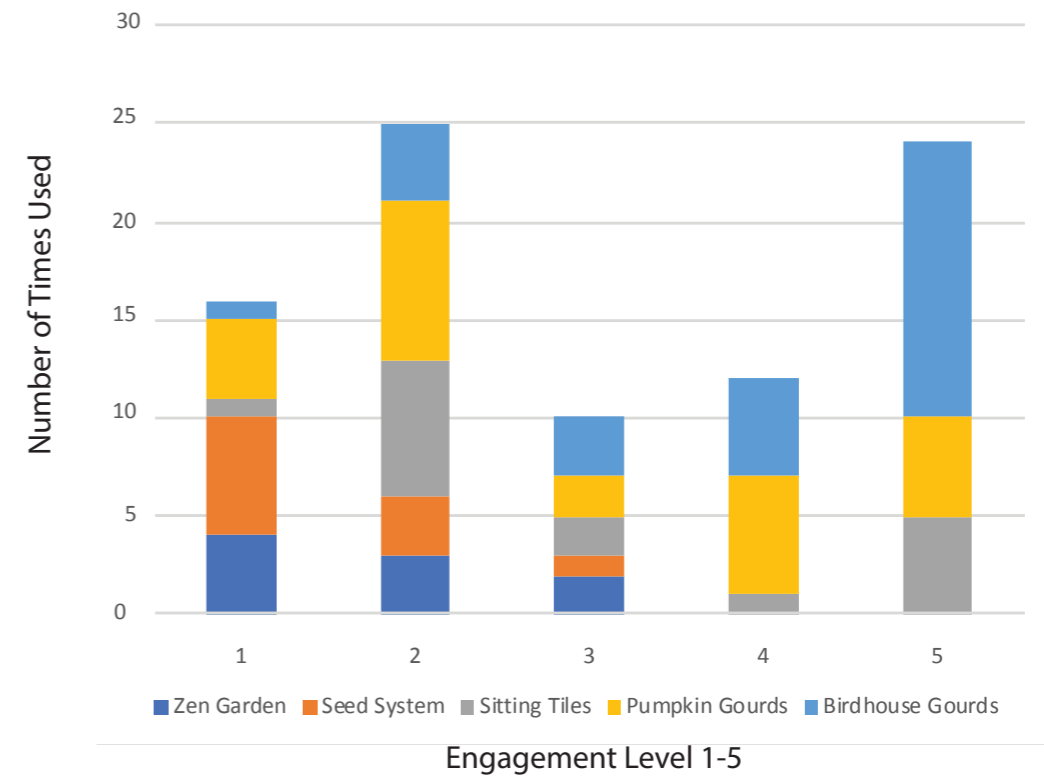
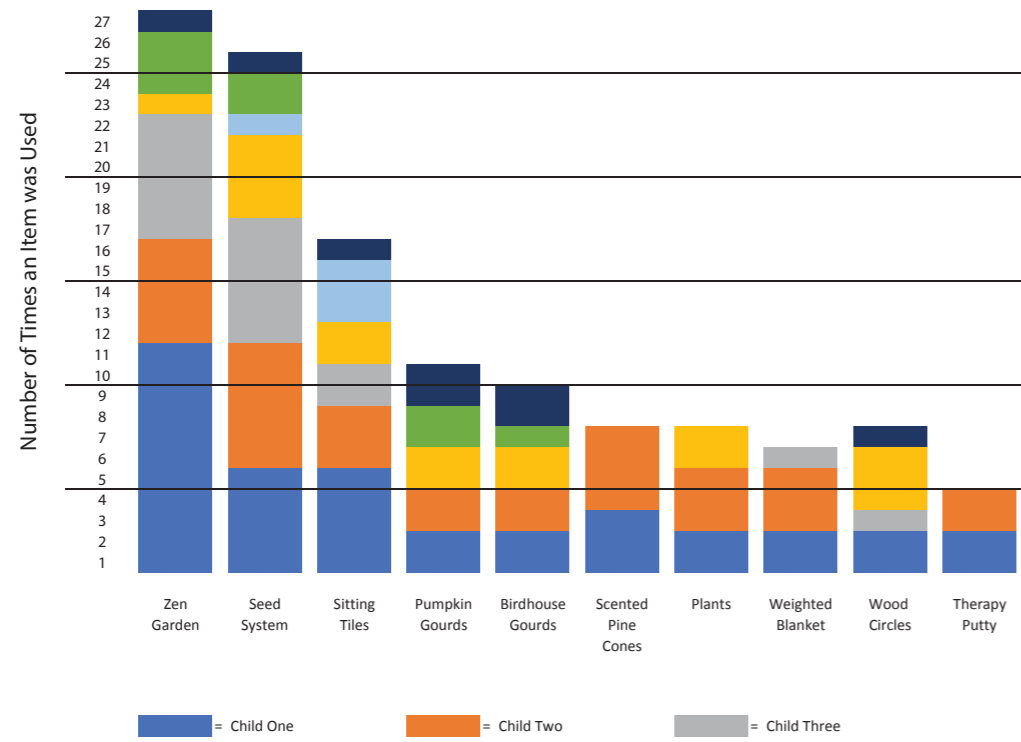


Figure 4.75 Engagement Level of the top five activities used and how many times they were observed

Items Used During the Second Observation



Items Used During the Second Observation

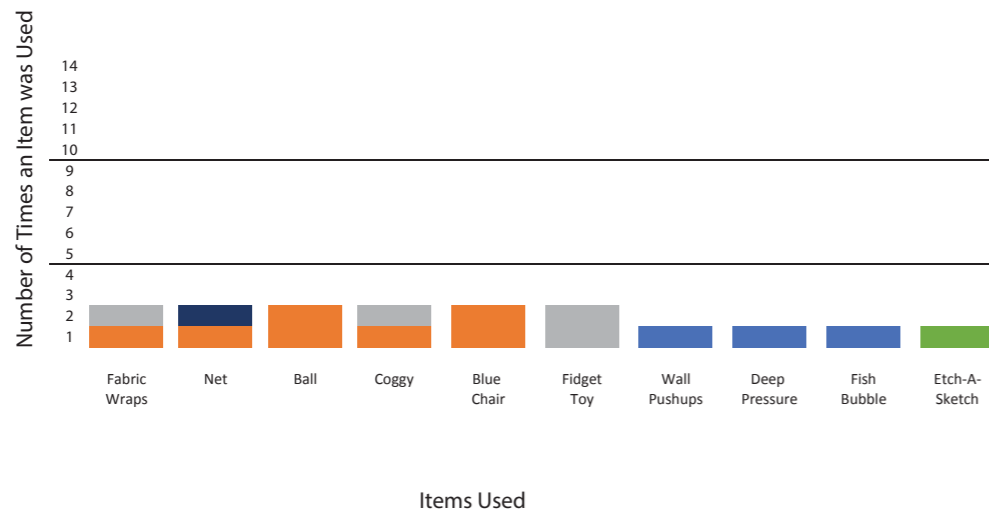
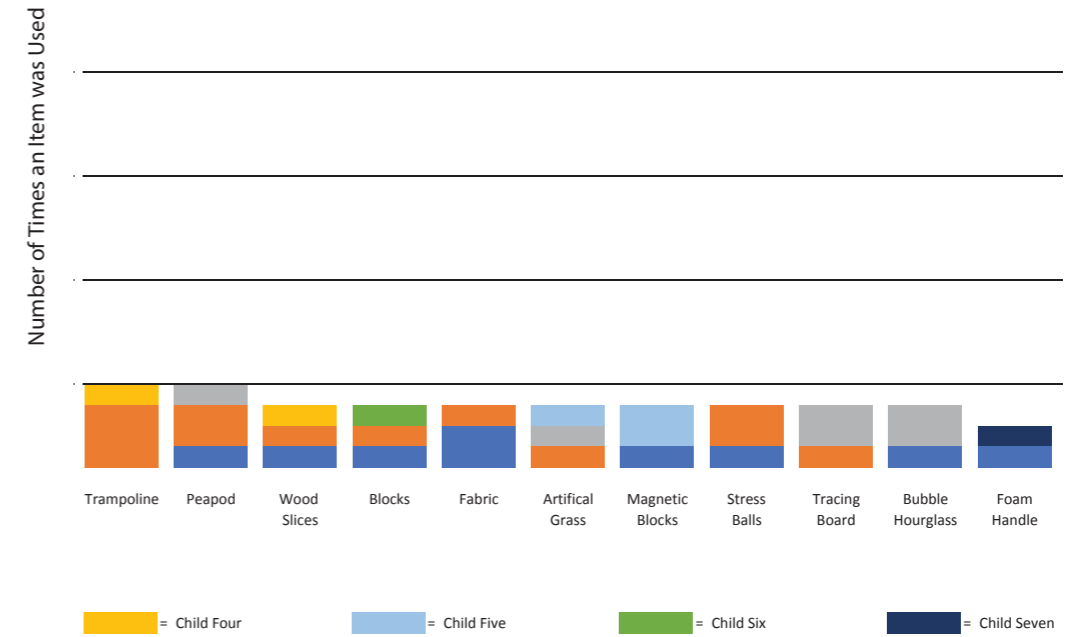


Figure 4.76 Items Used in Second Observation

CHAPTER 5: CONCLUSIONS

Introduction

Overall, during the time spent observing there have been many unique experiences and many productive insights in the sensory room. There were instances when children seemed to benefit from the sensory room and instances when the room did not seem to help them. This was true during the pre-cart observations, as well as with the sensory cart. Because there was a variety of activities for the children to use, some items seemed to work better for certain individuals.



Sensory Room

With the sensory room as a whole it is important to remember that the room is to help as many children with as many different types of sensory integration disorders as possible. While the school does not diagnose the children as having a sensory integration disorder, the occupational therapist makes notes in the Individual Education Plan (IEP) if they are displaying behavior that indicates that their sensory needs are not being met in a traditional classroom.

Each individual child has different needs and can have different needs during the same day. The para must judge how the child is acting and make a decision on what the child should use in the room. Sometimes the items help bring the child back down the correct level and sometimes it does not. When it does not it is important to note a few things. What did the child use in the sensory room? How long did they use it? Was it used correctly? And are there any better items in the sensory room for them to use to help with their sensory needs? Currently there is little to no documentation on how the children use the sensory room. The sensory room map could provide vital information on how the children use the room and what items work better for the individual children if used by school staff.

Sensory Garden Cart

The aim of providing a variety of items on the sensory garden cart was to see which ones the children gravitated to. Items that provided interaction were the ones with the highest level of engagement and used the most frequently. Items that did not provide interaction were still used but for less amount of time and less frequency. All of the items were used “correctly” or as expected, with the children’s own spin on the Zen Garden, and seed system such as adding different items to the Zen Garden and moving the bottles around on the Seed System to make different patterns. Items were added and taken away from the Zen Garden depending on the child who was using it. Some children removed all the tools and rocks and preferred to use only one; while others preferred to use all the tools and have all the rocks in the Zen Garden and use the scoop, originally intended for the seed system.

Benefits

The mobile sensory garden cart has many benefits but the main one is its mobility. It can be moved into a classroom, where students could access it. It can be moved to a separate room, an office, library, gym, and hallway. This is both beneficial for easy access but also storing the cart when the school is not in session. Plants can be removed and taken home if needed during winter break, or summer break. Another benefit for many schools who are just starting to use the



Figure 5.1 Lemon Balm die off after spring break.

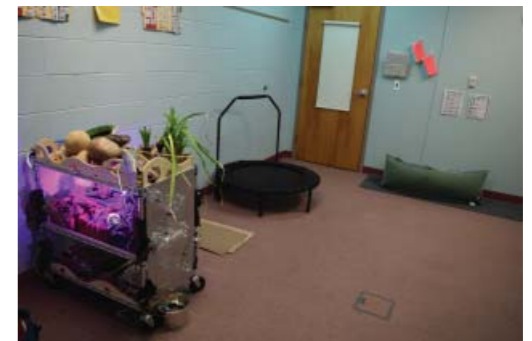


Figure 5.2 New sensory garden cart location.

idea of sensory breaks is that it is easier to have a cart than a whole room dedicated to sensory breaks. While often being separated, and having a quiet space is important for students receiving their sensory breaks that can be acquired by moving the cart to a room in the office that is vacant at the time the student needs it. Carts can also be designed with many different purposes and themes. Depending on the needs of the students the school could have several carts.

Another important benefit is that the school can make their own for relatively low cost. The most expensive item on the cart was the cart base itself, and many schools have similar carts already in the building. It would be easy for the school to adapt their budget to make the cart. They could add or exclude items depending on the school and the student’s needs. It is also easily changeable from year to year as needs change.

Overall the cart was a success, students were engaged with the mobile sensory garden cart during the observations.

Spring Break

During the week of spring break plants were alone in the building for ten days. Usually the plants are kept in a room with no natural light and depend on the plant lights during the day, and weekly watering to survive. On the Friday before spring break the cart was moved to the

library which is directly off the sensory room and placed in front of a south facing window, and given a good watering to hopefully get them through the next ten days.

Upon further inspection after spring break most of the plants handled it really well. Only the lemon balm showed any die off and it still had healthy leaves. (See Figure 5.1). The rest of the cart looked good. When they moved it back into the sensory room after spring break, they changed the position slightly which removed the electrical cords from being in the way. (See Figure 5.2).

Challenges

The primary limitations of this project include time, inability to talk to students, and receive feedback after the cart was installed. More time observing and talking with the students and their classroom teachers would have helped the findings. However, they do have children in the classroom that use the room and it is unclear with certain children how much the sensory room meets their needs and how much of it is a behavioral issue unrelated to sensory needs. Many of the paras stated that the room helped the children but sometimes their schedule did not allow them to observe the child back in the classroom.

Time is a limitation because a three-week observation period made it difficult to judge how much of the use of the sensory garden cart stemmed from the novelty factor and how much of it came from the benefits it provided. The cart caused a lot of commotion the first week as both the students and the paras used the cart for the first few times. For a better understanding the mobile sensory garden cart should be observed over several months and at the end of the school year, it would be important to note how many of the plants are still surviving.

The inability to interview and interact during the session limited feedback on how the sensory garden cart worked for them and things they like and did not like about the cart. Though interviews did not take place children verbally identified what they liked or loved about the cart and some expressed concern when they saw another child misusing one of their favorite items. No criticisms of the cart were heard during observation periods.

Formal feedback from the staff would also have been informative and beneficial, though informally, many expressed enthusiasm for objects on the cart and how they could observe the positive changes in the students after they used the mobile sensory garden cart.

Design Recommendations

With any design/build project there are aspects that could be changed. One of those would be to look into different ways the lights could be added into the cart. For this test the lights clipped on and could be removed if needed. They were easy to turn on and off and plugged directly into the wall. For some children, the lights were a big attraction and they wanted to play with the lights even when they were told not to. With everything on the cart, it was a case-by-case basis and children's uses changed from day to day. A different type of light that would be worth exploring would be one that attached directly to the underside of the top shelf and would shine directly on the plants.

Another change that would prove to be beneficial would be to replace the fabric wraps with more foam wraps like the handle. Children really enjoyed being able to squish and spin the foam around. The fabric wraps were also hard to make child proof, with large amounts of tugging and pulling the bark tended to fall off despite best efforts to secure the Velcro with sewing and gluing.

Depending on staff involvement, a watering system could be a beneficial additional design feature. During the study the plants were watered by hand by staff and students on Wednesdays and if staff noticed the plants drying out faster than they would add additional water throughout the week

as needed. There is also the concern during breaks like winter break, spring break and summer. For the shorter breaks a watering system could be installed so nothing was left to chance and during the summer it would be best for someone to come to the school at least once every seven days or take the plants home during this time. That was one of the main purposes for having the plants be removable from the sensory garden cart.

Landscape Architecture

Landscape architects design the outdoor environment, including sensory gardens. This project was recreating what a landscape architect would do outdoors with a sensory garden and adjusting it to create an indoor mobile sensory garden cart for children with sensory integration disorders. This project is valuable to landscape architecture because it given an opportunity to test and evaluate sensory items for indoor and outdoor sensory environments.

Future Research

Future research could include using only plants, or using only non-living items found in nature. This would provide definitive proof of the effects of plant life in the school setting. This would allow for sensory integration to be treated with only living or non-living aspects of the mobile sensory garden cart.

Another potential research perspective would be adding an interactive piece to the plants used on the mobile sensory garden cart. Interactive components proved to be the most engaged with during observation, and therefore would allow the children to have a higher level of engagement would theoretically allow for more interaction.

Additionally, it would be beneficial to see if the children's behaviors change if the cart is taken away for a period of time. Do they use the room like they did before the mobile sensory garden cart? Is the room of the same effectiveness? Do the children express the wish to have the cart back? What are the overall thoughts if the mobile sensory garden cart is removed from the room? It would be beneficial to see how they have depending on the cart to meet their needs and how they meet those needs when the room is gone.

Final Thoughts

Overall there was consensus that the mobile sensory garden cart helped the children. The mobile sensory garden cart did present its own set of unique set of problems. Similar to the sensory room before the mobile sensory garden cart, there were challenges with certain students. Some were not able to handle certain items for a variety of reasons including misuse of the items and behavioral issues. Despite some concerns the paras had with the original sensory room being translated to the sensory garden cart the cart was a success. The children showed high levels of engagement with the cart and continued to go back to it even in the third week.

References

- Adevi, Anna A. Adevi, Fredrika Mårtensson. 2013. "Stress Rehabilitation through Garden Therapy: The Garden as a Place for Recovery from Stress." *Urban Forestry & Urban Greening* 12 (2): 230–37. doi:10.1016/j.ufug.2013.01.007.
- Algozzine, Bob, and James E. Ysseldyke. 2006. *Teaching Students With Sensory Disabilities: A Practical Guide for Every Teacher*. 1 edition. Thousand Oaks, CA: Corwin.
- Al-Heizan, Mohammed O., Sami S. AlAbdulwahab, Shaji John Kachanathu, and Mohan Natho. 2015. "Sensory Processing Dysfunction among Saudi Children with and without Autism." *Journal of Physical Therapy Science* 27 (5): 1313–16. doi:10.1589/jpts.27.1313.
- Borgen, Liv, and Ane S. Guldahl. 2010. "Great-Granny's Garden: A Living Archive and a Sensory Garden." *Biodiversity and Conservation* 20 (2): 441–49. doi:10.1007/s10531-010-9931-9.
- Bruce, Hank. 2013. *Gardens for the Senses Gardening as Therapy, Revised and Expanded*. Edited by Tomi Jill Folk. 2 edition. Rio Rancho, NM: Create Space Independent Publishing Platform.
- Deans, Esther. 2001. *Esther Dean's "No Dig Gardening" / "Leaves of Life"*. Pymble, N.S.W.: HarperCollins Publishers.
- Emmons, Polly, and Liz Anderson. 2005. *Understanding Sensory Dysfunction: Learning, Development and Sensory Dysfunction in Autism Spectrum Disorders, ADHD, Learning Disabilities and Bipolar Disorder*. Jessica Kingsley Publishers.
- Etherington, Natasha. 2012. *Gardening for Children With Autism Spectrum Disorders and Special Educational Needs: Engaging With Nature to Combat Anxiety, Promote Sensory Integration and Build Social Skills*. 1 edition. London ; Philadelphia, PA: Jessica Kingsley Pub.
- Hirota, Jozan. 1970. *Bonkei: Tray Landscapes*. 1st edition. Tokyo, Palo Alto, Calif: Kodansha America, Inc.
- Hussein, Hazreena. 2010. "Using the Sensory Garden as a Tool to Enhance the Educational Development and Social Interaction of Children with Special Needs." *Support for Learning* 25 (1): 25–31. doi:10.1111/j.1467-9604.2009.01435.x.
- . 2012. "The Influence of Sensory Gardens on the Behaviour of Children with Special Educational Needs." *Procedia - Social and Behavioral Sciences*, ASIA Pacific International Conference on Environment-Behaviour Studies (AicE-Bs), Grand Margherita Hotel, 7-9 December 2010, Kuching, Sarawak, Malaysia, 38: 343–54. doi:10.1016/j.sbspro.2012.03.356.
- Isbell, Christy, Betty Exelby, Gary Exelby, and Rebecca Isbell. 2001. *Early Learning Environments That Work*. 1 edition. Beltsville, MD: Gryphon House.
- Isbell, Christy, and Rebecca Isbell. 2007. *Sensory Integration: A Guide for Preschool Teachers*. 1 edition. Beltsville, MD: Gryphon House.
- Kirra, Krisch. 2014. "Attention Restoration Theory & Nature: Let's Solve Problems..." June 10. <https://positivepsychologyprogram.com/attention-restoration-theory-nature-lets-solve-problems/>.
- LancUK. 2016. "Sensory Integration Disorder." *Lanc UK*. Accessed November 7. <http://www.lanc.org.uk/related-conditions/sensory-integration-disorder-adhd-asd/>.
- Longhorn, F. 1988. *A sensory curriculum for very special people : a practical approach to curriculum planning*. London : Souvenir Press (Educational & Academic). Retrieved from <http://trove.nla.gov.au/version/45265135>
- Marcus, Clare Cooper, and Naomi A. Sachs. 2013. *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces*. 1 edition. Hoboken, New Jersey: Wiley.
- Souter-Brown, Gayle. 2014. *Landscape and Urban Design for Health and Well-Being: Using Healing, Sensory and Therapeutic Gardens*. 1 edition. Abingdon, Oxon: Routledge.
- STAR Institute for Sensory Processing Disorder. 2016. "About SPD | STAR Institute." Accessed November 7. <https://www.spdstar.org/basic/about-spd>.
- Taylor, Andrea Faber, Frances E. Kuo, and William C. Sullivan. 2001. "Coping with Add The Surprising Connection to Green Play Settings." *Environment and Behavior* 33 (1): 54–77. doi:10.1177/00139160121972864.
- Taylor, Andrea Faber, Angela Wiley, Frances E. Kuo, and William C. Sullivan. 1998. "Growing Up in the Inner City Green Spaces as Places to Grow." *Environment and Behavior* 30 (1): 3–27. doi:10.1177/0013916598301001.

APPENDIX A: GLOSSARY



All definitions collected from *Sensory Integration A Guide for Preschool Teacher* by Christy Isbell and Rebecca Isbell (Only terms used in final report will be used in Glossary)

Attention Deficit Hyperactivity Disorder (ADHD) – A condition usually seen in children that is characterized by inattention, hyperactivity, and impulsiveness.

Child Psychiatrist (M.D.) – A medical doctor who has completed two to three years of an adult psychiatric residency and two additional years of a child psychiatry fellowship.

Deep Pressure – A firm tactile stimulus that causes receptor in the skin to respond (Example: A Hug or pat) Another term for firm touch.

Fidget toy – A small object or toy for a child to manipulate in his hands so as to decrease whole body movements. A fidget toy may assist the child in maintaining attention.

Fine motor – Movement of the small muscles in the fingers (for example, string of beads, drawing, writing, or cutting with scissors). Another term for small motor.

Gross Motor – Movement of the large muscles in the arms, legs, and back (for

example walking, running and jumping). Another term for large motor.

Individuals with Disabilities Education Act (IDEA) – A United States Federal law, most recently amended in 2004, which is meant to ensure “a free appropriate public education” for students with disabilities, designed to their individualized needs in the least restrictive environment. The Act requires that public schools provide necessary learning aids, testing modifications, and other educational accommodations to children with disabilities. The act also established due process in providing accommodations. Children, whose learning is hampered by disabilities not interfering with his/her ability to function in a general classroom, may qualify for similar accommodations under section 504 of the Rehabilitation Act of 1973 or the Americans with Disabilities Act (ADA).

Kinesthetic – Use of the body to gain control and learn about physical capabilities, develop body awareness, and gain understanding of the world. It is another way of knowing and feeling.

Occupational therapist (OT) – See Pediatric occupational therapist.

Open-Ended – An Activity that allows for many different responses to a problem; divergent thinking is needed.

Sensory Avoider – The child is over-sensitive to certain sensory inputs: visual, auditory, tactile, vestibular (movement and balance), and/or proprioception (body position). The child demonstrates behaviors that help him avoid experiencing these sensations.

Sensory Discrimination Disorder (SDD) – Experiencing difficulty in telling the difference between and among sensory stimulation.

Sensory Integration (SI) – The brain's process of taking in and effectively responding to information from all sensory inputs: vision, hearing (auditory), touch (tactile), taste (gustatory), smell (olfactory), movement (vestibular), and body awareness (proprioception).

Sensory Integration Dysfunction (SI Dysfunction) – Another term for Sensory Processing Disorder (SPD).

Sensory Integration Theory – A concept explaining the relationship between the brain and behavior.

Sensory Modulation Disorder (SMD) – An inability to sort out and control appropriate strength and type of response to sensory input.

Sensory Processing – See Sensory Integration

Sensory Processing Disorder (SPD) – Problems in the way the brain takes in and responds to information from all sensory inputs: visual, auditory, tactile, vestibular (movement and balance), and/or olfactory (smell), so that the child is unable to interact effectively in everyday life.

Sensory Seeker – The child is under-sensitive to certain sensory inputs: visual, auditory, tactile, proprioception and/or vestibular. The child seems to crave or seek out these types of sensations.

Sensory Under-Responder – The child does not respond enough to certain sensory inputs (visual, auditory, tactile, vestibular, and/or proprioception) or does not react as quickly as necessary to those sensory inputs. The child may need sensory inputs that are stronger or last longer before he or she will respond.

Sensory-Based Motor Disorder (SBMD) – A problem with movement that is due to inefficient sensory processing.

Sensory smart – activities that provide appropriate sensory inputs.

Vestibule (movement and balance) Sense – The sensory system responding to the pull of gravity and providing information about the head's position in relation to the earth's surface.

This sense coordinates movement of the eyes, head, and body which impacts balance, vision, hearing, and emotional security.

APPENDIX B: RESEARCH DEVICES

Forms Used for Frist Observation Period

Sensory Room — Williams Science & Fine Arts Elementary Magnet

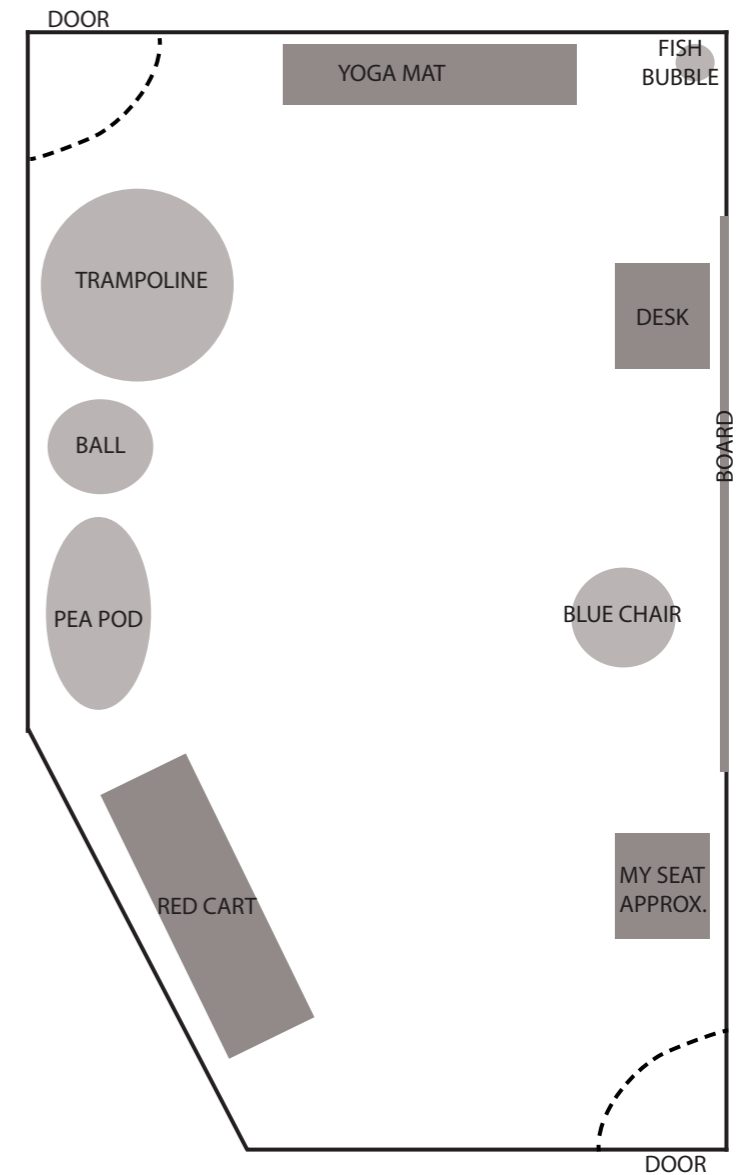
School, Topeka, KS

Child's Identification Number/Letter (depending on phase) _____

Date _____ Time Start _____ Time End _____

- ITEMS IN RED CART
Therapy Putty -TP
Squishy Ball - SB
Sock-SK
Fidget Toys - FT
Star Master -SM
Coggy- CG
Mini Sport Balls -MS
Magnetic Blocks -MB
Balance Block -BB
Etch-A-Sketch -ES
Bubble Hour Glass- BH
Charts -CH

Notes:



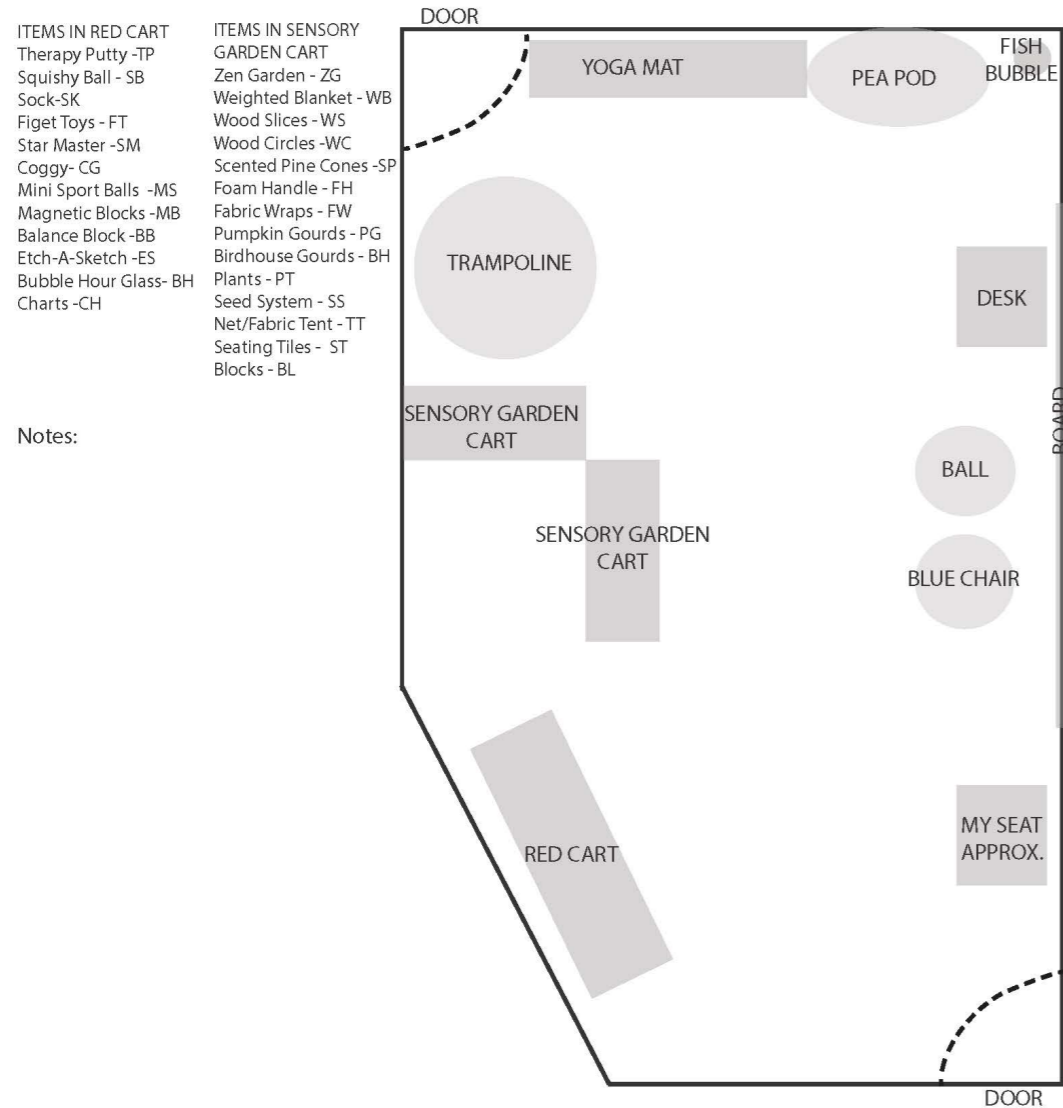
Forms Used for Second Observation Period

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) _____

Date _____ Time Start _____ Time End _____



Questionnaire Form

Interview with Williams Science & Fine Arts Elementary Magnet

School Principal

Date: _____

Principal: _____

How many students use the sensory room school-wide?

How many times a day is the sensory room utilized by children with Sensory Integration Disorder?

How many children are allowed in the sensory room at once?

What are the most common behavioral issues associated with Sensory Integration Disorders do you see here at the school?

Is there anything else I should know about the sensory room or the children who use it?

Interview with Williams Science & Fine Arts Elementary Magnet

School Faculty

Date: _____

Interviewee _____

At what times in the day is the sensory room used the most?

How is the child selected to use the sensory room?

Who brings the child to the sensory room?

What behavioral changes have you seen after a child uses the sensory room?

What benefits have you seen with the sensory room?

Are there any negative aspects to the current sensory room?

What would you like to see with the mobile sensory garden cart?

What are the most common types of Sensory Integration Disorders do you see at this school?

How is a child with Sensory Integration Disorders identified at Williams Elementary School?

Is there anything else I should know about the sensory room or the children who use it?

APPENDIX C: CONSENT FORMS

Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

Your child has the opportunity to influence the design of the new mobile sensory garden cart at Williams Science & Fine Arts Elementary Magnet School. To learn more about this activity keep reading.

The mobile sensory garden cart is something I am researching as part of my Master's project in the department of Landscape Architecture/Regional & Community Planning at Kansas State University. My aim is to design and build a sensory cart that could be used in the classroom and sensory room as an alternative to using a outdoor sensory garden.

I will be observing the current sensory room at Williams Science & Fine Arts Elementary Magnet School to help me understand how the children use the room, which will contribute to the design and development of my mobile sensory cart. When observing the room, I will be looking at are how long your child spends in the sensory room, his or her activities, what they play with, for how long and their level of engagement. I will be recording this data through handwritten notes and marking the location of the activities on a map of the room. The purpose of this research is to better develop my mobile sensory garden to help students with sensory needs. The length of the study will be three weeks, observation will happen on two days each week for a total of six days.

To protect your child's privacy, your child's name not appear in my final research and no photographs will be taken. Participation in this research is strictly voluntary and you can withdrawal at any time. Your child's participation will be represented as part of this project with no identifying information.

There are no known risks for in participating in this research. However there is a potential benefit; a new mobile sensory garden cart for the sensory room.

For any further questions, please feel free to contact me, Morgan Taylor at mktaylor@ksu.edu and 785-845-8847 or Anne Beamish at abeamish@ksu.edu and 785-532-3852 or K-State's Institutional Review Board (IRB) at 785-532-3224 and comply@ksu.edu, IRB Chair Rick Scheidt at 785-532-1483 and rscheidt@ksu.edu, or University Research Compliance Office or 2013 Fairchild Hall, Kansas State University, Manhattan, KS 66506 (URCO) administrator Cheryl Doerr at cdoerr@ksu.edu or 785-532-3224 or 203 Fairchild Hall, Kansas State University, Manhattan, KS, 66506.

I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to **have my child** participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form. The original form will be scanned and given to you.

By signing below, I _____ give permission for my child,

_____ to participate in the described mobile sensory cart research. By giving permission I acknowledge that parts of the observation of my child may be may be used in the final research of my Master's Project.

Signature of Parent _____ Date: _____

Please return this form to your child's classroom teacher. A copy of the final report will be available from School Principal Kyrstin Bervert for you to view

Informed Consent:

Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

Your child has the opportunity to experience the new mobile sensory cart at Williams Science & Fine Arts Elementary Magnet School. To learn more about this activity keep reading.

The mobile sensory cart is something I have designed as part of my Master’s project in the department of Landscape Architecture/Regional & Community Planning at Kansas State University. I am doing research on how well the mobile sensory cart was designed. Your child’s participation will contribute to the completion of my Master’s report. The cart will be located in the school’s sensory room. I will observe how your child interacts with the mobile sensory garden cart including, how long they spend with it. This will be used to help me create an indoor sensory garden cart that meets the needs of children with sensory integration disorders. The length of the study will be three weeks, observation will happen on two days each week for a total of six days.

How your child uses the mobile sensory garden including, how long they spend with a given activity, what do they like and what they would improve the mobile sensory garden will be used to help me create an indoor sensory garden cart best fitting the need of children with sensory integration disorders.

For confidentiality purposes, your child’s name or photo will not be recorded or appear in my final research documentation. Participation in this project is strictly voluntary. You can withdraw your child at any time for this research. Your child’s feedback will be represented as part of this project with no identifying information.

There are no known risks for in participating in this research. However there is a potential benefit-a new mobile sensory garden cart for the sensory room.

For any further questions, please feel free to contact me, Morgan Taylor at mktaylor@ksu.edu and 785-845-8847 or Anne Beamish at abeamish@ksu.edu and 785-532-3852 or K-State’s Institutional Review Board (IRB) at 785-532-3224 and comply@ksu.edu, IRB Chair Rick Scheidt at 785-532-1483 and rscheidt@ksu.edu, or University Research Compliance Office or 2013 Fairchild Hall, Kansas State University, Manhattan, KS 66506 (URCO) administrator Cheryl Doerr at cdoerr@ksu.edu or 785-532-3224 or 203 Fairchild Hall, Kansas State University, Manhattan, KS, 66506.

I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to **have my child** participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form. The original form will be scanned and given to you.

By signing below, I _____ give permission for my child,

_____ to participate in the described mobile sensory cart research. By giving permission I acknowledge that parts of the observation of my child may be may be used in the final research of my Master’s Project.

Signature of Parent _____ Date: _____

Please return this form to your child’s classroom teacher. A copy of the final report will be available from School Principal Kyrstin Bervert for you to view.



Informed Consent:

Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

You have the opportunity to influence the design of the new 9obile sensory garden cart at Williams Science & Fine Arts Elementary Magnet School. To learn more about this activity keep reading.

The mobile sensory garden cart is something I am researching as part of my Master’s project in the department of Landscape Architecture/Regional & Community Planning at Kansas State University. My aim is to design and build a sensory cart that could be used in the classroom and sensory room as an alternative to using a outdoor sensory garden.

I will be asking a series of questions related to the current sensory room in order to gain a better understanding of its current use. Your answers will be written down for potential use in my Masters report.

To protect your privacy, your name will not appear in my final research and no photographs will be taken. Participation in this research is strictly voluntary and you can withdrawal at any time. Your participation will be represented as part of this project with no identifying information.

There are no known risks for in participating in this research. Howeverw there is a potential benefit; a new mobile sensory garden cart for the sensory room.

For any further questions, please feel free to contact me, Morgan Taylor at mktaylor@ksu.edu and 785-845-8847 or Anne Beamish at abeamish@ksu.edu and 785-532-3852 or K-State’s Institutional Review Board (IRB) at 785-532-3224 and comply@ksu.edu, IRB Chair Rick Scheidt at 785-532-1483 and rscheidt@ksu.edu, or University Research Compliance Office or 2013 Fairchild Hall, Kansas State University, Manhattan, KS 66506 (URCO) administrator Cheryl Doerr at cdoerr@ksu.edu or 785-532-3224 or 203 Fairchild Hall, Kansas State University, Manhattan, KS, 66506.

I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form. The original form will be scanned and returned to you.

By signing below, I _____ give permission to participate in the described mobile sensory cart research. By giving permission I acknowledge that parts of the interview may be may be used in the final research of my Master’s Project.

Signature _____ Date: _____

Please return this form to Morgan Taylor. A copy of the final report will be available from School Principal Kyrstin Bervert for you to view.



APPENDIX D: 501 APPLICATION

Application to Conduct Research in Topeka Public Schools

Complete this form and email it to Rose Brunkow (rbrunkow@tps501.org) or mail a paper copy to:

Topeka Public Schools
Office of Assessment & Evaluation
624 SW 24th Street, Topeka, KS 66611
(785) 295-3084

Name of individual proposing study: Morgan Taylor
Professional title: Graduate Student at Kansas State University in Landscape Architecture
Home address (street, city, state, zip): 1005 Bluemont Ave, Manhattan, KS, 66502
Contact number(s): 785-845-8847
Email address: mktaylor@ksu.edu

Institution, organization or agency with which individual is associated:

Name of institution: Kansas State University
Address (street, city, state, zip): Manhattan, Kansas, 66506
Reason for study : <input type="checkbox"/> College or university course requirement <input type="checkbox"/> Doctoral Degree <input checked="" type="checkbox"/> Master's Degree <input type="checkbox"/> Other (explain below)

*If study is being conducted for course requirement for a degree, please provide the name of the course instructor, major advisor or committee chairperson and secure his/her signature for approval and support below.

Instructor, major advisor or committee chairperson: Anne Beamish
Full title: Assistant Professor, Department of Landscape Architecture
College/University: Kansas State University Contact number: 785-532-3852
Address (street, city, state, zip): 318 Seaton Hall, KSU, Manhattan, Kansas, 66506

I have reviewed the proposed research study and consider the project to be educationally worthwhile and the research technique to be satisfactory. I also agree to provide assurance that the submitter will comply with the established regulations and procedures for conducting research studies in Unified School District No. 501.

Anne Beamish October 26, 2016

Signature of Instructor, advisor, or committee chairperson

Application to Conduct Research in Topeka Public Schools

Title of study: Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

Statement of hypothesis and/or objective(s) of study: That access to nature, specifically a sensory garden will help reduce the effects of Sensory Integration Disorders.

Procedure: The researcher will be conducting qualitative research regarding a mobile sensory garden integrated into elementary schools. The researcher will conduct observation on the current sensory room in Williams Elementary School in Topeka, Kansas. Additionally the researcher will interview the staff of Williams Elementary School, discussing the sensory room, how it is used, how many students use the sensory room, when is it used the most and the faculty desires for the sensory room in the future. Once the observation has been analyzed the researcher will begin the design build of the mobile sensory garden. After the mobile sensory garden has been designed and built the researcher will bring it to the elementary school and place it in the sensory room. During the second phase how children interact with the sensory room/mobile sensory cart will be observed.

Starting date: December 1st

Period required December to March

Will students be used as subject? Yes No

If YES, tell the grade level(s) and number of students needed.

Students in grades K-5 at Williams Science & Fine Arts Elementary Magnet School, the number of students needed will depend on how many children use the current sensory room. I would like to use between 50-80% of students.

Required student characteristics: Students must currently be using the sensory room; and must have a form of sensory integration disorder.

Is a specific school or geographic area required? Yes No

If YES, explain I have established previous contact with Williams Science & Fine Arts Elementary Magnet School and they have agreed to work with me.

Will USD 501 personnel be required to assist in the study? Yes No

If YES, in what capacity? (interview, on-line survey, etc)

I will interview personnel regarding the sensory room.

Will school records be required? No school records will be required.

If YES, in to what extent?

How will students and/or staff of Topeka Public Schools benefit from participation in this study?

The students and staff of William's Elementary School will benefit from this study by gaining a new tool for their sensory room, a mobile sensory garden.

Application to Conduct Research in Topeka Public Schools

Provide a critical date by which you need approval to proceed: December 1st

NOTE: A COMPLETE COPY OF TESTS, QUESTIONNAIRES, RATING SCALES, OR OTHER DATA-GATHERING INSTRUMENTS YOU PLAN TO USE MUST ACCOMPANY THIS APPLICATION.

I agree to comply with the established regulations and procedures for conducting research studies in Unified School District No. 501 and to submit a complete copy of the final report of this study to the chairperson of the Research Committee of Unified School District No. 501 no later than six (6) months from the date the study is completed.

Date: 10-28-2016

Signature: Morgan Taylor



TOPEKA PUBLIC SCHOOLS

Ms. Kyrstin Bervert
Principal
Williams Science and Fine Arts Magnet School

To whom this may concern,

I have been in contact with Morgan Taylor, student at Kansas State University regarding the research that she would like to collect around the area of establishing a Mobile Sensory Garden Cart.

I fully support the research that Miss Taylor will be collecting, and I look forward to working with her so that Williams Science and Fine Arts Magnet School can better meet the needs of our students needing sensory input.

Kyrstin Bervert, Principal

Burnett Administrative Center, Pod B 624 SW|| 24th St Topeka, KS 66611-1294

Topeka Public Schools

Office of Assessment & Evaluation

November 24, 2016

Morgan Taylor
1005 Bluemont Ave
Manhattan, KS, 66502

Dear Ms. Morgan Taylor,

Your study, "Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools", was approved. Your Topeka Public School supervisor will be Kyrstin Bervert, Principal of Williams Magnet.

Approval by the district research Committee means the researcher now has permission to approach the building level staff about participation in the study to secure their agreement to participate. The applicant should first contact the study liaison/supervisor and then the building principal. In some cases, the study liaison/supervisor may need to assist the researcher in identifying schools to approach about participation in the study. Building staff, unless otherwise noted, have the right to pass on participation and may negotiate the manner in which the study is implemented. If there are questions about this, please contact the Supervisor/liaison appointed by the research committee. District policy requires the researcher to provide the district with a report of the research findings within six months of completion of the study.

If you have any future research projects involving Topeka Public Schools we can be reached at (785) 295-3055 for an updated research application.

Sincerely,
Aaron Kipp
Research Committee, Chairperson

APPENDIX E: IRB APPLICATION

FOR OFFICE USE ONLY: IRB Protocol # _____ Application Received: _____ Routed: _____ Training Complete: _____



Committee for Research Involving Human Subjects (IRB) Application for Approval Form

Please send your completed application to comply@k-state.edu

INSTRUCTIONS

Be sure to save the application PDF to your computer before you begin completing the form. You may not be able to save your changes if you edit this form in a web browser.

The KSU IRB is required by law to ensure that all research involving human subjects is adequately reviewed for specific information and is approved prior to inception of any proposed activity. Consequently, it is important that you answer all questions accurately. If you need help or have questions about how to complete this application, please call the Research Compliance Office at 532-3224, or e-mail us at comply@ksu.edu.

Please provide the requested information in the outlined text boxes. The text boxes are designed to accommodate responses within the body of the application. As you type your answers, the text boxes will expand where appropriate and as needed. After completion send your application by e-mail to comply@k-state.edu.

You may sign this form using a digital signature. **DO NOT** sign the form until it has been completed. You cannot edit the form entries once the form has been digitally signed. If you are making revisions to a previously signed form, right-click the digital signature and select Clear to remove the signature (this can only be done by the person who originally digitally signed the form).

Forms that have not been signed will not be accepted.

Additional material is requested with this application. Be sure to provide electronic copies of the following documents (if applicable) and submit them to comply@k-state.edu along with your application:

- Consent Form (see *Administrative Information, IX. Informed Consent A.*)
- Sponsor's grant application or contract as submitted to the funding agency. (See *Administrative Information*)
- Surveys, instruments, etc used for data collection (see *V. Design and Procedures C.* and *X. Project Information P.*)
- Debriefing statement to be utilized (see *IX. Informed Consent E.*)

FAILURE TO PROVIDE ALL INFORMATION REQUESTED MAY LEAD
TO A DELAY IN PROCESSING YOUR REQUEST.

**Please proof read and check spelling BEFORE submitting the form.
To use Acrobat spelling check, press F7 or select EDIT, CHECK SPELLING**

**PLEASE CONTINUE TO THE NEXT PAGE
TO BEGIN COMPLETING THE FORM**

Last Revised: 08/02/2016

ADMINISTRATIVE INFORMATION:

Title of Project/Course:

Type of Application: New / Renewal Revision (to a pending new application)
 (check one box) Modification to an existing approved application #:

Principal Investigator Details: (must be a KSU faculty member):

Name: Degree/Title:

Department: Campus Phone:

Campus Address:

E-mail: Fax #:

Responsible Graduate Student: (Person to contact for questions/problems with the form):

Name: Campus Phone:

E-mail:

Does this project involve any collaborators not part of the faculty/staff at KSU? (projects with non-KSU collaborators may require additional coordination and approvals):

No Yes

Project Classification (Is this project part of one of the following?):

Thesis Dissertation Faculty Research

Other:

Note: Class Projects should use the short form application for class projects.

Copy of the Consent Form: Copy will be submitted to comply@ksu.edu with this application Consent form not used

Funding Source: Internal External (Identify source. You will also need to provide a copy of the sponsor's grant application or contract as submitted to the funding agency. This should be submitted to comply@ksu.edu with your application.)

Based upon criteria found in 45 CFR 46 – and the overview of projects that may qualify for exemption explained at <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html>, I believe that my project using human subjects should be determined by the IRB to be exempt from IRB review:

No Yes (If yes, please provide the category of "Exemption" in the space below)

Exempt Projects: 45 CFR 46 identifies six categories of research involving human subjects that may be exempt from IRB review. The categories for exemption are listed here: <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html#c2>. If you believe that your project qualifies for exemption, please indicate which exemption category applies (1-6). Please remember that only the IRB can make the final determination whether a project is exempt from IRB review, or not.

Exemption Category:

MODIFICATION:

Is this a modification of an approved protocol? No Yes If yes, please comply with the following: If you are requesting a modification or a change to an IRB approved protocol, please provide a concise description of all of the changes that you are proposing in the following block. Additionally, please highlight or bold the proposed changes in the body of the protocol where appropriate, so that it is clearly discernible to the IRB reviewers what and where the proposed changes are. This will greatly help the committee and facilitate the review.

I. NON-TECHNICAL SYNOPSIS (Please provide a brief narrative description of proposal. This should typically be less than 75 words and be easily understood by nonscientists):

I intend to collect data on how Williams Science & Fine Arts Elementary Magnet School is currently using sensory rooms to address sensory deprivation disorders and along with any current gardens associated with their school. I will design and build a mobile sensory garden to better connect the students to nature.

II. BACKGROUND (concise narrative review of the literature and basis for the study):

A type of disorder is Sensory Integration (SI) which can cause problems in the classroom. Behaviors associated with sensory integration include covering ears during normal classroom activities; rolling over on the floor; refusing to touch playdough, sand or paint; climbing on objects and jumping off; falling down; often; and refusing to play on playground equipment (Isbell & Isbell, 2007). Senses start developing in the womb and continue to develop as the child grows (Isbell & Isbell, 2007). "Sensory integration is the neurological process of organizing sensory inputs for function in daily life." (Isbell & Isbell, 2007 page 12). Children are taught early about the five senses of sight, touch, taste, hearing and smell. Our sense of balance and movement (called vestibular sense) is often left out.

Another type of sensory disorder is Sensory Processing Disorder (SPD). SPD is "the difficulty in using the information that is collected through the senses in daily life" (Isbell & Isbell, 2007). The brain cannot process the senses correctly and the individual has difficulty functioning (Isbell & Isbell, 2007). Sensory Processing Disorder includes Sensory Modulation Disorder (SMD), Sensory Discrimination Disorder (SDD), and Sensory-Based Motor Disorder (SBMD) (Isbell & Isbell, 2007). Teachers and parents usually can easily recognize these disorders once the child starts showing developmental disabilities, including difficulty with social-emotional skills, gross motor skills, fine motor skills, play skills and self-help skills. Low self-esteem is also common in children with Sensory Processing Disorders (Isbell & Isbell, 2007). Children with these types of sensory disorders can be either under stimulated or over stimulated by their environment, which can cause them to exhibit negative behaviors such as including being unresponsive or angry (Isbell & Isbell, 2007).

SPD can affect the child's ability to learn, because they will process and understand information differently than a child without a sensory processing disorder (Isbell & Isbell, 2007). Problems with the child can include coordination problems; poor attention span or difficulty focusing on tasks; academic related problems including poor handwriting and difficulty cutting with scissors; problems with self-care skills, such as tying shoes and zipping; low self-esteem; over-sensitivity to touch or sounds, and unusually high or low activity levels (Isbell, Isbell, 2007).

Additional sensory processing disorders include Sensory Dysfunction and Sensory Processing Dysfunction, which occurs when the part of the brain where sensory integration happens, does not function appropriately (Emmons, Anderson 2005). Some signs of sensory dysfunction include overly sensitive to touch, movements, sights, or sounds, difficulties with coordination or academic achievement, delays in speech or motor skills or activity levels unusually high or low (Emmons, Anderson 2005). These disorders are primarily seen in children with special needs including autism, ADHD, learning disabilities and bipolar disorder. Sensory dysfunction can impair the learning capabilities of the child if not handled effectively (Emmons, Anderson 2005).

There are many different methods in reducing the effects of sensory disorders. One of these methods is including Sensory-Smart Equipment, which is equipment that can help children with Sensory Integration Disorder. Including soft balls of all sizes, plastic containers or trash cans for collection and storage of

equipment, tire swing, riding toys, climbing structures, wagons, hula hoops and sandboxes (Isbell & Isbell, 2007). Actively involved adults can help the child feel safe in participating, and allows the child to feel more at ease while playing (Isbell & Isbell, 2007). Fostering collaboration, supporting accommodations and understanding the characteristics of sensory disabilities will help the children overcome the sensory disorders (Algozzine, Ysseldyke, 2006).

Exposure to sensory gardens can help with many of the behavioral issues associated with sensory disorders (Hussein 2010). Studies from the 1970s & 1980s show positive findings when sensory curriculum was placed into the classrooms for children with special needs. This is also true with outdoor learning environments (Hussein 2010). Overall sensory gardens have been shown to help a variety of individuals suffering from a variety of problems. Sensory gardens have shown to improve a variety of aspects in life for the sick, elderly, children and special needs individuals. When designing a sensory garden, the designer focuses primarily on human interactions with the space. As the individual walks through the garden all of the senses can be engaged several times throughout the experience in multiple ways (Hussein 2012); it could include changing the type of surface the individual walks on, perhaps gravel and then stone (Hussein 2012). Every garden is sensory, people want to touch and smell, they want to interact with the garden (Bruce, 2012). Hussein also looked into what sensory elements were most interacted with. Hussein found that easier to access pathways and components that linked parts of the garden were more utilized by the children (Hussein 2012). Another connection Hussein made in the study was that teachers found outside aggressive behavior decreased along with bullying (Hussein 2012). Sensory gardens allow children to remain active and have their needs met.

III. PROJECT/STUDY DESCRIPTION

(Please provide a concise narrative description of the proposed activity in terms that will allow the IRB or other interested parties to clearly understand what it is that you propose to do that involves human subjects. This description must be in enough detail so that IRB members can make an informed decision about the proposal).

I intend to observe children in Williams Science & Fine Arts Elementary Magnet School, specifically children who are using the schools current sensory rooms/gardens and other areas as part of a pull out program. A pull out program is a program where students are pulled out of the classroom for an activity to help them in the traditional classroom. I will use information including how long a child spends with a sensory object, frequency of users, amount of engagement. Once I have collected enough information I will design the mobile sensory cart. Then once the cart is complete I will bring it into the schools and observe how the children interact with it collecting the same data as the first observation.

IV. OBJECTIVE

(Briefly state the objective of the research – what you hope to learn from the study).

I hope to learn how to design and build a mobile sensory garden cart, which will help provide a connection to nature for children with sensory integration disorders.

V. DESIGN AND PROCEDURES (succinctly outline formal plan for study)

A. List all sites where this research will be conducted:

Williams Science & Fine Arts Elementary Magnet Schooll in Topeka, Kansas as part of USD 501

B. Variables to be studied: How the sensory room is set up in a Topeka elementary school. How children interact with the room and the object in it. How do children interact with the mobile sensory cart I have designed and built.

C. Data collection methods: (surveys, instruments, etc - copies must submitted to comply@k-state.edu).

I will conduct semi-structured interviews with school faculty and staff. In addition, I will use observational methods, using a floor plan of the room and how the children use it. Afterwards I will observe how the children interact with the newly designed mobile sensory garden cart. Please see attached questions and observational checklist.

D. List any factors that might lead to a subject dropping out or withdrawing from a study. These might include, but are not limited to emotional or physical stress, pain, inconvenience, etc.

If a child is uncomfortable with me sitting silently in the sensory room and doesn't play normally with the sensory items they can be taken out of the study.

E. List all biological samples taken: (if any)

None.

F. Debriefing procedures for participants:

Teachers will be told exactly what I am studying and what I hope to achieve with my research. Students in the sensory rooms will be told that I am observing the sensory room to attempt to make it better.

VI. RESEARCH SUBJECTS:

A. Source:

Students attending Williams Science & Fine Arts Elementary Magnet School who use the current sensory room.

B. Number: (provide a brief rationale for your sample size)

Because the number of users and frequency of use is impossible to predict, I will consult with the Principal of Williams Science & Fine Arts Elementary Magnet School to determine the best days to observe the room and the best time of day. Students who will be observed will have the consent form signed by their parents and will use the sensory room during the days and times I observe the sensory room. Each observation period will consist of two days a week for three weeks. Days and times will be the same during both phases of observation.

C. Inclusion criteria: (List any unique qualifiers desirable for research subject participation)

The individuals to be surveyed will have previous experience with the schools sensory programs. Be able to provide feedback on the current sensory room. Students must currently be using the sensory room, and have a signed consent form.

D. Exclusion criteria: (list any unique disqualifiers for research subject participation)

Children who do not have a sensory integration disorder will be excluded.

E. Recruitment procedures:

How will subjects be identified?

Students located at William Elementary School, USD 501, in Topeka, Kansas will be used. Teachers and other school staff will recommend the students who currently use the sensory room.

How will subjects be recruited (advertisement, associates, etc.) ?

Teachers will provide a list of students in their classroom who use the sensory room. Parental consent will be requested. Teachers or Paras will collect consent forms from the students, and I will collect them from the teacher.

How will subjects be enrolled?

Teachers and other school staff will recommend children with sensory integration disorders and parents will give permission.

Describe any follow-up recruitment procedures: (reminder emails, mailings, etc.)

I will coordinate with the school principal on how to contact teachers. Emails will be the prime source of communication, if there should be any follow-up information needed. The consent forms will be sent home with the parents and returned to the teacher or paras responsible for the children, which I will then collect.

VII. RISK - PROTECTION - BENEFITS: The answers for the three questions below are central to human subjects research. You must demonstrate a reasonable balance between anticipated risks to research participants, protection strategies, and anticipated benefits to participants or others.

A. Risk for Subjects: (check all that apply)

- Exposure to infectious diseases
- Use of confidential records
- Exposure to radiation
- Manipulation of psychological or social variables such as sensory deprivation, social isolation, psychological stressors
- Examining for personal or sensitive information in surveys or interviews
- Presentation of materials which subjects might consider sensitive, offensive, threatening, or degrading
- Invasion of privacy of subject or family
- Social or economic risk
- Risk associated with exercise or physical exertion
- Legal risk
- Review of medical records
- Review of criminal records
- HIV/AIDS or other STD's
- Employment/occupational risk
- Others – Please explain below (Indirect risks, risk to individuals who are not the primary subjects):

B. Minimizing Risk: (Describe specific measures used to minimize or protect subjects from anticipated risks.)

There will be no photographs or recordings of subjects. There will be no confidential information collected, the consent forms will be collected and kept locked for the required time, then shredded. There will be no digital copies of consent forms.

C. Benefits: (Describe any reasonably expected benefits for research participants, a class of participants, or to society as a whole.)

Students at these schools will benefit from mobile sensory garden integrated into the school environment.

D. More than Minimal Risk? In your opinion, does the research involve more than minimal risk to subjects? (“Minimal risk” means that “the risks of harm anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.”)

- Yes No

VIII. CONFIDENTIALITY: Confidentiality is the formal treatment of information that an individual has disclosed to you in a relationship of trust and with the expectation that it will not be divulged to others without permission in ways that are inconsistent with the understanding of the original disclosure. Consequently, it is your responsibility to protect information that you gather from human research subjects in a way that is consistent with your agreement with the volunteer and with their expectations.

Explain how you are going to protect confidentiality of research subjects and/or data or records. Include plans for maintaining records after completion.

I will protect the identities of the children and teachers participating in the studies by keeping their names out of the report, I will take no photographs of the students or teachers. Any records I have will be kept in non-digital form and I will keep them in a secure

location. There will be no digital copies kept regarding confidential information.

IX. INFORMED CONSENT: Informed consent is a critical component of human subjects research - it is your responsibility to make sure that any potential subject knows exactly what the project that you are planning is about, and what his/her potential role is. (There may be projects where some forms of “deception” of the subject is necessary for the execution of the study, but it must be carefully justified to and approved by the IRB). A schematic for determining when a waiver or alteration of informed consent may be considered by the IRB is found at <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html#c10>

Even if your proposed activity does qualify for a waiver of informed consent, you must still provide potential participants with basic information that informs them of their rights as subjects, i.e. explanation that the project is research and the purpose of the research, length of study, study procedures, debriefing issues to include anticipated benefits, study and administrative contact information, confidentiality strategy, and the fact that participation is entirely voluntary and can be terminated at any time without penalty, etc. Even if your potential subjects are completely anonymous, you are obliged to provide them (and the IRB) with basic information about your project. See informed consent example on the URCO website. It is a federal requirement to maintain informed consent forms for 3 years after the study completion.

Answer the following questions about the informed consent procedures.

Yes No **A.** Are you using a written informed consent form? If “yes,” include a copy with this application. If “no” see B.

Yes No **B.** In accordance with guidance in 45 CFR 46, I am requesting a waiver or alteration of informed consent elements (see section VIII above). If “yes,” provide a basis and/or justification for your request.

Yes No **C.** Are you using the online Consent Form Template provided by the URCO? If “no,” does your Informed Consent document have all the minimum required elements of informed consent found in the Consent Form Template? (Please explain)

I have adapted the online Consent Form Template and include all required elements.

Yes No **D.** Are your research subjects anonymous? If they are anonymous, you will not have access to any information that will allow you to determine the identity of the research subjects in your study, or to link research data to a specific individual in any way. Anonymity is a powerful protection for potential research subjects. (An anonymous subject is one whose identity is unknown even to the researcher, or the data or information collected cannot be linked in any way to a specific person).

The researcher will not know the names of the students, and the forms regarding the observation the child will be given a letter or a number depending on the phase of observation as an identifying marker.

Yes No **E.** Are subjects debriefed about the purposes, consequences, and benefits of the research? Debriefing refers to a mechanism for informing the research subjects of the results or conclusions, after the data is collected and analyzed, and the study is over. (If “no” explain why.) Copy of debriefing statement to be utilized should be submitted to comply@lk-state.edu with your application.

The children will not be debriefed, though they will be informed about the purpose of the research – that the researcher is trying to learn from them to make the sensory room better.

The principal will have a copy of the final report, which will be available to any and all of the

participating parents. In addition, USD 501 administrators will receive a copy of the report.

F. Describe the Informed Consent Process:

Who is obtaining the consent? (i.e. Principle Investigator, Graduate Student, etc.)

The graduate student

When and where will consent be obtained?

Consent will be obtained at the Williams Science & Fine Arts Elementary Magnet School with permission of the parents and students. The consent form will be sent home with the students and returned to the teacher responsible for the student. Additionally on the day of research the child can withdraw at any time.

If assent (for minors) is required, please describe who will obtain the assent? (Assent means a child's affirmative agreement to participate in research)

Though the children's assent is not required, if the child is noticeably uncomfortable with the researcher's presence on the day of observation, the researcher will step out.

If assent (for minors) is required, when and where will assent be obtained?

It will be obtained in the consent letter, and then on the day of observation if the child does not want the researcher in the room, the researcher will step out.

How will consent be obtained from non-English speaking participants? (a translated written form, orally, identify the name and qualifications of the individual providing the translation)

Translated into written form.

Informed Consent Checklist

Items	YES	NO	N/A
Does the title appear at the top of the consent/assent form?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the consent/assent form written toward the subject?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a statement that explains that the study is <i>research</i> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a statement that explains the <i>purpose</i> of the research?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the procedures to be followed explained clearly and adequately?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the consent document describe <i>risks or discomforts</i> to subjects as a result of participating in the research?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the consent/assent form written in the <i>native language</i> of the potential subject?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are participants compensated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If the subjects' identity is known to the PI, does the form detail how confidentiality of records will be maintained?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is contact information for both the PI and the URCO/IRB office included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the consent document indicate to the participant that he/she can withdraw at any time from the project without penalty or loss of benefit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there probable circumstances which would require the PI to terminate a subject's participation regardless of his or her consent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is the consent document written in lay language (Recommended 8th grade level)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. PROJECT INFORMATION: (If you answer Yes to any of the questions below, you should explain them in one of the paragraphs above)

Yes No A. Deception of subjects? If "YES" explain why this is necessary.

- Yes No B. Shock or other forms of punishment
- Yes No C. Sexually explicit materials or questions about sexual orientation, sexual experience or sexual abuse
- Yes No D. Handling of money or other valuable commodities
- Yes No E. Extraction or use of blood, other bodily fluids, or tissues (if "yes", you must comply with facility and handling protections detailed in the 5th Edition of the Biosafety in Biomedical Laboratories (BMBL))
- Yes No F. Questions about any kind of illegal or illicit activity
- Yes No G. Questions about protected health information as defined by HIPAA
- Yes No H. Purposeful creation of anxiety
- Yes No I. Any procedure that might be viewed as invasion of privacy
- Yes No J. Physical exercise or stress
- Yes No K. Administration of substances (food, drugs, etc.) to subjects
- Yes No L. Any procedure that might place subjects at risk
- Yes No M. Will there be any use of Radioactive materials and/or use of Radioactive producing machines
- Yes No N. Any form of potential abuse; i.e., psychological, physical, sexual
- Yes No O. Is there potential for the data from this project to be published in a journal, presented at a conference, etc?
- Yes No P. Use of surveys or questionnaires for data collection. Copies should be submitted to comply@k-state.edu with your application.

XI. SUBJECT INFORMATION: (If you answer yes to any of the questions below, you should explain them in one of the paragraphs above)

- Yes No a. Under 18 years of age (these subjects require parental or guardian consent)
- Yes No b. Over 65 years of age
- Yes No c. Minorities as target population
- Yes No d. Physically or mentally disabled
- Yes No e. Economically or educationally disadvantaged
- Yes No f. Unable to provide their own legal informed consent
- Yes No g. Pregnant females as target population
- Yes No h. Victims
- Yes No i. Subjects in institutions (e.g., prisons, nursing homes, halfway houses)
- Yes No j. Are subjects likely to be vulnerable to coercion or undue influence
- Yes No k. Is this international research? If yes, provide details as to if OHRP regulations apply in or near the area you intend to conduct research or if you have contacted individuals for applicable regulations to human subject research.
- Yes No l. Are research subjects in this activity students recruited from university classes or volunteer pools? If so, do you have a reasonable alternative(s) to participation as a research subject in your project, i.e., another activity such as writing or reading that would serve to protect students from unfair pressure or coercion to participate in this project? If you answered this question "Yes," explain any alternatives options for class credit for potential human subject volunteers in your study. (It is also important to remember that: Students must be free to choose not to participate in research that they have signed up for at any time without penalty. Communication of their decision can be conveyed in any manner, to include simply not showing up for the research.)
- Yes No m. Is audio from the subjects recorded? If yes, how do you plan to protect the recorded information and mitigate any additional risks?
- Yes No n. Are research subjects' images being recorded (video taped, digitally recorded, photographed)? If yes, how do you plan to protect the recorded information and mitigate any additional risks?

XII. FDA ACTIVITIES: Answer the following questions about potential FDA regulated activities:

- Yes No a. Is this a Clinical Trial?
- Yes No b. Are you using an FDA approved drug/device/diagnostic test?
- Yes No c. Does this activity involve the use of FDA-Regulated products? (biological products, color additives, food additives, human drugs, etc.)
- Yes No d. Has the protocol been submitted to the FDA, or are there plans to submit it to the FDA?
- Yes No e. Have you submitted an FDA form 3454 or 3455 (conflict of interest)?

XIII. CONFLICT OF INTEREST: Concerns have been growing that financial interests in research may threaten the safety and rights of human research subjects. Financial interests are not in themselves prohibited and may well be appropriate and legitimate. Not all financial interests cause Conflict of Interest (COI) or harm to human subjects. However, to the extent that financial interests may affect the welfare of human subjects in research, IRB's, institutions, and investigators must consider what actions regarding financial interests may be necessary to protect human subjects. Please answer the following questions:

- Yes No a. Do you or the institution have any proprietary interest in a potential product of this research, including patents, trademarks, copyrights, or licensing agreements?
- Yes No b. Do you have an equity interest in the research sponsor (publicly held or a non-publicly held company)?
- Yes No c. Do you receive significant payments of other sorts, eg., grants, equipment, retainers for consultation and/or honoraria from the sponsor of this research?
- Yes No d. Do you receive payment per participant or incentive payments?
- e. If you answered yes to any of the above questions, please provide adequate explanatory information so the IRB can assess any potential COI indicated above.

XIV. PROJECT COLLABORATORS:

A. **KSU Collaborators:** List anyone affiliated with KSU who is collecting or analyzing data: (list all collaborators on the project, including co-principal investigators, undergraduate and graduate students).

Name:	Department:	Campus Phone:	Campus E-mail:
Chip Winslow	Landscape Architecture and Regional and Community Planning	785.532.2447	chipwin@ksu.edu
Gregory Davis	Landscape Horticulture	785.532.1417	gdavis@ksu.edu

B. **Non-KSU Collaborators:** List all collaborators on your human subjects research project not affiliated with KSU in the spaces below. KSU has negotiated an Assurance with the Office for Human Research Protections (OHRP), the federal office responsible for oversight of research involving human subjects.

Name:	Organization:	Phone:	Institutional E-mail:

C. Does your non-KSU collaborator's organization have an Assurance with OHRP? (for Federalwide Assurance listings of other institutions, please reference the OHRP website under Assurance Information at: <http://ohrp.cit.nih.gov/search>).

Yes No If yes, Collaborator's FWA #

Is your non-KSU collaborator's IRB reviewing this proposal?

Yes No If yes, IRB approval #

XV. IRB Training:

A. The URCO must have a copy of the Unaffiliated Investigator Agreement on file for each non-KSU collaborator who is not covered by their own IRB and assurance with OHRP. When research involving human subjects includes collaborators who are not employees or agents of KSU the activities of those unaffiliated individuals may be covered under the KSU Assurance only in accordance with a formal, written agreement of commitment to relevant human subject protection policies and IRB oversight. The Unaffiliated Investigators Agreement can be found and downloaded at <http://www.k-state.edu/research/comply/irb/forms>

Online Training

TRAINING REQUIREMENTS HAVE RECENTLY CHANGED

The IRB has mandatory training requirements prior to protocol approval. Training is now offered through the Collaborative Institutional Training Initiative (CITI) Program. Instructions for registration and access to training are on the URCO website <http://www.k-state.edu/research/comply/>.

Use the check boxes below to select the training courses that apply to this application. If you have any questions about training, contact URCO at comply@ksu.edu, or (785) 532-3224.

Mandatory Training

Required for all Principal Investigators, research staff and students

- Responsible Conduct of Research
- IRB core modules

Required (Provost-mandated) for all full-time K-State employees

- Export Compliance

Required procedure-specific training (check all that apply to this protocol):

- International Research Research in Public Elementary and Secondary Schools Research with Children
- Research with Prisoners Internet Research Vulnerable Subjects - Research Involving Workers/Employees
- Research with Subjects with Physical Disabilities and Impairments Illegal Activities or Undocument Status in Human Research
- Gender and Sexuality Diversity in Human Research Research with human blood, body fluids, or tissues
- Research with Older Adults

All new personnel or personnel with expired training are required to register for CITI and take the new training requirements. If you previously completed online IRB modules, your training status will remain current until it expires. URCO will verify training from the previous system as well as the new system prior to approval of any protocol.

INVESTIGATOR ASSURANCE FOR RESEARCH INVOLVING HUMAN SUBJECTS

(Print this page separately because it requires a signature by the PI)

P.I. Name:

Title of Project:


XVI. ASSURANCES: As the Principal Investigator on this protocol, I provide assurances for the following:

- A. **Research Involving Human Subjects:** This project will be performed in the manner described in this proposal, and in accordance with the Federalwide Assurance FWA00000865 approved for Kansas State University available at <http://www.hhs.gov/ohrp/assurances/forms/filasurl.html>, applicable laws, regulations, and guidelines. Any proposed deviation or modification from the procedures detailed herein must be submitted to the IRB, and be approved by the Committee for Research Involving Human Subjects (IRB) prior to implementation.
- B. **Training:** I assure that all personnel working with human subjects described in this protocol are technically competent for the role described for them, and have completed the required IRB training accessed via the URCO website at: <http://www.k-state.edu/research/comply/irb/training>. I understand that no proposals will receive final IRB approval until the URCO has documentation of completion of training by all appropriate personnel.
- C. **Extramural Funding:** If funded by an extramural source, I assure that this application accurately reflects all procedures involving human subjects as described in the grant/contract proposal to the funding agency. I also assure that I will notify the IRB/URCO, the KSU PreAward Services, and the funding/contract entity if there are modifications or changes made to the protocol after the initial submission to the funding agency.
- D. **Study Duration:** I understand that it is the responsibility of the Committee for Research Involving Human Subjects (IRB) to perform continuing reviews of human subjects research as necessary. I also understand that as continuing reviews are conducted, it is my responsibility to provide timely and accurate review or update information when requested, to include notification of the IRB/URCO when my study is changed or completed.
- E. **Conflict of Interest:** I assure that I have accurately described (in this application) any potential Conflict of Interest that my collaborators, the University, or I may have in association with this proposed research activity.
- F. **Adverse Event Reporting:** I assure that I will promptly report to the IRB / URCO any unanticipated problems involving risks to subjects or others that involve the protocol as approved. Unanticipated or Adverse Event Form is located on the URCO website at: <http://www.k-state.edu/research/comply/irb/forms>. In the case of a serious event, the Unanticipated or Adverse Events Form may follow a phone call or email contact with the URCO.
- G. **Accuracy:** I assure that the information herein provided to the Committee for Human Subjects Research is to the best of my knowledge complete and accurate.

You may sign this form using a digital signature. DO NOT sign the form until it has been completed. You cannot edit the form entries once the form has been digitally signed. If you are making revisions to a previously signed form, right-click the digital signature and select Clear to remove the signature (this can only be done by the person who originally digitally signed the form). Forms that have not been signed will not be accepted.

P.I. Signature: Digitally signed by Anne Beamish
Date: 2016.12.01 16:56:01 -06'00' Date:

TO: Anne Beamish Proposal Number: 8527
LARC
Seaton Hall

FROM: Rick Scheidt, Chair 
Committee on Research Involving Human Subjects

DATE: 12/13/2016

RE: Approval of Proposal Entitled, "Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools."

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval. This proposal is **approved for one year from the date of this correspondence, pending "continuing review."**

APPROVAL DATE: 12/13/2016

EXPIRATION DATE: 12/13/2017

Several months prior to the expiration date listed, the IRB will solicit information from you for federally mandated "continuing review" of the research. Based on the review, the IRB may approve the activity for another year. **If continuing IRB approval is not granted, or the IRB fails to perform the continuing review before the expiration date noted above, the project will expire and the activity involving human subjects must be terminated on that date. Consequently, it is critical that you are responsive to the IRB request for information for continuing review if you want your project to continue.**

In giving its approval, the Committee has determined that:

- There is no more than minimal risk to the subjects.
- There is greater than minimal risk to the subjects.

This approval applies only to the proposal currently on file as written. Any change or modification affecting human subjects must be approved by the IRB prior to implementation. All approved proposals are subject to continuing review at least annually, which may include the examination of records connected with the project. Announced post-approval monitoring may be performed during the course of this approval period by URCO staff. Injuries, unanticipated problems or adverse events involving risk to subjects or to others must be reported immediately to the Chair of the IRB and / or the URCO.

APPENDIX F: PLANTS



Herbs

Source: Deans, Ester. 2001 *Leaves of Life*

Hot, Dry, Sunny Site
Bay - *Laurus nobilis*
Catmint - *Nepeta cataria*
Citrus - *Citrus medica*
Lavender - *Lavandula angustifolia*
Rosemary - *Rosmarinus officinalis*
Sage - *Salvia officinalis*
Thyme - *Thymus vulgaris*
Cool, Damp Site
Basil - *Ocimum basilicum*
Chives - *Allium schoenoprasum*
Fennel - *Foeniculum vulgare*
Lemon Balm - *Melissa officinalis*
Mint - *Mentha spicata*
Parsley - *Petroselinum crispum*

Must Have Sensory Plants

Source: Etherington, Natasha. 2012. *Gardening for Children with Autism Spectrum Disorders and Special Educational Needs*

Sunflowers - *Helianthus annuus*
Lamb's Ear - *Stachys byzantina*
Roses - *Rosa rubiginosa*
Pot Marigolds - *Tagetes erecta*
Snapdragons - *Antirrhinum majus*
Cherry Tomatoes - *Solanum lycopersicum var. cerasiforme*
Grape Hyacinth - *Muscari armeniacum*
Hyacinth - *Hyacinthus orientalis*
Sweet Peas - *Lathyrus odoratus*
Lavender - *Lavandula angustifolia*
Parsley - *Petroselinum crispum*
Lemon Balm - *Melissa officinalis*
Curry Plant - *Murraya koenigii*
Basil - *Ocimum basilicum*
Oregano - *Origanum vulgare*
Rosemary - *Rosmarinus officinalis*
Garlic - *Allium sativum*
Thyme - *Thymus vulgaris*
Sage - *Salvia officinalis*
Mint - *Mentha spicata*

Safe Plant List

Source: Bruce, Hank. 2013. *Gardens for the Senses Gardening as Therapy Revised and Expanded* by Hank Bruce

African Violets - Saintpaulia ionantha
Aloe vera - Aloe Barbadensis Miller
Bamboo - Bambusoideae
Basil - Ocimum basilicum
Begonias - Begonia obliqua
Camellia - Camellia japonica
Canna - Canna indica
Catnip - Nepeta cataria
Celery - Apium graveolens
Chives - Allium schoenoprasum
Christmas Cactus - Schlumbergera kautskyi
Cilantro - Coriandrum sativum
Daylily - Hemerocallis lilioasphodelus
English Ivy - Hedera helix
Gardenia - Gardenia jasminoides
Green Bean - Phaseolus vulgaris
Hen & Chicks - Sempervivum tectorum
Ice Plant - Carpobrotus edulis
Lambs Ear - Stachys byzantina
Lavender - Lavandula angustifolia
Marigolds - Tagetes erecta
Mint - Mentha spicata
Onions - Allium cepa
Orchids - Orchidaceae
Oregano - Origanum vulgare
Parsley - Petroselinum crispum
Peppermint - Mentha x piperita
Prayer Plant - Maranta arundinacea
Purple Coneflower - Echinacea purpurea
Radish - Raphanus sativus
Roses - Rosa rubiginosa
Rosemary - marinus officinalis
Spearmint - Mentha spicata
Spider Plant - Chlorophytum comosum
Thyme - Thymus vulgaris

Dangerous Plant List

Source: Bruce, Hank. 2013. *Gardens for the Senses Gardening as Therapy Revised and Expanded* by Hank Bruce

Amaryllis - Amaryllis belladonna
Angels Trumpet - Brugmansia 'Feingold'
Autumn Crocus - Colchicum autumnale
Azalea - Rhododendron Pentanthera
Balsam pear - Momordica charantia
Bittersweet - Celastrus scandens

Black Locust - Robinia pseudoacacia
Bracken Fern - Pteridium aquilinum
Calla Lily - Zantedeschia aethiopica
Cardinal Lily - Lobelia cardinalis
Castor Bean - Ricinus communis
Cherry Tree - Prunus avium
Christmas Rose - Helleborus niger
Columbine - Aquilegia vulgaris
Daffodil - Narcissus pseudonarcissus
Dumb cane- Dieffenbachia bowmannii
Elderberry - Sambucus nigra
Jasmine - Jasminum officinale
Lantana - Lantana camara
Peace Lily - Spathiphyllum wallisii
Peony - Paeonia suffruticosa
Philodendron - Philodendron bipinnatifidum
Poinciana - Delonix regia
Pothos - Epipremnum aureum
Primrose - Primula vulgaris
Tulip - Tulipa gesneriana

APPENDIX G: ITEMS PURCHASED

Collection of Items in Sensory Garden Cart

Purchased Online

The Base Cart	\$69.99
Zen Garden Tools	\$4.99
Polyurethane Pellets	\$32.65
Candy Scoop	\$3.99
Carabiners	\$9.99
Plant Lights	\$15.99 x 2
Soil	\$30.39
Bird Seed	\$4.88
Metal Pail	\$9.78
White Sand	\$8.70 x 3
Bamboo	\$21.99
Wooden Blocks	\$11.99
Net	\$12.71
Velcro	\$8.85
Drift Wood	\$3.99

Purchased at Local Market

Pumpkin Gourds	\$.79 x 10
Birdhouse Gourds	\$3.99 x 2

Purchased at Local Craft Store

PolyFil	\$8.00
Hot Glue Gun	\$5.99
Hot Glue Sticks	\$4.99
Wood Circles	\$4.99
Wood Slices	\$4.99
Bark Strips	\$2.99

Purchased at Local Green House

Panda Plant	\$3.00
Aloe	\$3.00
Lavender	\$3.00
Rosemary	\$3.00
Thyme	\$3.00
Catmint	\$3.00
Chocolate Mint	\$3.00
Lemon Balm	\$3.00
Christmas Cactus	\$5.99
Swedish Ivy	\$3.00
Plant Trays	\$5.00
Plant Pots	\$8.99 x 6
Bulb Vases	\$19.99

Total \$445.00



APPENDIX H: OBSERVATION EXAMPLES

Samples of Observations

There are twenty four examples, twelve from each observation. Four observations are when the child is calm and there is little movement around the room. Four observations are when the child uses several items/activities in the room and had an average amount of movement around the room. Then four observations are when the child is all over the room, touching as much as possible.

Low Activity

Sensory Room ← Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

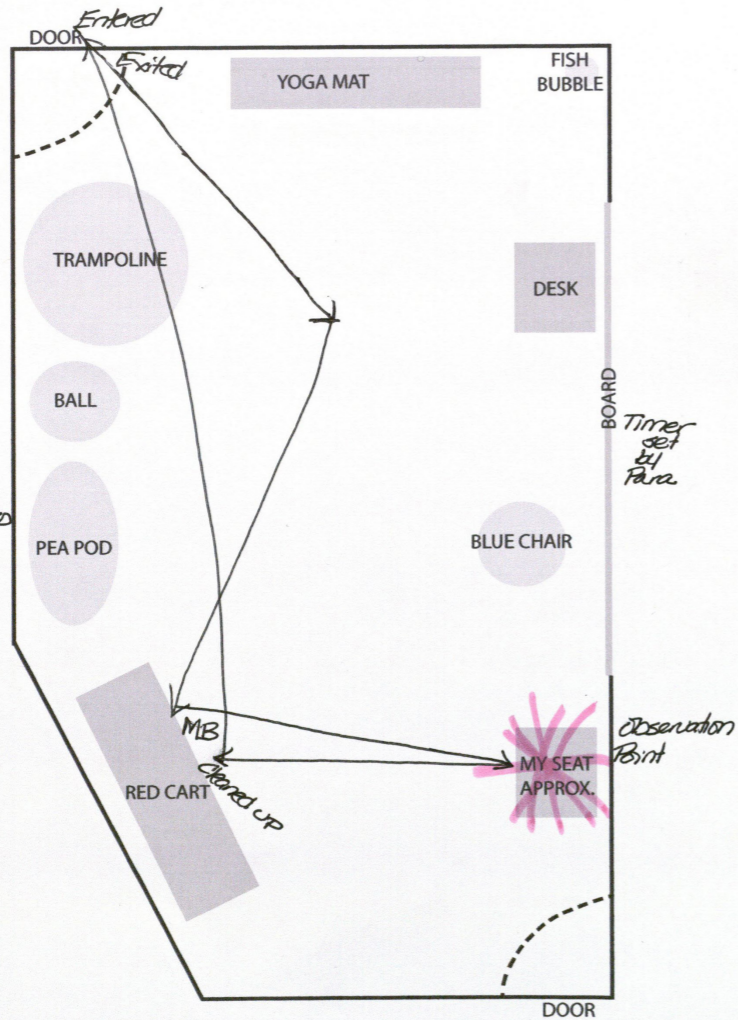
Child's Identification Number/Letter (depending on phase) U

Date 2/9/2017 Time Start 9:04 Time End 9:15

- ITEMS IN RED CART
- Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES
 - Bubble Hour Glass- BH
 - Charts -CH

Notes:

Instructed not to use Balls
 Sits down on the ground * not as verbal para making tower w/ squares
 Showed slight interest in me.
 Knelt tower over
 Picked up blocks



MB

Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

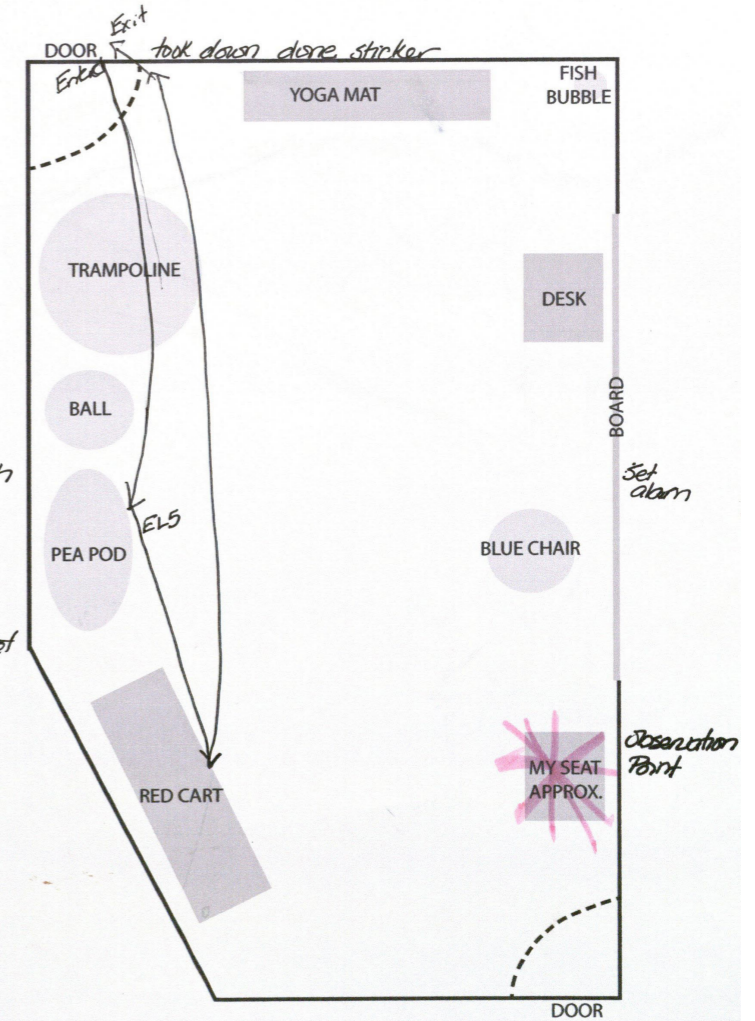
Child's Identification Number/Letter (depending on phase) O

Date 2/8/2017 Time Start 8:44 Time End 8:50

- ITEMS IN RED CART
- Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES ✓
 - Bubble Hour Glass- BH
 - Charts -CH

Notes:

Sits in pea pod
 Playing w/ etch sketch
 no talking at this point
 Striking etch ES
 must take stress off for Pea pod
 Playing with his wallet helped out



ES, Peaped

Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) A

Date 1/25/17 Time Start 10:30 Time End 10:50

ITEMS IN RED CART
 Therapy Putty -TP
 Squishy Ball - SB
 Sock-SK
 Figet Toys - FT
 Star Master -SM
 Coggy- CG
 Mini Sport Balls -MS
 Magnetic Blocks -MB ✓
 Balance Block -BB
 Etch-A-Sketch -ES
 Bubble Hour Glass- BH
 Charts -CH

Notes:
 sat down
 MB-moves them
 around -stacked all
 like items
 Building items
 Circles flowers
 Squares
 stacking
 threw SB across
 the room
 -stacked
 tower collapsed
 Cleaned up

DOOR

YOGA MAT

FISH BUBBLE

TRAMPOLINE

BALL

PEA POD

RED CART

DESK

BLUE CHAIR

BOARD

MY SEAT APPROX.

Observation area

entered DOOR

showed zero interest in me

MB

Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) S

Date 2/8/17 Time Start 1:27 Time End 1:36

ITEMS IN RED CART
 Therapy Putty -TP
 Squishy Ball - SB
 Sock-SK
 Figet Toys - FT
 Star Master -SM
 Coggy- CG
 Mini Sport Balls -MS
 Magnetic Blocks -MB
 Balance Block -BB
 Etch-A-Sketch -ES
 Bubble Hour Glass- BH
 Charts -CH

Notes:
 Climbs in pea pod
 takes off shoes and
 plays with CG
 Para sets clock
 seems very sluggish +
 tired
 almost asleep
 no talking very
 quiet
 fell asleep

DOOR

YOGA MAT

FISH BUBBLE

TRAMPOLINE

BALL

PEA POD

RED CART

DESK

BLUE CHAIR

BOARD

MY SEAT APPROX.

Observation Point

Exit DOOR

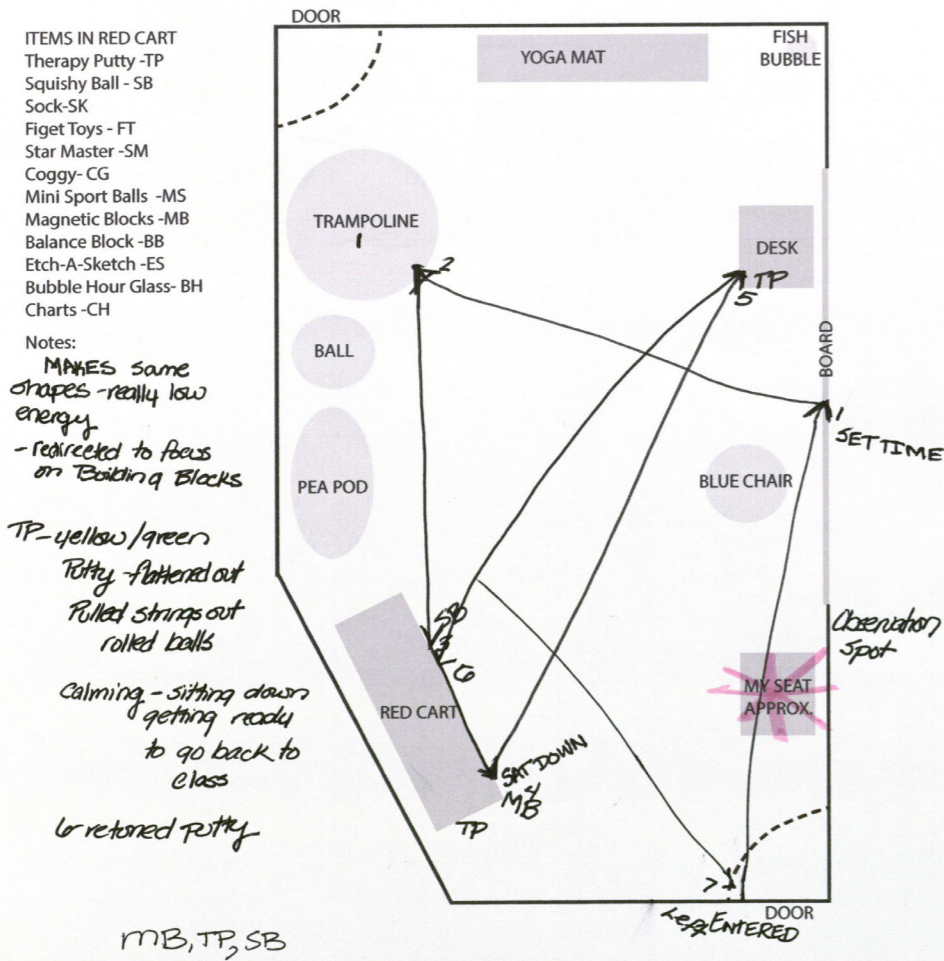
Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) B

Date 1/20 Time Start 10:34 Time End 10:47



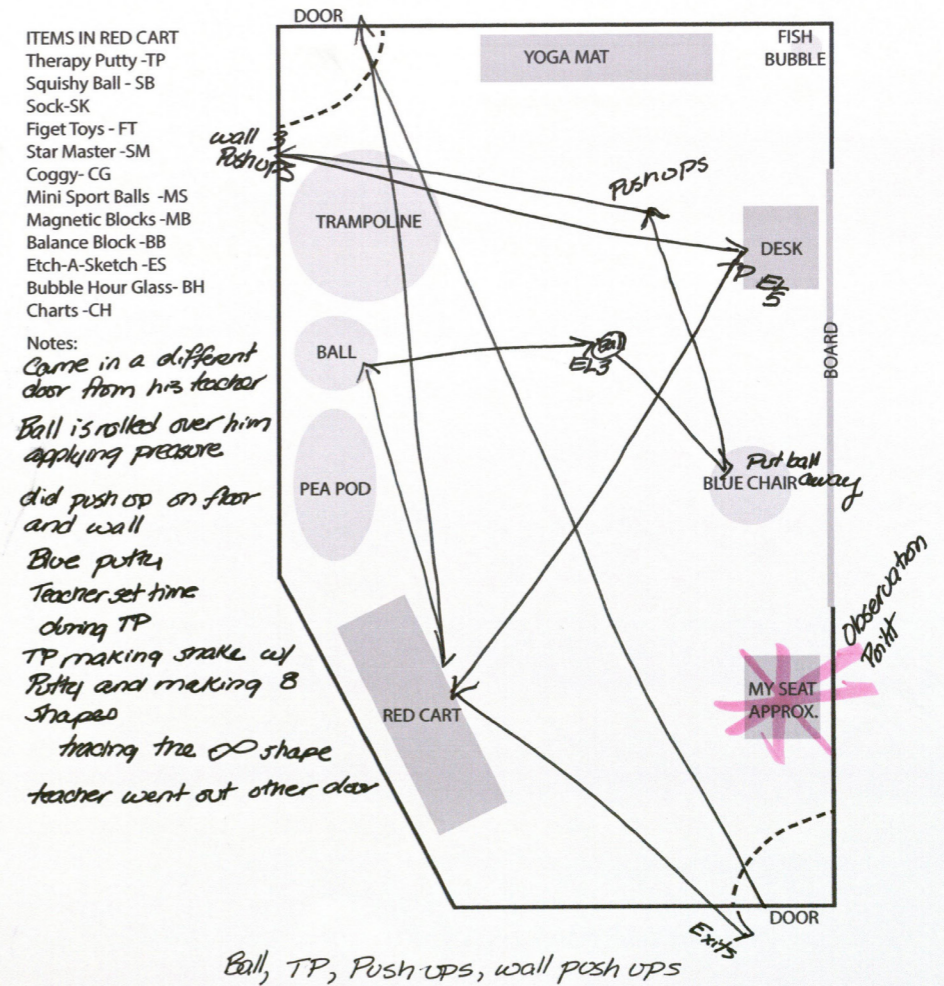
Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) H

Date 2/9/17 Time Start 1:39 Time End 1:50



Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

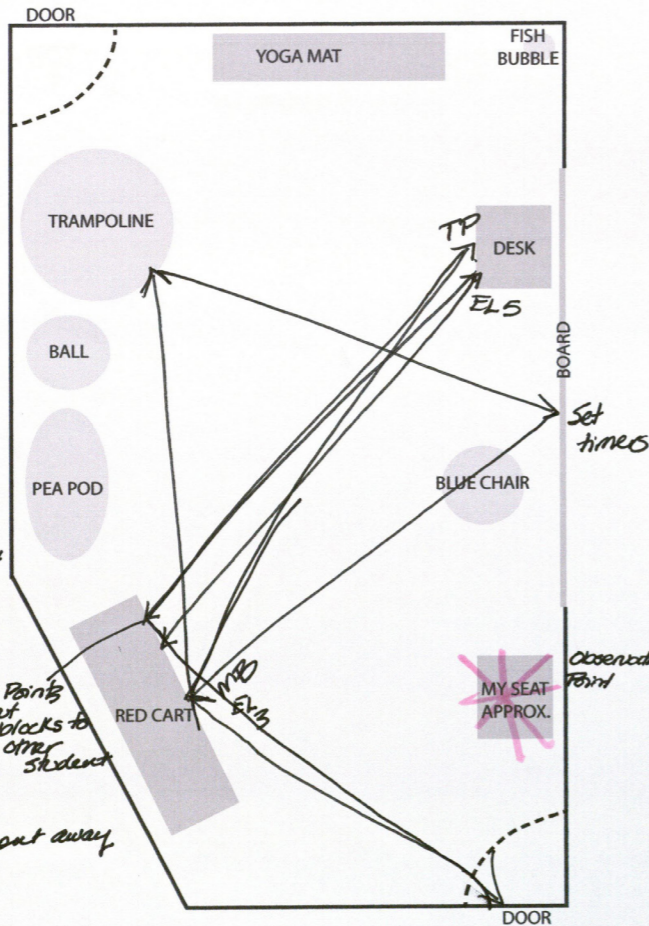
Child's Identification Number/Letter (depending on phase) K

Date 2/2/2017 Time Start 10:37 Time End 10:51

- ITEMS IN RED CART
- Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES
 - Bubble Hour Glass- BH
 - Charts -CH

Notes:

Playing together with other student MB
 Sticking blocks to cart
 making circle on the floor
 talking to other student while play w/ TP
 Flattened out + poking holes
 rolls it up
 nits it and rolls it back up
 flattens out
 Rts away
 Helps other student put away toys (MB)



TP, MB

Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

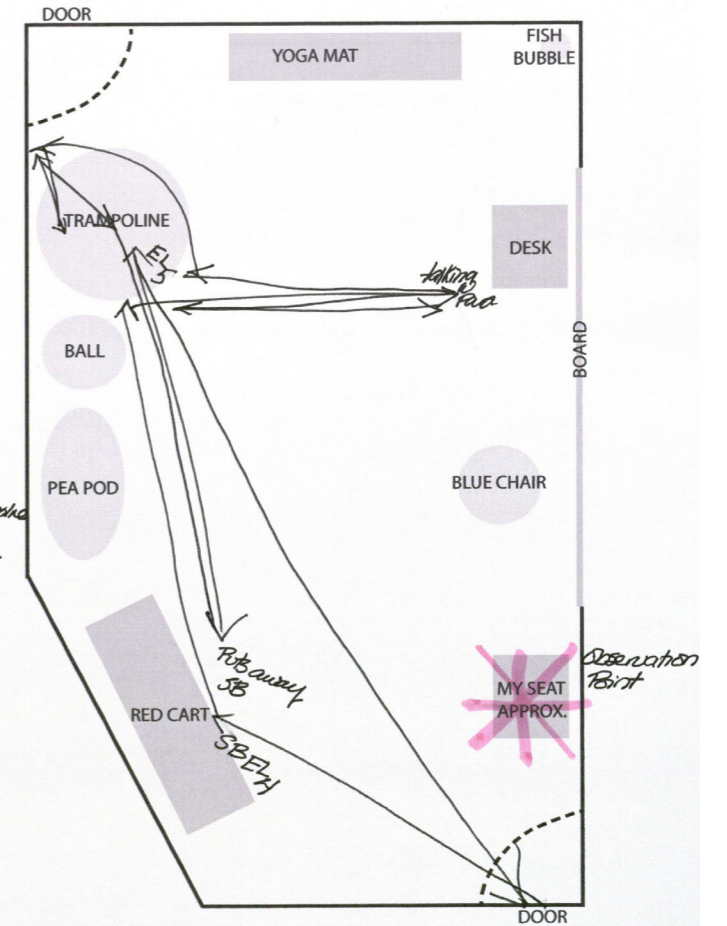
Child's Identification Number/Letter (depending on phase) Z

Date 2/9/2017 Time Start 12:5 Time End 1:33

- ITEMS IN RED CART
- Therapy Putty -TP
 - Squishy Ball - SB
 - Sock-SK
 - Figet Toys - FT
 - Star Master -SM
 - Coggy- CG
 - Mini Sport Balls -MS
 - Magnetic Blocks -MB
 - Balance Block -BB
 - Etch-A-Sketch -ES
 - Bubble Hour Glass- BH
 - Charts -CH

Notes:

SB - stress balls
 sitting on trampoline
 Play w/ SB
 Bouncing the balls off his hand
 Throwing them off trampoline
 wants to use trampoline
 Extracted after trampoline
 Doesn't want



SB, Trampoline

High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

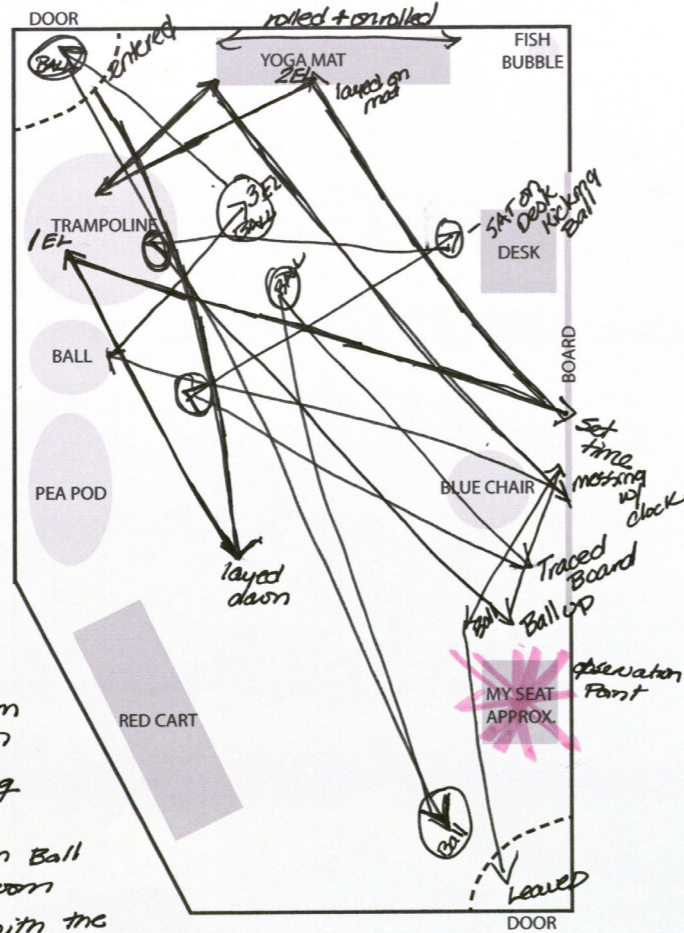
Child's Identification Number/Letter (depending on phase) E

Date 2/1/2017 Time Start 10:39 Time End 10:55

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy- CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts -CH

Notes:

rough morning
 stood on trampoline
 Yoga mat rolled himself up
 Instructed to be rolled up again
 sat near trampoline wanted para to roll herself up
 Ball rolled over him while he layed on stomach. Calming
 Bouncing on ball
 rolls on stomach on Ball moved around room
 Told not to mess with the time



Red cards Ball, Trampoline, Tracing Board, rolled up

High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

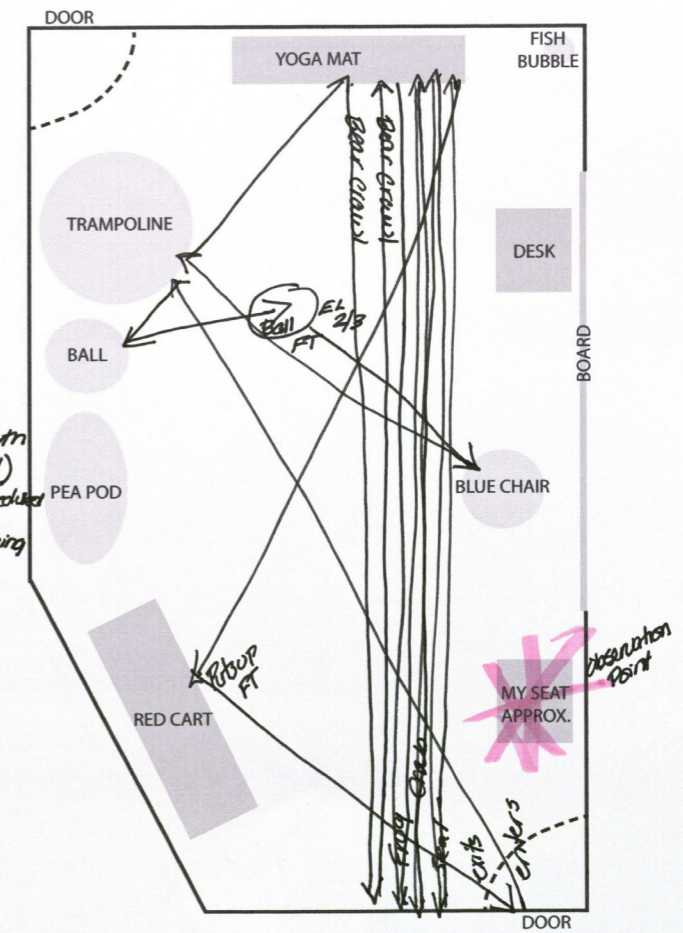
Child's Identification Number/Letter (depending on phase) G

Date 2/1/2017 Time Start 1:25 Time End 1:35

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy- CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts -CH

Notes:

Bellie on the ball
 laying around
 rolling back and forth
 holding FT (suggested)
 only seven minutes scheduled
 rolls back + forth touching the FT / watching the clock
 Bear crawl
 Hop Like a frog
 Crab walk
 Seal walk



Ball, Trampoline, FT, animal crawl

High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

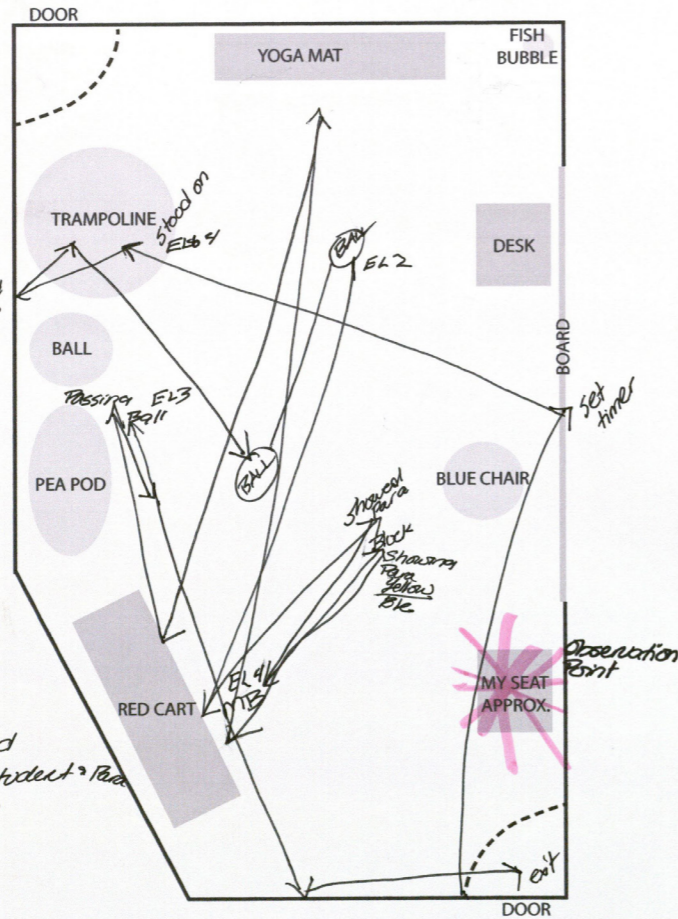
Child's Identification Number/Letter (depending on phase) P

Date 2/8/17 Time Start 10:35 Time End 10:53

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy-CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts-CH

Notes:

Focus -yellow
 Figuring out what he wants to do.
 Jumping on trampoline while holding
 Jumping jacks
 running in place
 hopping on one foot
 Bouncing on ball
 noted he was having a bad day
 making cubes
 Put up MB cubes
 Passing Ball back and forth to other student → Pass activity they made up



Trampoline, Ball, MB, Passing Ball

High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

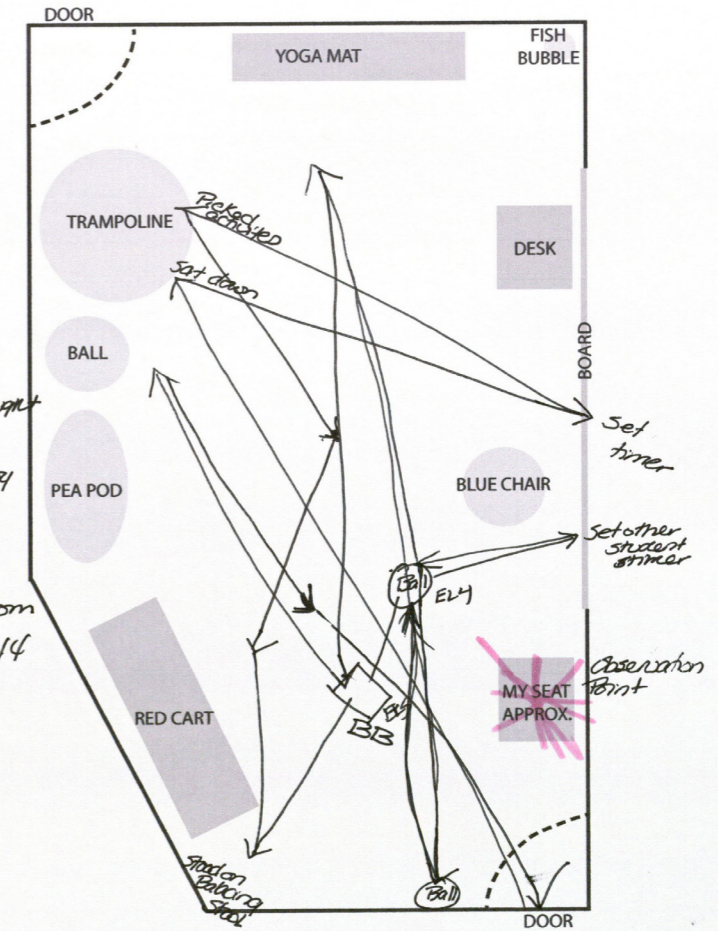
Child's Identification Number/Letter (depending on phase) V

Date 2/9/17 Time Start 10:31 Time End 10:43

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy-CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts-CH

Notes:

Wants to wait for other student
 Playing w/ 44 he brought
 Balancing Block
 Playing with 44
 Sat down on BB
 Bouncing on Ball
 Singing
 Bouncing around the room
 BB playing with 44



BB, Ball

Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

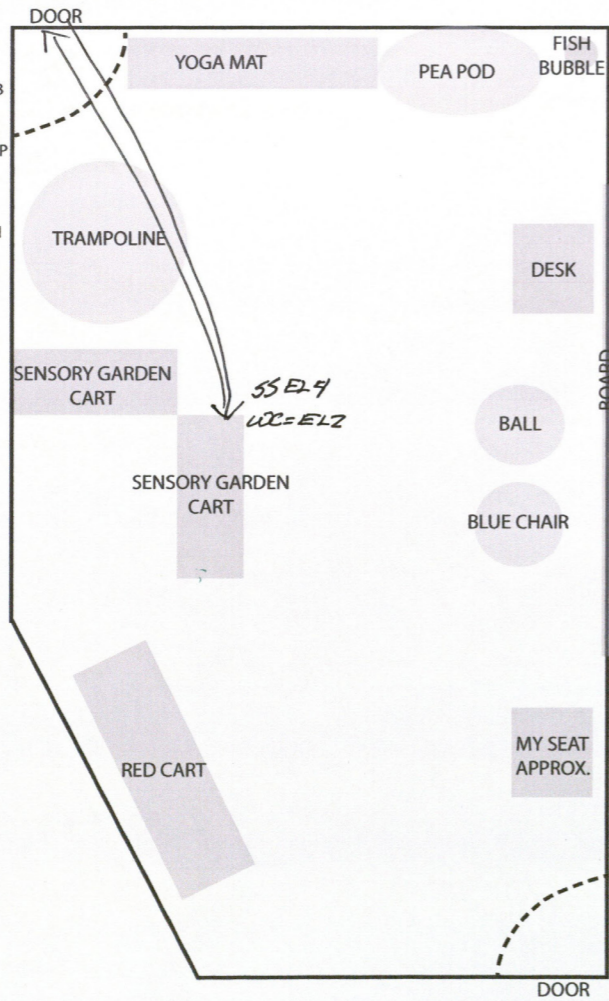
Child's Identification Number/Letter (depending on phase) 1

Date 2/22/17 Time Start 8:41 Time End 8:47

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:

seed system while playing with the FW
WC moving from on top of dove! - rolling it across the floor
Back to SS
Filling it up and watching the seeds go down
Filling up a bottle waiting for it to be full before tilting.



Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

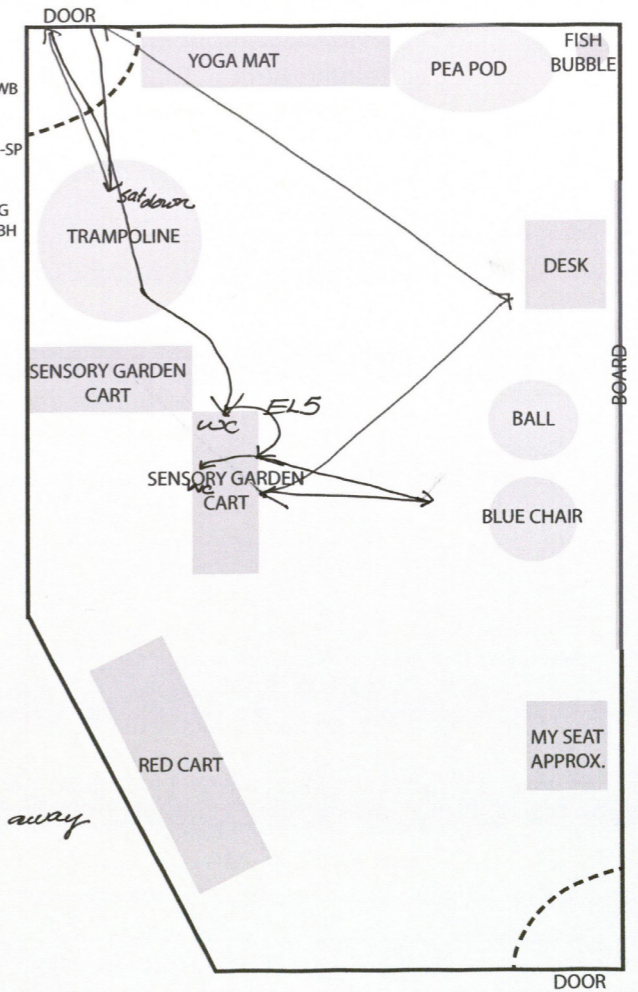
Child's Identification Number/Letter (depending on phase) 14

Date 3/1/2017 Time Start 8:43 Time End 8:52

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:

Sat down tied shoes
left to go grab drink
wood circles on wooden dove!
talking about wood and where it's made
reaching over the cart to grab WC
looks like hammer
"Swinging"
Putting all WC on dove!
doesn't want stop
Pava helps put them away



WC

Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 21

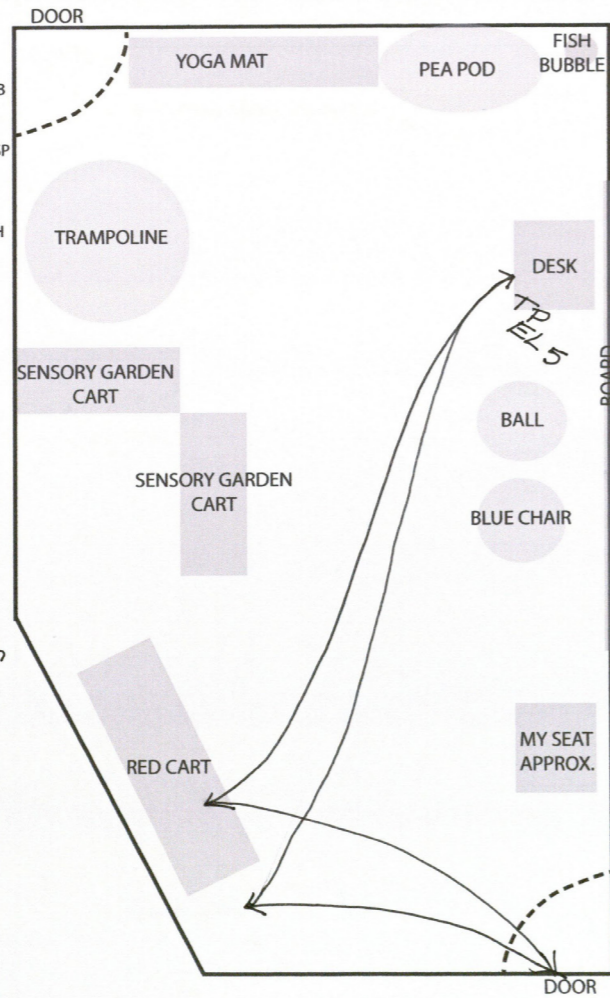
Date 3/1/2017 Time Start 1:32 Time End 1:39

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy- CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts-CH

- ITEMS IN SENSORY GARDEN CART
- Zen Garden - ZG
- Weighted Blanket - WB
- Wood Slices - WS
- Wood Circles -WC
- Scented Pine Cones -SP
- Foam Handle - FH
- Fabric Wraps - FW
- Pumpkin Gourds - PG
- Birdhouse Gourds - BH
- Plants - PT
- Seed System - SS
- Net/Fabric Tent - TT
- Seating Tiles - ST
- Blocks - BL

Notes:

TP at Para's request
yellow color
 not talking/making sad faces
 wrapping putty around arm
 flattening it on desk
 leaving knuckle prints
 rolling it using lid to slice in half
 timer went off
 put putty away
 doesn't want to leave



Low Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 32

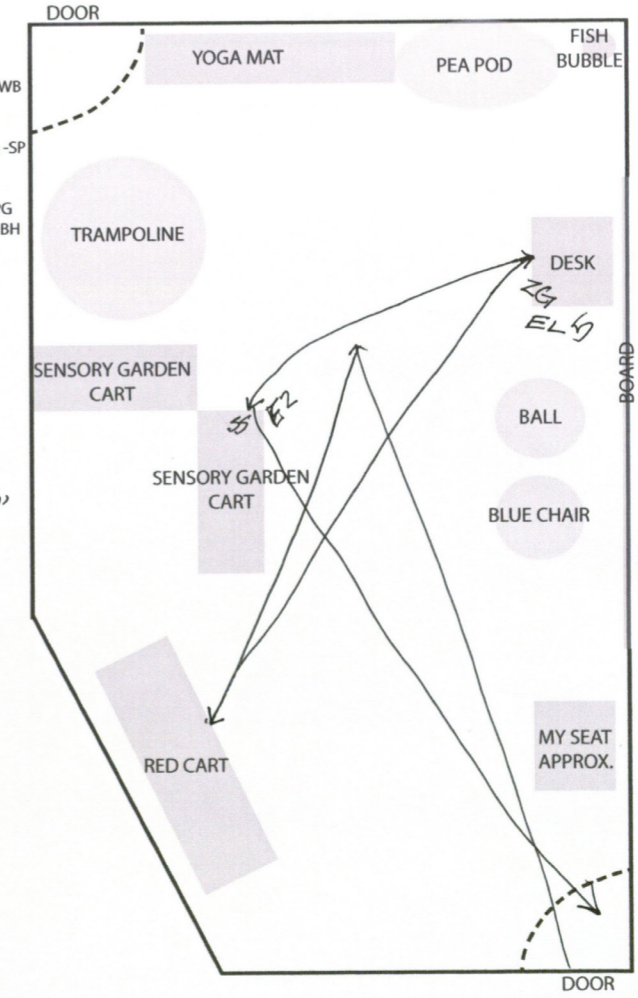
Date 3/2/2017 Time Start 1:59 Time End 2:05

- ITEMS IN RED CART
- Therapy Putty -TP
- Squishy Ball - SB
- Sock-SK
- Figet Toys - FT
- Star Master -SM
- Coggy- CG
- Mini Sport Balls -MS
- Magnetic Blocks -MB
- Balance Block -BB
- Etch-A-Sketch -ES
- Bubble Hour Glass- BH
- Charts-CH

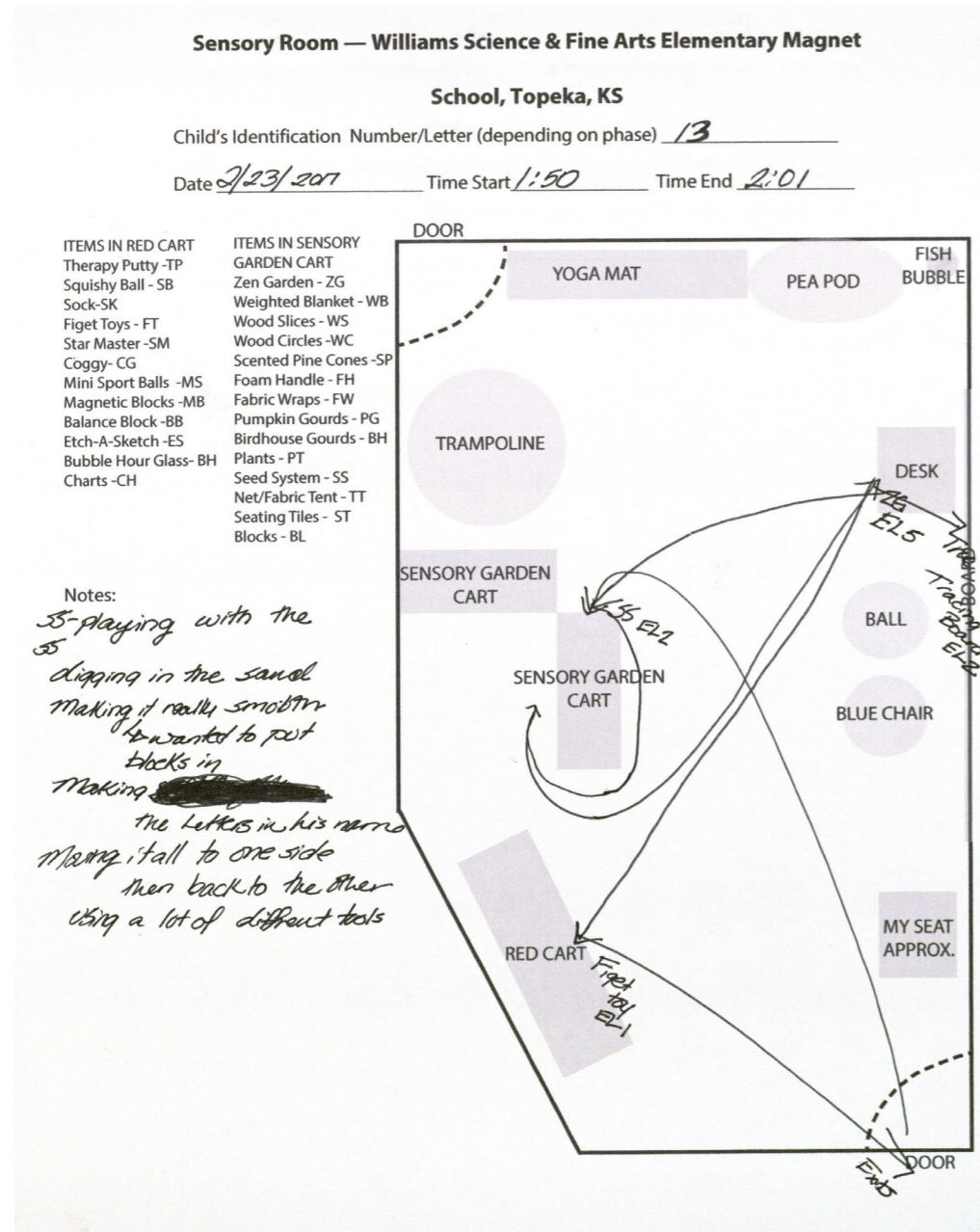
- ITEMS IN SENSORY GARDEN CART
- Zen Garden - ZG
- Weighted Blanket - WB
- Wood Slices - WS
- Wood Circles -WC
- Scented Pine Cones -SP
- Foam Handle - FH
- Fabric Wraps - FW
- Pumpkin Gourds - PG
- Birdhouse Gourds - BH
- Plants - PT
- Seed System - SS
- Net/Fabric Tent - TT
- Seating Tiles - ST
- Blocks - BL

Notes:

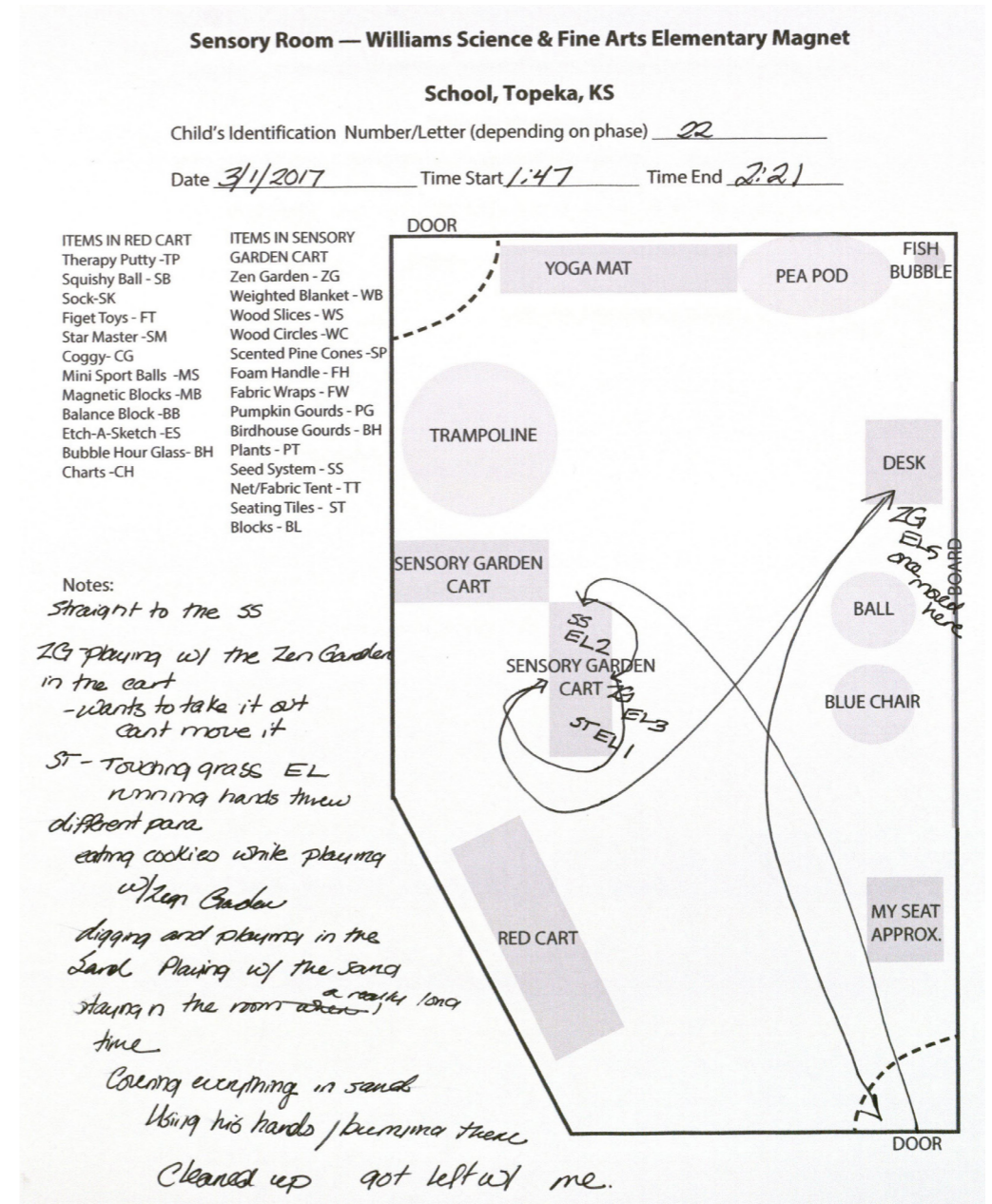
was told to use his words
 Zen Garden
 wants to use "Bird feeder"



Average Activity



Average Activity



Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 3

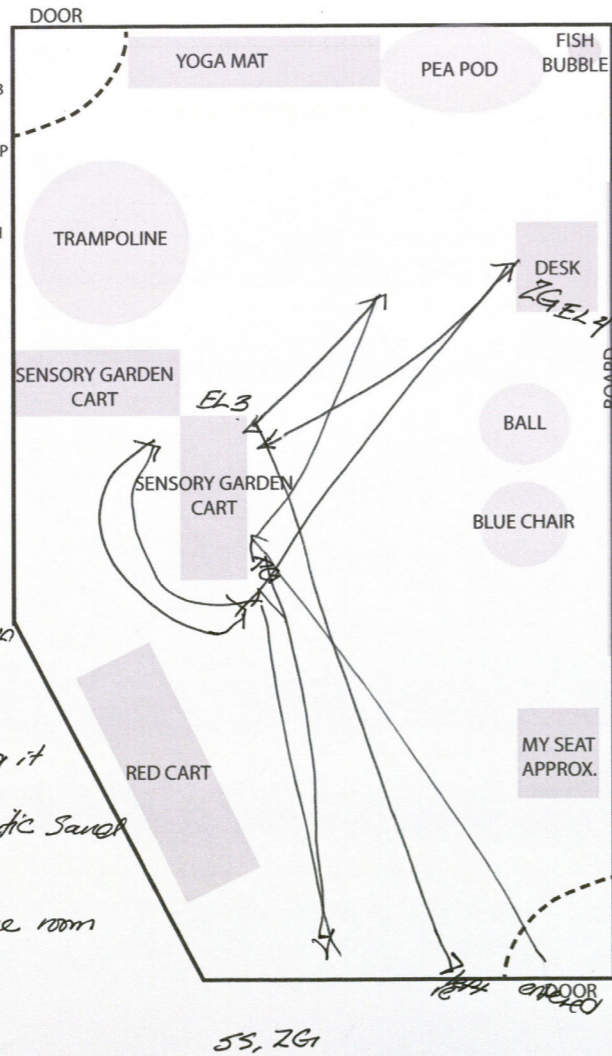
Date 2/22/17 Time Start 10:41 Time End 10:56^{10:43}

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Water EL 5

Notes:

*Playing with the Lights
spray the plants
and every thing had to be
taken away
Pg EL 2
BK EL 2
Playing w/ Lights turned off
Big lights
lights back on
ZG - hiding Rocks flattening it
out /not a garden
mess sand /Kendic sand
sand making a mess
Concerns about plant survival
not wanting to leave the room
SS - making a mess*



Average Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

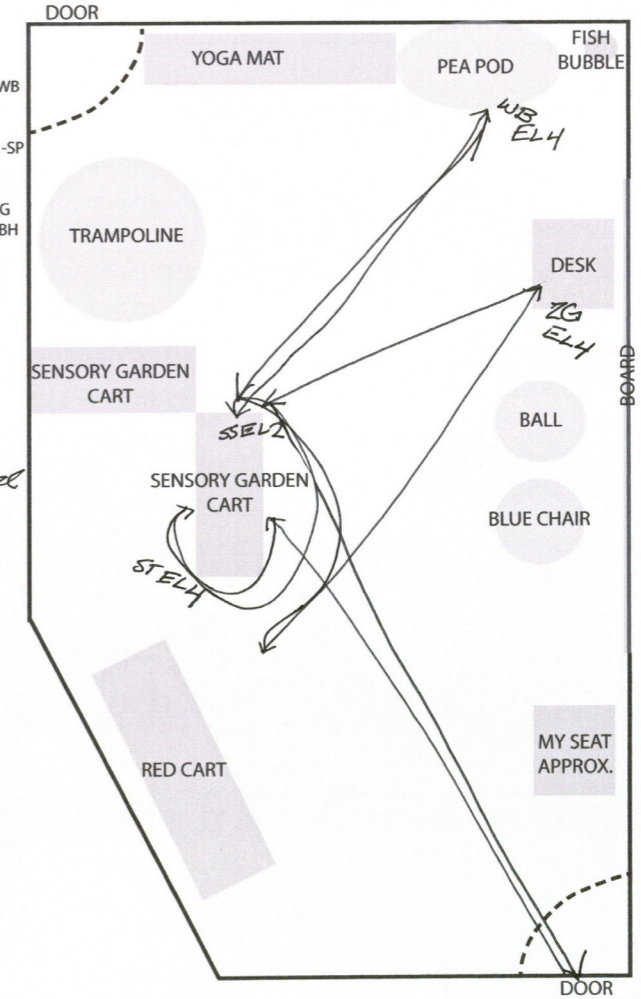
Child's Identification Number/Letter (depending on phase) 31

Date 2/2/2017 Time Start 1:56 Time End 2:08

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:

*Covered up
the lights were turned off
rolling around the peapod
sitting on seating tile
Rocks/rough
Grass + tile
inspecting them*



High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

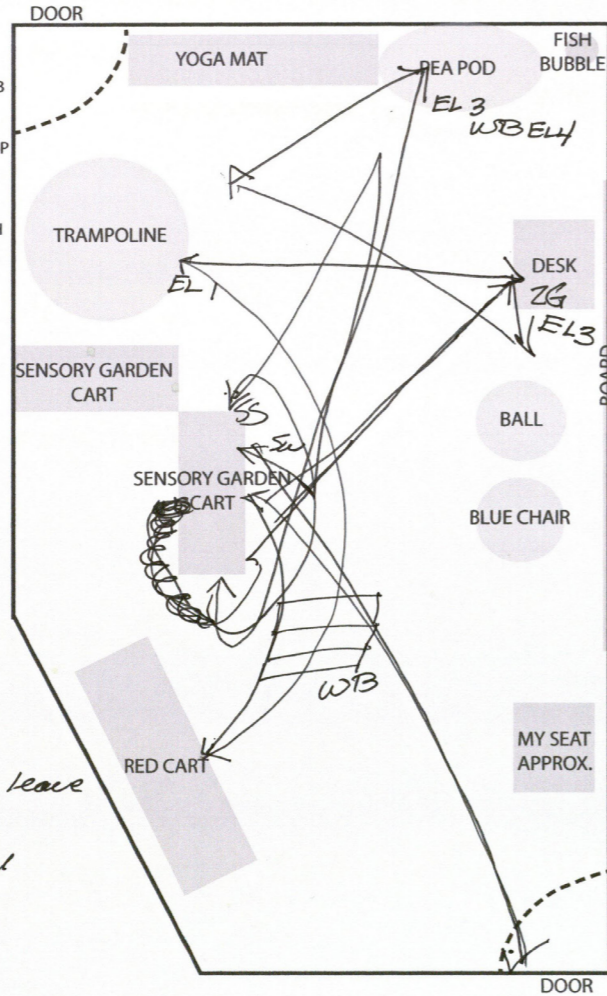
Child's Identification Number/Letter (depending on phase) 10

Date 3/1/2017 Time Start 10:30 Time End 10:40

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Fidget Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:

Playing with balloons he brought
(Sweeping the sand)
 Popped the balloon
 Fake grass/seating tiled
 Sitting + rolling
 laying
 Smelling SP EL 1
 does not want to leave
 sweeping up instead
 at Birdhouse!



High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

School, Topeka, KS

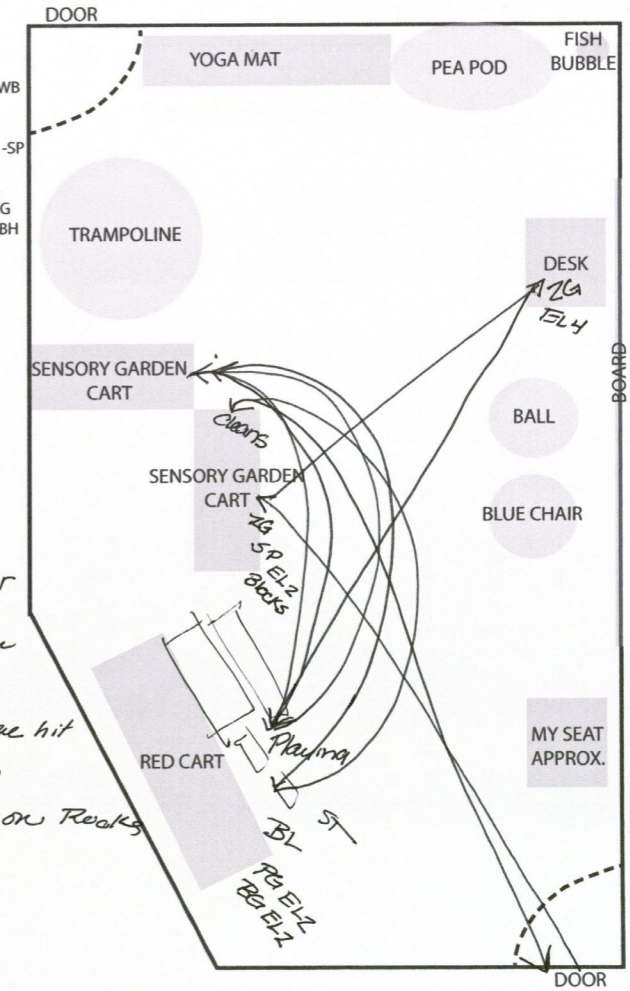
Child's Identification Number/Letter (depending on phase) 25

Date 3/2/2017 Time Start 10:33 Time End 10:49

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Fidget Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:

ZG - having issues
 Crawling on seating
 tiles/laying on floor
 grabs Weighted Blanket
 puts weighted blanket on ST
 lay on the
 takes blocks roll them
 on blanket
 makes sounds when he hit
 different seating tiles
 Pumpkin gourds tossed on Reaky
 Bird HG
 tossed from para
 throwing them



High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

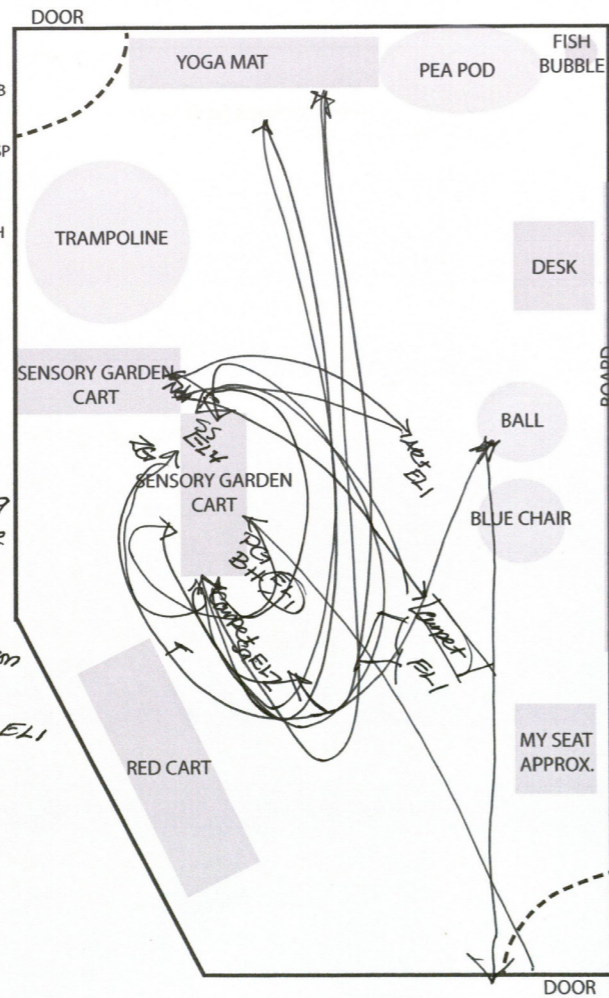
School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 27

Date 3/2/2017 Time Start 10:53 Time End 11:23

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:
 Shaking and placing with everything
 rolling the wood dowel / turning
 running around singing about the carpet
 reading the rules
 SS-knocked off both the said son
 Net using to catch himself ELI
 Spinning the FH-ELI
 ZG



High Activity

Sensory Room — Williams Science & Fine Arts Elementary Magnet

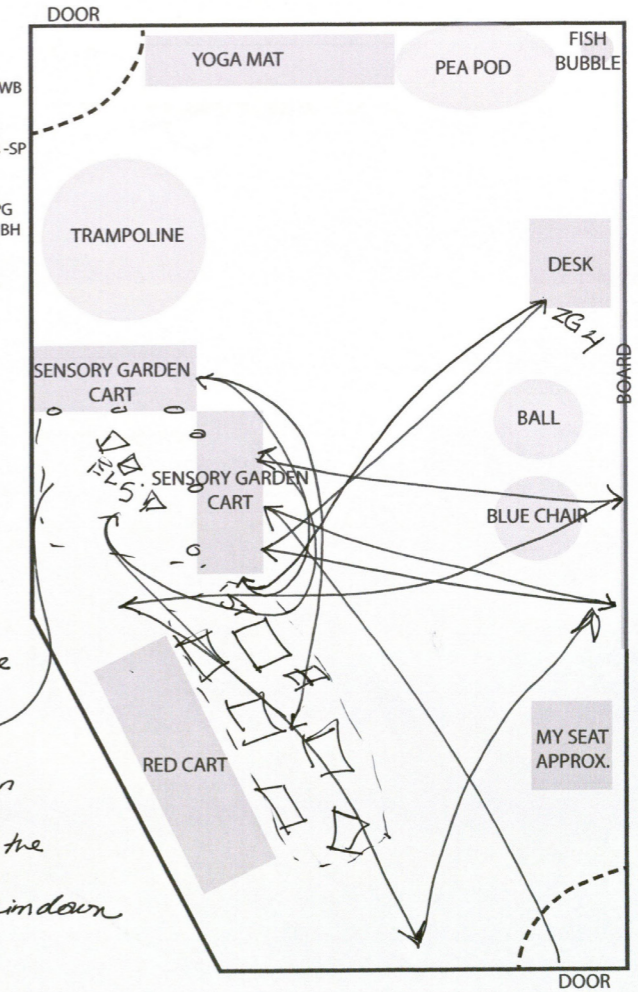
School, Topeka, KS

Child's Identification Number/Letter (depending on phase) 33

Date 3/2/2017 Time Start 2:51 Time End 3:04

- | | |
|-----------------------|------------------------------|
| ITEMS IN RED CART | ITEMS IN SENSORY GARDEN CART |
| Therapy Putty -TP | Zen Garden - ZG |
| Squishy Ball - SB | Weighted Blanket - WB |
| Sock-SK | Wood Slices - WS |
| Figet Toys - FT | Wood Circles -WC |
| Star Master -SM | Scented Pine Cones -SP |
| Coggy- CG | Foam Handle - FH |
| Mini Sport Balls -MS | Fabric Wraps - FW |
| Magnetic Blocks -MB | Pumpkin Gourds - PG |
| Balance Block -BB | Birdhouse Gourds - BH |
| Etch-A-Sketch -ES | Plants - PT |
| Bubble Hour Glass- BH | Seed System - SS |
| Charts -CH | Net/Fabric Tent - TT |
| | Seating Tiles - ST |
| | Blocks - BL |

Notes:
 ZG, pedal out his three activities
 ZG, grass, SS
 Using the tools to smooth out the sand
 making the seating tiled like a whole new place
 wants to use blanket
 Tent using green fabric
 Being quiet and making the garden under the tent
 he seemed to calm him down
 Puts grass



APPENDIX I: FIELD NOTES



Notes were taken after each session summarizing the child's activities and interaction in the sensory room. The following are associated with the previous appendix: H observation examples.

10:30 **A**

Child played with one object the whole time and seemed really focused on making blocks and shapes out of the MB. He built blocks and his level of engagement was five. The magnetic blocks had his full attention the entire time he was in here. He was instructed not to talk to the other child in the room, but made sure that he talked to the adult who was with him. I was surprised that the child did not care one bit that I was in the room, never really looked my way. They seem to really know the routine and have it down. I also was unaware that there was a timer in the room that was used to directly tell the students when cleanup was and when they needed to get back to class.

10:30 **B**

There was more activity today. The child is allowed to pick a green red or yellow sticker indicating what they need to help them to return to class and what they need meet their needs. He really enjoys the magnetic blocks but this time he spent the time between the MB and TP. The TP was his getting ready to return to class object and it helped him transition between class. It is obvious the child knows the routines of the sensory room. He picked out the items that he thought would best help him get ready to return to class. These children are about kindergarten age.

10:30 E

This child was having a bad day and could not sit still for even a moment they tried several calm down activates or in the red card. He was all over the place and talking the entire time. He really wanted to stay in the room longer and didn't want to leave. He was the most engaged with the ball, and bounced all around the room and laid on the ball. It was hard for him to sit through several of the calming down exercises. He also made quite a fuss with the timer; he changed the time and made the alarm sound several times. He even ran into the other child who was in the room at the time.

1:15 G

Same child from this morning that was having a rough time, while he was full of energy this morning he had none this afternoon it was a chore to get him to move around with the ball and do the animal walks. Animal walks was a new activity that I haven't seen before where the para picks different animals for the kid to walk like. This seems like it helped him get moving. He talked a lot and asked questions about the animals while he was walking like them. See notes for the different animal types. It was interesting to see the difference in this child from the morning to the day. He almost wanted to leave the room this time whereas

this morning it was almost impossible for him to have any time to do anything. He almost seemed sluggish or down.

1:30 H

This child who was also in the morning followed a much different schedule than other previous observations. He had the ball rolled over him while he laid on his stomach and then did push-ups on the ground and on the wall while finishing with TP he was directed to use the hard TP.

10:30 K

This student followed his regular routine the only difference was that he directly played with and talked to the other student who was in the room at the same time. They both seemed really wound up and not able to settle down. The built things together and then when this child moved on to the TP the other child built off his creations. He seemed to enjoy that and even encouraged the other child and at one point left the desk and the TP to help the other child find a certain shape of MB that was needed. He did not have a hard time leaving the room, or putting away the toys.

8:45 O

This was a different child that I have not had the opportunity to observe yet. He didn't say

a single word while I was observing and the adult with him is the one that set the timer and set the done sticker. He used two items that I have never seen used before as well. The Peapod and the ES he used the ES while sitting in the pea pod and seemed to really be enjoying it. He also played with his wallet while sitting there. He showed interest in doing an item from the red cart I am unsure what item, but he was told that they would be doing it in class.

10:30 P

This student was noted at having a bad day and seemed active overall. He wanted to run on the trampoline and he used it as a way to do jumping jacks. His para noted that he was having a bad week. He was the first student I have seen use the trampoline as an actual activity and not just something to stand on while they are making the choices for the day. He also sat on the ball and bounced around the room for a little while until the other student came in. Then they both played with magnetic blocks and made different activities. He made the blocks and kept bringing them to his para to show her the different activities. Then the three of them sat in a triangle and passed the ball around to one another. This is an activity that this student came up with and the other students joined in on a few times in the last couple of days.

1:30 S

This student usually comes in with a bunch of energy but this time seemed to only be interested in using the peapod. He sat in there with the CG and didn't really seem that interested in the CG all he wanted to do was shut his eyes and take a brief nap. It seemed like he actually fell asleep at one point though it is hard to tell if he was faking it or not. Usually this child is full of energy but I did notice that there have been a few times in the afternoon that he has not been so full of energy.

9:00 U

This was a child that I have never observed before. She had to be walked through the activity and there were several times that I did not understand her. She wanted to use the balls but was instructed to use the MB.

10:30 V

He seemed to be having a much better day than previous days. He still had a lot of energy and this time he brought something from home with him into the sensory room. He brought in a yo yo and played with it as he did various activities. He also used the balancing block, this is something that I have not seen used before and seemed to help him focus a little while he was trying to keep his balance. It is a little wooden square with

a rounded bottom that they have to try and stand on. He also bounced around the room on the purple ball. While he moved around the room a little bit there have been times where he ran around the room a lot more.

1:00 **Y**

The child was really into the MB and SB he was highly engaged with both of them for about equal amounts of time. There was nothing particularly new other than the fact he tried to make sharks out of the MB and that he got frustrated when they fell apart when he picked them up. I have seen the SB used before and he did the pretty typical stuff with them. The only new thing is he used the lid and the box that they come in to flatten out the balloon with a smiley face.

Second Sensory Room Observation with Mobile Sensory Garden Cart

8:45 **1**

The child was instantly drawn to the sensory garden cart. He went straight for the SS and then moved around to the wooden dowel and WC and then back the SS. While playing with the SS he also moved the bark around on the FW and played with it. The para remarked how she thought a lot of children will really enjoy this. He was excited and there

was plenty of noise with the SS.

10:30 **3**

This child is usually really high energy and typically is running around the room. The cart didn't seem to calm him down that could have been because it is new to the room and he wanted to play and to touch everything. His time with the ZG was an example of how not to use it he got out of control with the sand and while it seemed slightly calming once he was told it was almost time to go he seemed to be less calm. There have been no picking activities either during the time here. There will probably be certain items that he is no longer allowed to play with. I did not notice any calming difference from the time he entered to the time he left. This did happen during the first round of observation as well. It was remarked that maybe moon sand would be a better option or kinetic sand that way it stuck to itself a little more and wasn't all over the place. He was also not good with the spray bottle. He watered the plants but it had to be taken away from him. He also wanted to water everything else.

1:30 **13**

He was really excited to use the room and see the plants. He played with the seed system and made sure to keep the seeds in the bottles. He also wanted to look around and

play with the Zen Garden which was taken to the desk. He played well with it and kept wanting to use his hands but was instructed not to. He also tried to place the wooden blocks in the Zen Garden in the beginning he ended up putting them back after he was instructed too. When the timer went off he also did his usual tracing the board and making sure that he beat his para in the maze. He also briefly played with the fidget toys on the way out.

8:45 **14**

This child has been using the sensory room once a day and during last week's observation was completely enthralled in the SS and this week he looked at it then moved on to the WC he really like putting the wood circles on the dowel and taking them on and off. He was told not to swing them around. One thing that I thought was interesting is because he was playing with wood he asked where wood came from which his para answered trees and he was said like leaves and seemed to make a connection that he had not previously made.

10:30 **16**

He was having a hard day and really wanted to be all over the place. He is a usual, and it almost always active in the morning. Something that was out of the normal that I

have seen is he went to the pea pod and laid with part of the weighted blanket on him. This really seemed to help while he was using in. The normal two children that were in the room got distracted when a third joined this was the first time I have seen this and the child. I do not believe that he is a regular. This really seemed to throw off and distract the other children in the room. The next thing he played with was the seating tile, he laid a bunch out on the floor and sat/laid on them with the weighted on him then he laid on the weighted blanket. There was lots of running around and touching different things both on the cart and off of it. It seemed less calm when the third child was in the room. He also used the Zen Garden and that seemed to create some problems. He does not want to leave the sand in the Zen Garden. He also did not want to leave the room when his timer went off and did everything possible to not leave the room.

1:30 **21**

Usually this child is high energy in the morning and lower energy in the afternoon, and today was no exception. This morning he was almost destructive in the sensory room and this afternoon at all he did was play with TP and hardly talked at all. He sat there and wrapped the TP around his arm

and then rolled it out on the table. Usually he is a ball of energy but this time he was quiet and hardly said a word until it was time to go, and then he made a fuss with everything he didn't want to leave and was generally just grumpy. It appeared that the para gave instructions as to what items he could use before he came into the room. He wanted possibly do the Zen Garden and that was not an option.

1:30 22

There was a substitute para who brought him into the room and clearly had not been trained. He stayed over half an hour and then she just got up and left him in the room with me. He played with the SS and the Zen Garden which got most of his attention and that seemed to help him calm down and he cleaned up after himself.

10:30 25

This child comes in with a lot of energy in the mornings, he usually has a problem with the ZG and today was no exception. He did that first then and didn't want to give the other child a chance to play with it. Eventually he did stop and then he went on to playing with the seating tiles which the other child who uses the room had already laid out all of the carpet, grass, and tiles were spread out near the red cart he laid on them and then he

brought the weighted blanket over to the seating tiles and laid on the weighted blanket on top of the seating tiles. His para started handed him the different gourds and he separated them by which ones made noise and which ones did not. He then threw them on the WB along with the blocks he did this because it made different noises depending on what was underneath the WB. He did not want to leave again today, but that is common with him.

10:45 27

This is only the second time he has used the sensory room while I have been here and the second time with the sensory garden. He bounced all over the place asking what this was and what that was. When he got his answer, he would repeat the word and continue to the next thing. He really seemed to like the fake grass, the seed system, the net and the gourds. He was energetic and had amazing manners every time he spilled some seeds he would apologize and once he knocked off the bottle and he seemed to think he was going to get yelled at but his para said its okay and showed him how to get it back on.

2:00 31

He always comes in around this time and it is his only time throughout the day. He

went straight for the pea pod and had the weighted blanket put over him. He sat there in the dark for most of his time until the other student came in and turned the light on. Then he went to the SS and used that a few times. When he was done using that he went on to the seating tiles. He loved to feel them all touching the front and back of every single one. He sat on them moved them around and laid on them. Then he went to the ZG are used it until his timer went off. He then helped put it away and had to do the SS one last time. When he was done, he left.

2:00 32

This student is having a really hard day this is the most number of times I have seen him in the room in one day. He was instructed to use the ZG and is making sure that he only uses his time productively. He was asked several times to use his words, he communicated that he also wanted to do the SS or as he called it the "Birdfeeder" his teacher allowed him to do the SS twice and then it was time to go. He was ready to go once he was done with that.

2:40 33

This was the child that was having a hard day and it is his 5th break of the day. He used the Zen Garden and the ST and also used the green fabric as a tent. This is the first

time I have witnessed a student use it in that way. He used it only on one cart. Which is a positive thing because that is the cart that belongs to Chip and will not stay in the sensory room. He really wanted to lay out all of the seating tiles and play with them. He sat, touched, and moved them around. He wanted to use the weighted blanket like him and another student did this morning, but the para said no that seemed too much like playing with the blanket. He seemed to really calm down while using the tent. It was quite fascinating for me to watch him calm all the way down after being hyper earlier in the sensory break.

