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Connecting At-risk Youth To Place: Using Restorative Practices To Improve Learner Awareness Of Local Climate Change

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CONNECTING AT-RISK YOUTH TO PLACE: USING RESTORATIVE PRACTICES TO IMPROVE LEARNER AWARENESS OF LOCAL CLIMATE CHANGE

by

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DEDICATION

To my parents, Melissa and Randy, who raised me in nature and taught me that by taking care of the environment, it would take care of me. I'm forever grateful for your continuous love and support. To Deanna, who first lit the flame for my passion of environmental education and has been a mentor ever since. Your enthusiasm for teaching encouraged me to pursue environmental education. To Bryan, for providing opportunities for me to reflect on life through expanding my knowledge of nature and environmental concerns. It was through the seminars that I was inspired to pursue this study. To Jude, my partner and best friend, who's always ready for the next adventure in life and who has supported and encouraged me to follow my dreams, even when I doubted myself. Life with you will always be an adventure. To my students, my "kids", who always taught me new things and encouraged me to be a better person and educator. To my "kids" and children: may you always find solace in nature and when you feel alone in your worries, tell it to the trees.

In memory of Emery Blair Johnson Martinez, whose spirit lives in the flowers dancing on the prairie.

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CHAPTER ONE

Introduction

Overview

This capstone thesis will use a case study to investigate the question: *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* Through my internships while an undergrad, my short time as a high school science teacher, and my reflections during my graduate courses through Hamline University, I began to inquire about what connects people to place, what defines place, and how those connections tended to make them more aware of natural phenomenon while I also observed how interactions with nature could support holistic well-being for people (Albrecht, 2005; Berman, et al., 2008; Bowler, et al., 2010). While often we think of "place" as being simply the area that we experience daily, there are many factors that define "place". During the summer of 2019, I attended Hamline courses at the Osprey Wilds Environmental Learning Center (formerly the Audubon Center of the North Woods). The hands-on learning opportunities provided opportunities to create deeper connections to place by becoming more informed and aware of the ecosystems and their inhabitants. It is through experiences and the immersion into nature that people can develop a relationship with the place they live and the people that live in that place (Capaldi, et al., 2015).

While teaching 7th-11th grade science at the Fond du Lac Ojibwe School, I would often bring students outside to provide place-based and inquiry-based learning experiences. During these outdoor adventures, I would often notice a change in behavior and attitude: students were more engaged and calmer. This phenomenon was specifically observed and studied by Berman, et al., in 2008 during a study that examined cognitive benefits from being in nature, in which the study determined that nature restores attention, a theory that other studies have supported (Albrecht, et al. 2007; Capaldi, et al. 2015; Cumming & Nash, 2015; Goggin, et al. 2017). It was during my time as a teacher that I was also introduced and trained on restorative practices. Restorative practices use circle talks, a sharing session where members listen to and discuss views to connect to one another, and conflict resolution techniques to rebuild relationships after a harm has been made or to build stronger communities. This process changed the way I interacted with students because the goal was to support students by repairing the harm they committed through their negative actions to change behavior and reconnect them to their community (Disney, 2017; Gaarder and Hesselton, 2012; Kehoe, et al., 2018; Schumacher, 2014). Youth can have an impact on their community when crimes involving them are considered, and the aftereffects are examined. Considering that about one in every thirteen juveniles were arrested for murder and about one in every five juveniles were arrested for robbery and vandalism, with national data from 2017 (Puzzanchera, 2019, p. 8), it's apparent how youth can harm their community and disconnect from the people in their community. Throughout my professional experiences, I have observed that youth are often more relaxed, more engaged, more willing to work

with peers, and have an increased awareness of environmental concerns when they are given opportunities to interact in nature. My observations of restorative practices in a school setting have also shown that students are able to build stronger relationships with peers and staff while also being able to communicate their feelings and needs more effectively. Given the holistic well-being support that nature and connection to place can provide and how restorative practices are meant to connect people to their community, I began to wonder if there could be a way to connect students to place with the concepts of restorative practices while also helping students recognize local signs of climate change.. In a study conducted by Cumming and Nash (2015), participants did express a sense of belonging and built new relationships among peers and staff during student involvement activities outside (p. 305 and 306). Perhaps there was a way to help people heal their relationships to community while helping them heal through connecting to nature, which, in turn, could help them heal the environment by making them more aware of local impacts from climate change. I started to wonder about the connection between these two seemingly different topics during my own reflections over the summer of 2019. As I grew more connected with the places I lived, I wanted to better the community and get to know my neighbors. I felt inspired and motivated to help others connect to nature and to share the joy in experiencing the outdoors, which encouraged me to join outdoor and adventure groups in the area. It appeared that others felt the same way about connection to place and connecting with others to share experiences in the outdoors, especially to raise awareness of local issues regarding natural resources and natural places. My observations suggested a correlation between connection to place, connection to

community, and increased awareness of local issues such as climate change. It made me wonder if it would be possible to support at-risk youth to repair relationships with their community while engaging in restorative practices and outdoor, place-based activities about nature.

Chapter one will discuss the meaning and purpose for the case study as well as an overview of the researcher's reflections, experiences, and the passion for bringing youth outdoors to explore and learn. The interest to the researcher and the importance of restorative practices and connection to place will be discussed before the introduction of chapter two.

Background

The history of my interest in the outdoors and connection to place stems back to the start of my childhood. I grew up in a small town in northern Wisconsin where my parents still live today in a cozy house on lakefront property. Summers were spent fishing, boating, swimming, picking wild berries, and stargazing around a campfire. Autumn was hunting season and, when we weren't hunting, we would build tree forts. As I got older, I would spend fall hiking through the local park while testing my hand at photography. Winters meant ice skating, ice fishing, and building snow forts. Spring was the muddy, transition season that I was the least fond of since the ice was no longer safe to skate but too frozen to even begin to think about swimming. Every season gave me the opportunity to connect with the place I grew up and the fond memories have kept me connected, despite the environmental changes that have occurred over time.

It was during high school that my walks through the park and interactions with nature became more observant and were encouraged as my high school biology teacher and my high school physics/chemistry/math teacher sparked my interest in studying nature. I used a water quality testing kit for the first time there. During stream investigations, people hiking the trails along the stream would often stop and question what we were doing or what we were finding. I didn't realize at the time, but these discussions planted the seed for my future pursuit of a career in environmental education because sharing my passion for nature fueled me and made me realize that not everyone knows what's going on in the place they engage with daily.

Connecting to Place through Education

Though I started my time as an undergrad as an engineering major, I eventually wandered my way into biology, broad field science, earth and space science, and geographic information systems (GIS). I was lucky to have many opportunities to expand on my connections to nature and place through internships, some of which allowed me to share my passion with others through environmental education. From water quality monitoring on the south shore of Lake Superior for the Lake Superior Research Institute, to sampling fish on the north shore of Lake Superior with the Minnesota Department of Natural Resources Fisheries, I had many incredible hands-on experiences that connected me to the Lake Superior watershed. My internships with the Rivers2Lake program through the Lake Superior National Estuarine Research Reserve and the MinnAqua program with the Minnesota Department of Natural Resources Fisheries ignited my goal

of pursuing Environmental Education as a career. This ignited my passion due to the impact it had on the people I interacted with through various workshops and field trips.

The most eye-opening experience as an undergrad was during my internship with Rivers2Lake when I was mentoring a 5th grade teacher by supporting her in developing skills in outdoor, place-based, and inquiry-based education. During the mentorship program, her class took weekly walks to the stream by the school to test the water quality. There was one student who was at a 3rd grade reading and writing level, yet, when he was exposed to the outdoor *classroom*, he excelled. This student could explain every parameter being tested and what each parameter could tell us about the health of the stream. It was during this mentorship that I realized the power of connecting youth to place and how it supported them holistically. As studied by Cumming and Nash (2015), students are happier and more likely to engage in conversations with the people around them when interacting outdoors, which can help students feel more confident, and explains what I observed during my internship (p. 303).

Holistic Health, Academic Success, and Outdoor Experiences

I began teaching at the Fond du Lac Ojibwe School in the fall of 2017 and considered myself to be the luckiest science teacher ever, considering that the school had a greenhouse connected to the science room, a brand new lab, and trails around the school that wrapped around a small pond. My rowdiest class was always 7th grade while my 8th grade class was usually my distracted and often troubled class. With both classes, I noticed increased engagement and even curiosity when the students were brought outside for class. It was during these outings that I noticed the students were more focused (Kuo

& Taylor, 2004, pp. 1583-1584). Interactions in nature have been shown to increase attention because of the peaceful environment that provides fewer distractions than, say, a classroom or urban setting (Berman, et al. 2008; Capaldi, et al. 2015; Cumming & Nash, 2015; Scannell & Gifford, 2017). When bringing students outside, I also found myself more relaxed, which helped me build relationships with my students as they strengthened the relationships with each other. Engaging in class activities outside supports students in developing social skills by promoting building relationships with their peers and staff (Cummings and Nash, 2015, p. 305).

At the Ojibwe School I was introduced to trauma informed schools, or schools that address the needs of students who have experienced trauma, and restorative practices. After completing a restorative practice training in the summer of 2018, my view on discipline and classroom management changed dramatically. The goals of restorative practices are to rebuild relationships, reconnect the individual to the community, and help the individual heal or develop coping skills from previous harm done to them so they don't repeatedly cause harm to others (Disney, 2017; Gaarder and Hesselton, 2012; Kehoe, et al., 2018; Schumacher, 2014). I became more compassionate and was more determined to reach out to the *troubled children*, children who had experienced trauma and may be more likely to fall into the school-to-prison pipeline. I wanted to build relationships with them in order to help them feel loved and accepted in my classroom. The process changed my classroom. I was closer with my students the second year of teaching and could see the influence it had with their behavior in my

classroom, thus making me even more curious about the power of restorative practices for youth.

Using Connection to Place to Create a Sense of Identity

The summer of 2019 was a pivotal time for me personally and professionally, and it impacted me mentally, emotionally, and spiritually as many changes occurred. Soon I began to reflect on my journey to where I was in life. I was becoming burnt out from teaching, and it made me decide to go back to school for the Master of Art in Education: Natural Sciences Environmental Education program at Hamline University. Shortly after starting at Hamline, I accepted a position in Student Services at the Fond du Lac Tribal and Community College.

I took three courses at Osprey Wilds Environmental Learning Center, previously known as the Audubon Center of the North Woods, with its executive director Bryan Wood: Sustainable Foods, Biomes: Ecological Systems, and Reading the Landscape. One of the class requirements for every seminar was a reflection paper. These reflections gave me the opportunity to reflect on more than just what I learned. I also reflected on my previous knowledge from my life experiences, and helped me in deciding where I wanted to go in the future in environmental education and in personal life habits regarding the environment, while also inspiring the topic of my capstone.

In looking back at the progressions of my reflections over three semesters, it's clear how the courses and my life experiences brought me to my focus of study being tied to connection to place, self-awareness, understanding of changes to local place, and holistic healing through interacting with nature. An excerpt from my reflection of the

Sustainable Foods course examines not only my connection to place and its people, but also looks at my own identity and values related to the place I grew up:

"They [the farmers and business owners we met in the course] were all more than willing to share information and to welcome people to see what they were doing. It's a community vibe that I long to be a part of because having grown up in a small town and now moved into a new community, I feel disconnected from those around me. In my community, we would all fish, hunt, garden, or forage and create dishes or drinks that could be shared at times of gathering (celebrations, graduations, etc.). Since I started college up until now, I haven't been in a place where I can really connect with the land through using its resources and I haven't had the opportunity to connect with neighbors as I have moved around quite a bit."

My reflection from Reading the Landscapes really clarified what connection to place can do to support people, especially during hardships, and was probably the driving factor that led me to wanting to answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* It was during this reflection that I knew that I wanted to conduct a case study to determine if there was a connection between how connecting to place can have holistic health benefits and, most importantly, how interacting with nature can help people heal by helping them find their sense of identity and belonging. Nothing really made me realize what the connection to place could be until Wood [during the Ecological Systems course] mentioned that "To get to know the place you're in and make connections, introduce yourself to the things that live there (Wood, D., 2019, Course

Lecture).” It made me realize that we can draw connections between our daily life and how we can apply that to nature. The quote also made me realize that if we approach encounters with nature like we approach meeting people, we can make connecting to place habitual and simpler than many people probably feel when they attempt to interact with nature. All of this brings me to the statement that really spoke to me during that course: “If you start paying attention, your subjects will start telling you their story (Wood, D., 2019, Course Lecture).” Again, by interacting with nature as if we were interacting with people, I think it makes connecting to nature easier for those who might otherwise have no interest in trying to connect to place as they may not see the value of doing so despite there being a vast amount of research that shows there are holistic benefits to connecting to place.

The final thoughts from my reflection of Reading the Landscape reflect on my personal challenges at the time and showed me that not only can nature heal itself over time, but it can help people heal and cope with the difficult chapters in their lives. Thinking back, I realize that perhaps the most important thing that this class has shown me through every landscape that we examined, every tree that we studied, and every story that we helped to tell is that no matter the challenges, the disturbances, and sometimes the total catastrophic destruction, nature has a way of healing, growing, and making something new and beautiful that can give hope for the future.

Given the hope that the story of the landscape provided me, I wanted to see how I could help others heal by connecting them to place and its people on a more personal

level of connecting their story to the story of the place and the people that reside in that place.

Conclusion

Connecting people to place can have holistic health benefits while also helping individuals create a sense of identity as they reflect on their own story (Berman, et al., in 2008; Bowler, et al., 2010; Capaldi, et al., 2015; Cummings and Nash, 2015). The purpose of connecting people to place is to provide a sense of community and identity while raising awareness to the history, culture, resources, people, and uniqueness of their place. In focusing on the natural aspects of a place, it can raise awareness to the local impacts that climate change has and makes the urgency of addressing climate change more apparent for people who are more connected to the place (Ojala, 2013; Albrecht, et al., 2007). Given how people are a large part of place, I started to wonder if connecting people to place and its people, and if restorative practices could be tied in to help repair the harm an individual has committed that may be tied to the people in a place. Restorative practices focuses on rebuilding relationships between people when a harm has occurred, and I hypothesized, based on review of previous literature, that it could be a process used to help students rebuild connections to their community and sense of place and identity through connecting them to the natural spaces in a place (Cumming and Nash, 2015). Thus, I became interested in examining if there is a connection between connecting to place through environmental education and rebuilding relationships to people in a place through restorative practices and if this would raise awareness of local climate change.

Chapter two examines literature topics focusing on connection to place, student/youth awareness, local climate change, and restorative practices. The definition of place, processes in which connections to place are made, and the holistic impacts connections to place has will be analyzed. Student/youth awareness, examined as metacognition, self-efficacy, and mindfulness, will be reviewed to discuss the student's identified level of awareness, how awareness can be assessed, and methods for raising awareness. Although climate change is a large topic of today's media, the focus will be primarily on local impacts climate change has and what this does not only to the species that live in northeastern Minnesota, but also for the place and culture of northeastern Minnesota. The brief history of restorative practices, the purpose of restorative practices, and how these practices have been previously implemented will be discussed. Lastly, the background of the study group will be described to introduce the study group.

Chapter two literature review will highlight the importance of the background of these topics and provide insight to information and methods needed to complete the study. Chapter three will connect information discussed from Chapter two and to articulate the methods of the study and how this process will provide answers to the research question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* Chapter four will analyze the results of the data and provide interpretation of the data to determine the extent in which the question was answered by the case study. The fifth and final chapter will provide a conclusion to the capstone, review the literature presented in Chapter two, address potential future studies, and provide a reflection of the experience to the author.

CHAPTER TWO

Review of Literature

Connection to Place

In this section, connection to place will be discussed by defining what connection to place is and explaining how place is defined. Connection to place will be further defined by determining what the most important factors are to connecting people to place and examining how interactions with nature and connection to place changes a person holistically. Lastly, this section will discuss how local climate change can impact a person who is connected to place.

What is Connection to Place*?*

Douglas Wood, musician and author, had said that in order to feel comfortable in a new setting, one must introduce themselves to those around them (Wood, D., 2019, course lecture). Though Wood's words hold true for when a person is new to a group of people, the context was discussing when a person feels disconnected from nature: to connect to nature, one must introduce themselves to nature by learning the names of the plants and animals in that natural setting. People's connection to place has been evident throughout history and the natural resources that have connected people to those natural places have been vital for survival. The Lake Superior Chippewa migrated to the Lake Superior region looking for a place that would sustain them (Stults, et al. 2016). Those who live on and around the ceded territories of Minnesota have utilized specific places

over many generations to continue exercising their treaty rights to hunt, fish, and gather in traditional ways, and this included seasonal migrations to the same locations year after year in order to provide food for survival (Stults, et al. 2016, p. 14). From the sugar bush in the spring to tap maple trees to the rivers with wild rice in the fall, the Chippewa, or Ojibwe, people have connected to place by engaging with nature to continue traditional ways of providing for their families. Even for those not affiliated with the tribe, family traditions of interacting with nature and getting to know the natural resources have connected them to place (Stults, et al. 2016). In order to understand connection to place, the term *place* must be defined regarding the environment in which the person resides as well as the personal experiences the person has to the place (Lewicka, 2011; Mendoza & Morén-Alegret, 2012; Scannell & Gifford, 2017). By defining place and understanding how people connect to place through various factors, one can begin to answer the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

How do we Define* Place*?

To determine what factors connect people with place and how the attachment to place can influence a person as well as how changes to place can affect a person and their connection to place, *place* needs to be defined in such a way that includes more than the geographic location and the area in which a person lives. Too often, place is defined as the location a person resides at and the surrounding area in which they live. Much discussion has focused on the geographical region and the landscape that is involved in defining place. A place as a location refers to a geographic area with a defined point or

space that could be found on a map (Dentzau, 2013, p. 166). The environment contains the flora, fauna, landscape, structures, and waterways, which is not limited to only *wild spaces* or natural areas, but also urban areas and human-made environments. While natural spaces are often thought of as being places of untamed wild, often these spaces are outdoor areas such as a park or playground that can be easily accessible and interacted *with and by* people of all ages (De Bell, et al. 2018). *Place* is defined as a place where people typically reside in which they interact and connect with their community, thus creating a sense of identity and improving self-esteem (Lewicka, 2011; Mendoza & Morén-Alegret, 2012; Scannell & Gifford, 2017). These interactions can also add another component in which there are historical and cultural factors that influence the definition of place (Scannell & Gifford, 2009, p. 2). *Place* in terms of environmental education is usually referred to as the landscape and natural resources that people interact with and experience (Stedman, 2002, p. 563). Place attachment includes many aspects of a person's engagement with the landscape and includes the cultural, historical, physical, emotional, social, and spiritual connections, and all of these aspects also connect to a person's memories that are intertwined with the place (De Bell, et al. 2018; Dam & Eyles, 2012; Goggin, et al. 2017; Kemkes & Akerman, 2019; Mendoza & Morén-Alegret, 2012; & Scannell & Gifford, 2009).

What Factor is Most Important in Connecting People to Place?

The definition of place includes several variables, and these variables are the core of what connects people to place: history, culture, personal experiences and memories, and interactions with nature all influence a person's connection with nature. A person's

experiences, memories, and interactions have the largest influence of a person's connection to place (Capaldi, et al. 2015; Dam & Eyles, 2012; Mendoza & Morén-Alegret, 2012). Interactions not only influence connections, but can help individuals create connections with a place if they do not have previous personal associations with the place or can help create positive associations if there are previously negative associations with a place (Capaldi, et al. 2015; De Bell, et al. 2018; Dentzau, 2013; Mendoza & Morén-Alegret, 2012; Stedman, 2002). While the types of interactions people have can vary, the interactions must include a feeling of safety for the participant, inclusion of active participation, and an engaging activity that the participant enjoys (De Bell, et al. 2018; Goggin, et al, 2017; Stedman, 2002). These interactions are commonly seen when students conduct stewardship projects or when community members participate with community events, such as a community garden, and studies have shown these actions will help the participants develop strong positive associations and emotions with place as well as the people that they interact with through these experiences in nature (Capaldi, et al. 2015; De Bell, et al. 2018; Goggin, et al. 2017). Active participation in an outdoor activity that makes the person comfortable in nature is the largest contribution to connecting people to place, especially for those individuals who have not had previous experiences with a place or who may have a negative perception of nature and outdoor places. Trails and play areas in or near nature that are maintained, which may be deemed less natural by some, are safe, comfortable, and accessible places where people can engage in nature and are therefore great ways to begin to expose individuals, especially children who may fear nature, to the outdoors (De Bell, et al.

2018, pp. 5 - 7). Engagement in the outdoors can help people create a personal attachment to the place through creating memories, learning about the history and culture, connecting one's own culture and history to the place, and engaging with natural resources with hands-on experiences, and interactions, even with maintained trails and play areas, is a key method for helping children and young adults connect to place.

How do Interactions With Nature and Connection to Place Change a Person Holistically?

Connection to place and interactions with nature can have dramatic effects on a person's wellbeing, including social, mental, physical, emotional, and spiritual aspects, and many studies have shown just how valuable a person's relationship with nature and place can be for long-term health. While the outdoors can provide a means for people to be physically active, there are also other health benefits that can be attributed to interactions with nature. For example, cognitive performance has been shown to increase when individuals spend time in the outdoors (Berman, et al. 2008, p. 1211). Time spent in the outdoors has also helped individuals with increasing their awareness of their surroundings, which can address physical safety and comfort as well (Reese & Myers, 2012, p. 402). Engaging in the outdoors has shown to reduce stress and increase positive emotions, both of which factor into longevity of life (Capaldi, et al. 2015; Goggin, et al. 2017). Emotional benefits of engaging in nature not only include reduced stress, increased levels of connectedness, and increased levels of happiness, it also increases a sense of belonging, increases self-esteem, and creates a place where people can find solace in times of need (Albrecht, et al. 2007; Capaldi, et al. 2015; Cumming & Nash,

2015; Goggin, et al. 2017; Reese & Myers, 2012; Scannell & Gifford, 2017). As discussed by Capaldi, et al. 2015 and Galway, et al. 2019, people could be more connected to nature, and these connections would benefit both the emotional health of the individual as well as the health of the environment (Capaldi, et al. 2015; Galway, et al, 2019). Feelings of connectedness with nature can develop into attachment with the place, which can help the individual with a sense of identity and belonging while interacting with the place (Cumming & Nash, 2015; Goggin, et al. 2017). This sense of identity and belonging also increases social wellbeing for the individual during interactions with peers, mentors, teachers, or community members in nature. As observed by Cumming and Nash, 2015, having classes in natural settings while focusing on natural resources helped staff and students develop relationships as there were more informal and genuine conversations among staff and students (p. 2). One staff member in Cumming and Nash's, 2015 study also observed that students "showed empathy towards one another" in the natural setting, something not observed in the school and classroom setting (Cumming & Nash, 2015, p 303). All of these benefits can be related to spiritual health, however the connection to place is, in itself, a spiritual connection that can even provide "feelings of transcendence (Capaldi, et al. 2015, p. 3). The spiritual connection with a place can help people find solace, comfort, and the support to overcome challenges in their lives (Galway, et al. 2019; Goggin, et al. 2017). With connection to place being so influential on a person's mental, emotional, physical, social, and spiritual health, there is little question to the importance of helping individuals connect to place and it sheds light

on the concerns of how local climate change will impact individuals beyond the direct physical implications that local climate change will have on people.

How does local climate change impact a person who is connected to a place?

The definition of place includes many factors that influence a person's connection to place, the person's holistic wellbeing, and the level in which they can interact with nature in a comfortable and safe manner that provides activities they enjoy. Due to these influences that interactions with nature and place have on people, the topic of climate change on local areas is a huge concern, especially for those who have deep connections to the places that they inhabit (Albrecht, 2005). Studies by Albrecht, (2005 & 2007), have examined peoples' perceptions of places, emotional and mental wellbeing, and changes in attachment to places that cause negative emotions as "solastalgia". Solastalgia, according to Albrecht (2005), "was created to describe the specific form of melancholia connected to a lack of solace and intense desolation" (p. 5). Negative emotions associated with changes to place caused by local climate change is one of the many ways a person can experience solastalgia. The negative emotions of solastalgia come as Albrecht (2005) states, from the "pain or sickness caused by the loss or lack of solace and the sense of isolation connected to the present state of one's home and territory" (p. 5). These negative emotions can create a sense of distress in people who are disconnecting or isolating from their place and this can lead to larger health issues, such as depression, drug abuse, and physical illness (Albrecht, 2005, p. 7). Though solastalgia has many negative responses in people, Kemkes and Akerman (2019) found that solastalgia can support people in taking action to address changes to place and communication about solastalgia among people

can create a sense of hope (p. 6). While climate change is just one factor of many that can change places, solastalgia can be used to examine people's responses holistically to changes to place as the climate changes. As Galway, et al. (2019) concluded, "solastalgia is an increasingly useful concept for understanding the links between ecosystem health and human health, specifically, the cumulative impacts of climatic and environmental change on mental, emotional, and spiritual health" (p. 15). The deep connections between a person's holistic wellbeing and the health of the environment are relatively new concepts, yet studies support the correlation and suggest that people's wellbeing is in jeopardy as the health of the environment is degraded, in part by climate change.

The term *place* can include much more than just the geographic location or area that a person inhabits and interacts with, including the flora, fauna, landscape, and the personal connections to the place (Albrect, 2005; Galway, et al. 2019; Kemkes & Akerman, 2019). Connections to place not only focus on the direct use of the place and its natural resources or the historical and cultural attachments, but also the holistic connection to the place and the level of solace a person can feel while engaging with the place. These connections can impact a person's health and, in turn, the environment. Studies show that connection to place can help increase a person's holistic health and that there is a correlation to the health of the environment. Furthermore, when there are changes to the environment, including changes in climate, people change, and this process has been termed *solastalgia*, where people can experience distress and isolation due to a change in their habitat. Though many studies have shown how people respond to positive interactions with nature, few studies have looked directly at how reconnecting or

connecting at-risk youth to nature can support their holistic wellbeing and raise their awareness and involvement of protecting the local environment. In addition, although some studies have shown people's holistic responses to the changes in their place and the environment, few studies have examined if there is a connection between at-risk youth's behavior and holistic wellbeing and the health of the place they inhabit. With the information about what factors contribute to place and people's holistic responses to changes in place, the question of *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices* can be addressed.

Learner Awareness

In this section, learner awareness will be defined and will examine how metacognition, self-efficacy, and mindfulness play a role in learning and self-reflection and how these components can be supported. Also in this section will be the examination of the role that nature has in awareness if this will increase awareness of nature.

What is learner awareness*?*

Awareness of how one is a part of a larger picture within the world is often a difficult thing to quantify. Other studies have used methods of examining self-efficacy, mindfulness, and metacognition in order to study awareness in individuals (Cikrikci & Odaci, 2015; Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2016; Zolkoski & Lewis-Chiu; 2019). In the field of education, the definition and assessment of understanding in learners is a large focal point, and is often examined in terms of metacognition or self-efficacy. Metacognition

and self-efficacy are closely related: metacognition is the actions or processes of self-knowledge (Cikrikci & Odaci, 2015, p. 978) while self-efficacy is what the individual knows they are able to do (Cikrikci & Odaci, 2015, p. 980). Both attributes can be used to help individuals, in this study the focus being on young adults, reflect on their view of themselves and are both associated with the level of satisfaction in life, which can help them in creating goals for future education and career pursuits (Cikrikci & Odaci, 2015, p. 984). Another form of awareness is self-awareness, or mindfulness, which, for the purpose of this study, focuses on how an individual sees themself as a part of the world in which they live and the level in which they reflect on the role they have in their community. Mindfulness, defined by Zolkoski & Lewis-Chiu (2019), is a state in which an individual is "fully present in what is happening in the here and now without dwelling on the past or worrying about the future" (p. 47). When an individual is able to practice mindfulness, they have more self-control and lower levels of stress which can make them more aware of themselves and the world around them (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2016; Zolkoski & Lewis-Chiu, 2019). Learners who have higher levels of metacognition are able to reflect on their cognitive processes by making connections to knowledge and new learning and by being resilient with new learning (Cikrikci & Odaci, 2015; Dahlin, 1999; Torres, Whitebread, & McLellan, 2018; Sandi-Urena, Cooper, & Stevens, 2011). While the level of self-efficacy can determine if an individual will have the confidence to complete an action or strive for personal development, there are many factors that can support self-efficacy and, thus, a learner's awareness and development (Cikrikci &

Odaci, 2015; Mittelstaedt & Jones, 2009). The same can be said for mindfulness, which is often practiced in the form of meditation, but over time has branched off and has resulted in there being many differentiated methods for individuals to practice mindfulness and this can lead to changed behavior, lowered stress and anxiety, and heightened self-reflection (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2017; Zolkoski & Lewis-Chiu, 2019). Metacognition, self-efficacy, and mindfulness can all be used to help individuals reflect on behaviors and promote changed behavior, as many studies have shown, especially in regard to pro-environmental, stewardship, or sustainable practices. Studies not only support that there is a correlation between increased learner awareness and changed behavior when engaging in outdoor activities or experiencing nature, but that there is also a correlation that learner awareness through engagement with nature can increase connection to place (Barbaro & Pickett, 2016: Dzhambov, et al. 2019; Mittelstaedt & Jones, 2009; Weaver, 2015).

What purpose does metacognition, self-efficacy, and mindfulness have in learning and self-reflection?

Metacognition, self-efficacy, and mindfulness all involve self-reflection for an individual to determine their level of awareness in each category and, oftentimes, these areas of awareness are not explicitly discussed unless a mentor, teacher, group leader, or other leading presence guides the self-reflection of awareness. Whether a learner realizes or reflects on their level of awareness or not, their participation in learning and personal development leads them to become more aware (Cikrikci & Odaci, 2015; Dahlin, 1999;

Dzhambov, et al. 2019; Mittelstaedt & Jones, 2009; Torres, Whitebread, & McLellan, 2018). This awareness can create a cycle in which learning continues and, thus, learners who learn how to use awareness as a tool can support further learning and observation (Barbaro & Pickett, 2016; Dahlin, 1999; Mittelstaedt & Jones, 2009; Torres, Whitebread, & McLellan, 2018; Sandi-Urena, Cooper, & Stevens, 2011; Weaver, 2015; Zolkoski & Lewis-Chiu, 2019). Learners who exhibit higher levels of metacognition exhibit signs of higher self-awareness and examine learning as a whole rather than as parts. This means that learners see how the parts connect and how they connect to the parts of learning when demonstrating metacognition (Dahlin, 1999, p. 196). In addition to self-awareness and reflection of self in the larger view of learning, learners who demonstrate metacognition are "more reflective and aware of their own problem-solving skills" (Sandi-Urena, Cooper, & Stevens, 2011, p. 337). As learners become more aware of their metacognition, their perceived self-efficacy increases and this correlates with higher life satisfaction (Cikrikci & Odaci, 2015, p. 985). Metacognition is a large component of mental development and, for that reason, is important for educators to be aware of to ensure that learners are understanding content and are finding connections between their own lives and the learning. Mindfulness, on the other hand, targets more of the social and emotional aspects of development and processes in individuals. Mindfulness practices have been shown to not only reduce stress, anxiety, and depression (Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2017; Zolkoski & Lewis-Chiu, 2019), but it can also "help participants begin to reclaim an empowered sense of self from the aftermath of past traumas" (Kelly & Garland, 2016, p. 323). In turn, "mindfulness activities can help

students with challenging behaviors to manage their emotions and actions" (Zolkoski & Lewis-Chiu, 2019, p. 52), which can help learners be more successful in social interactions and in learning. Metacognition, self-efficacy, and mindfulness are skills that can be utilized to determine an individual's well-being, a learner's level of self-reflection, and be used to determine a learner's understanding of new concepts.

How can metacognition, self-efficacy, and mindfulness be measured and supported?

It can be difficult to measure cognitive and emotional processes, especially for youth who may not have the skills to self-reflect or identify skills and understandings they have from learning. Qualitative research is often used to evaluate progress with metacognition, self-efficacy, and mindfulness, though there has been debate over the validity of qualitative research (Weaver, 2015, p. 82). Quantitative research commonly takes the form of surveys that have participants rank their feelings about questions being presented, and there are multiple self-reporting frameworks that measure emotional and mental capacities (Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2016; Mittelstaedt & Jones, 2009; Sandi-Urena, Cooper, & Stevens, 2010). While quantitative research can provide numerical results to determine trends, it can often miss out on the deeper meanings and purposes of studies when working with the socioemotional changes in participants. Therefore, qualitative research, through self-reporting, observations, self-reflection, and personal statements, can provide the most telling results of a study involving metacognition, self-efficacy, and mindfulness (Barbaro & Pickett, 2016; Cikrikci & Odaci, 2015; Dahlin, 1999; Kelly & Garland, 2016; Mittelstaedt & Jones,

2009; Weaver, 2015). Metacognition, self-efficacy, and mindfulness are skills that require practice and guidance for learners to be able to develop and use the skills. To best support learners in developing metacognition skills and increasing self-efficacy, learners need to be provided cognitive actions that teach the learner about themselves and utilizes information and skills they already possess in order to make connections to new learning and development of new skills (Cikrikci & Odaci, 2016, p. 979). By allowing learners to relate new learning and skills to their reality and daily life, learners are able to demonstrate understanding of concepts by connecting them to the bigger picture of how the information is pertinent to them (Dahlin, 1999, pp. 198-199). Perhaps the most important factor in supporting learners in metacognition and self-efficacy, as concluded by Mittelstaedt & Jones in their 2009 study, is that learners need to enjoy what they are experiencing. "Feeling a sense of accomplishment, achievement, and a sense of challenge...are also important contributors to feelings of self-efficacy" (p. 111). This conclusion demonstrates the importance of emotional well-being in the process of mental development and cognition processes, which ties into mindfulness: as learners become more mindful of their own emotions, they will be more successful with cognitive development (Zolkoski & Lewis-Chiu, 2019, pp. 52-53). Mindfulness can be differentiated to best support learners at any level with a variety of techniques, as discussed in the study conducted by Zolkoski & Lewis-Chiu in 2019. However, studies have shown that the inclusion of nature or natural views can help learners be successful in practicing mindfulness (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Lymeus, Lundgren, & Hartig, 2017). Practicing mindfulness can negatively impact attention, as it

does require increased attention span. Nature imagery provided support in maintaining attention span, as Lymeus, Lundgren, and Hartig (2017) concluded: "Combinations of mindfulness and nature interventions may, for example, help individuals with attention problems achieve mindful states through mindfulness practices directed toward softly fascinating environmental features that help hold attention to present experience with little effort" (p. 552). Green spaces, or natural areas, are correlated to higher mindfulness and overall better mental health (Dzhambov, et al. 2019, p. 8). Most importantly, "mindfulness intensifies experiences with the natural environment, which may foster a stronger connection with the natural world" (Barbaro & Pickett, 2016, p. 142). The studies conducted by Lymeus, Lundgren, and Hartig (2017), Dzhambov, et al. (2019) and Barbaro and Pickett (2016) support the correlation between holistic human health and the health of the environment. As individuals focus on their mental, social, and emotional development, they can use nature as a tool to support their personal growth and this, in turn, helps people to become more aware and support the health of the environment.

What role does nature have in awareness and does this increase awareness of nature?

Metacognition and self-efficacy can provide insight to an individual's life satisfaction while mindfulness can provide insight to an individual's connection to their surroundings, including the natural world. While these factors may not seem directly connected, studies have shown that mindfulness practices involving nature can be correlated to higher levels of pro-environmental behaviors, stewardship, and sustainable practices (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Lymeus, Lundgren, & Hartig,

2017; Weaver, 2015; Zolkoski & Lewis-Chiu, 2019). Interactions in nature or, at a minimum, interactions with natural imagery, have been proven to support metacognition and cognitive functioning, including attention span (Dzhambov, et al. 2019; Lymeus, Lundgren, & Hartig, 2017; Zolkoski & Lewis-Chiu, 2019). However, these interactions with nature still need to be comfortable, safe, and enjoyable experiences in order for metacognition to improve and mindfulness to be supported (Mittelstaedt & Jones, 2009).

These interactions, as discussed previously, create positive experiences which connect people to place and have holistic health benefits for individuals. Thus, there appears to be a correlation that engagement in nature can increase awareness and this increased awareness of nature becomes a positive feedback system where an individual connects to place and feels empowered and motivated to develop pro-environmental behaviors that can benefit the environment. It seems that as people become self-aware and reflective of their holistic well-being while interacting in nature, they become more connected to a place which, in turn, makes them aware of environmental health and causes them to adopt pro-environmental behaviors and sustainable practices. The positive feedback system between a person's connection to place through increased engagement causing an elevated awareness of nature is a tool that can be used to study the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Climate Change

In this section is the discussion of peoples' perceptions of climate change as well how the landscape responds to climate change. The impacts to people that occur when

flora and fauna responds to climate change and the direct impact climate change has on people will also be discussed in this section.

What are peoples' perceptions of climate change?

Climate change has become a focus of environmental discussions for the drastic impacts it has had and will have on the environment, its plants and animals, and humans. The changing climate has resulted in species going extinct, plant and animal diversity decreasing, biomes shifting or disappearing, and landscape changing due to flooding, erosion, or thawing (permafrost) (Brody, et al. 2008; Semenza, et al. 2011). Although people are familiar with the general trend of a warming climate due to human-caused greenhouse gas emissions, specifically carbon dioxide, there are other driving factors for climate change and other changes occurring due to climate change. These changes have also impacted agriculture and natural resources which have impacted people's cultures, ways of life, connections to nature, and food security (Stults, et al. 2016). While many studies have been conducted to show how climate change is impacting people, there are few studies that have examined the process of connecting people to their place and how it could potentially raise awareness of climate change.

Discussion on climate change primarily focuses on the warming climate and changes in weather patterns, and there are many effects to biomes that occur because of these changes (Brody, et al. 2008; Linden, 2014; Raymond & Brown, 2011). Although people understand that one cause of the warming climate is due to carbon dioxide emissions, perceptions of the risks and effects of climate change are less understood. It is hypothesized that personal experiences create connections of the cause and effect that

climate change has on natural disasters and weather events. Once a connection is defined between changing climate and personal experiences with the climate and weather, people become more aware and reactive to changing climate impacts (Brody, et al. 2008; Linden, 2014; Raymond & Brown, 2011).

Extreme weather, natural disasters, and damages to natural resources are, to many people, not connected to the changing climate. However, there are widely accepted causes of climate change, such as melting glaciers and ice caps and rising sea and lake levels (Brody, et al. 2008; Semenza, et al. 2011). Data from 1950 to 2012 shows that average annual temperatures in northeastern Minnesota have increased 3.7 degrees Fahrenheit. This has led to longer unfrozen periods and earlier ice out dates for inland lakes in the region (Stults, et al. 2016, pp. 16 - 54). People are willing to acknowledge and accept changes to glaciers and water levels, yet there are extended impacts to landscape, plants, and animals that people view as disconnected from changing climate. Connecting people to place may provide the bridge between accepted knowledge of warming temperatures, melting ice, and rising water levels to the larger consequences to landscape, natural resources, and human health.

How is the landscape responding to climate change?

Melting glaciers and ice caps have led to more than just high-water levels: the landscape has changed due to meltwater runoff, erosion, and exposed topsoil or bedrock. The disappearance of glaciers exposes rocks and creates areas of lakes and ponds (D'Agata, et al. 2019, p. 9). Increased runoff causes erosion of soil that can carry contaminants or mercury to water systems that would then contaminate fish that are

consumed by humans and animals. Flooding and stormwater runoff can result in increases in nutrients, such as nitrogen and phosphorus, that lead to algal blooms including species of blue-green algae that are toxic to animals and people (Stults, et al. 2016, p. 105). Yet these cause and effect systems are disconnected and remain misunderstood by people (Brody, et al. 2008; Linden, 2014). In a study done by Raymond and Brown (2011), it was suggested that psychological variables should be included in evaluating importance of landscapes because, although landscapes can be valuable for economic reasons, there is intrinsic value in recreational uses and in aesthetics related to biodiversity in a place (pp. 672-673). The study led to the question of whether risks of climate change to a landscape is due to understanding of climate change or due to personal experiences and interactions with the land (Raymond & Brown, 2011, pp. 674-675). Awareness about the perceived risks climate change has on landscapes is commonly misunderstood by people, yet a connection to place could increase perceived risks of climate change to landscapes that people deem important or meaningful, thus motivating people to address solutions for climate change.

How do flora and fauna responses to climate change impact people?

Destruction to landscapes and habitat has affected humans as well as the flora and fauna that inhabit these places being subjected to changes in climate and while extinction is a primary focus worldwide. Local biomes are being degraded or are in jeopardy of being degraded in response to climate change (Semenza, et al. 2011; Stults, et al. 2016). Natural resources have many uses, including for use as a food source, which can be concerning considering that studies have shown that a decrease in use of traditional foods

has been detrimental to the health, and an increase in health problems such as diabetes and high blood pressure, of Indigenous People (Stults, et al. 2016, p. 46). Berries are a prime example of a natural resource that has provided food for people and animals and can be found in a variety of soil types and landscapes. While raspberries, pin cherries, thimbleberries and strawberries are able to adapt and overcome changes to the environment, berries that grow in bogs or wetlands show vulnerability to changes in climate (Stults, et al. 2016, p. 46). Local fishermen have observed changes in fishing locations and fish availability. Earlier ice-out days and a reduction of ice coverage has contributed to warming water temperatures in Lake Superior and inland lakes. Lake sturgeon (*Acipenser fulvescens* or *name* in Ojibwe), Brook Trout (*Salvelinus fontinalis*, or *namegosi-ziibiin* in Ojibwe), Cisco (*Coregonus artedi*, or *odoonibiins* in Ojibwe), Lake Trout (*Salvelinus namaycush*, or *namegos* in Ojibwe), and Whitefish or (*Coregonus clupeaformis*, or *atikameg* in Ojibwe) are commonly sought-after fish and as cooler water fish, have a high vulnerability status in terms of climate change vulnerability (Stults, et al. 2016, pp. 70-72). Trees in Minnesota have long been logged for building and paper products. Indigenous People have used trees for additional uses as well, including medicinal and as food sources, such as the sugar maple. Paper Birch, Northern White Cedar, and Quaking Aspen are considered high vulnerability, or less likely to adapt and survive, while Sugar Maple, Black Ash, and Eastern White Pine are considered medium vulnerability (Stults, et al. 2016, pp. 81-100). The affects climate change causes on natural resources are not always clear for people, yet studies show that personal experiences could provide a means in which people can develop an understanding of how

climate change can be detrimental to their places and the natural resources they rely on for livelihood and survival.

How does climate change directly impact people?

Climate change has become a largely discussed topic in the medical field as humans experience the consequences of warming temperatures, extreme weather conditions, and lesser known effects of climate change on the environment that have been detrimental to humans, thus forcing humans to start contemplating how to adapt to climate change. Air, water, and soil quality are variables that are analyzed to evaluate the quality of the environment and how it influences human health and wellbeing. The quality of air can be impacted by natural causes such as volcanoes or by emissions from human activity. These can both lead to acid rain or particulates in the air that can reduce visibility in the form of smog and cause illnesses and respiratory problems (Stults, et al. 2016; Semenza, et al. 2011). Water quality can be affected by runoff and flooding in terms of sediment, contaminants, and nutrients. As land near waterways are shaped by humans or eroded by extreme weather, the surface becomes impervious and therefore runoff is even more detrimental because there is little to no vegetation to slow and purify the water before it enters waterways. Stormwater that enters city sewage facilities can negatively impact water treatment plants because of the influx of water through the treatment facility and this could cause increases in water-borne pathogens (Stults, et al. 2016, p. 105). Climate change has been detrimental to the health and wellbeing of humans, many of whom have adapted by utilizing resources such as fans or air conditioning to combat increasing temperatures. Interestingly enough, heat related

illnesses, as well as anxiety, were seen as major concerns for human health related to climate change (Semenza, et al. 2011, p. 9). People have become more aware that the climate is changing and that there are repercussions due to the increasing temperatures and rising water levels (Brody, et al. 2008; Linden, 2014). However, many people still do not see climate change as a cause for extreme weather events, destruction to landscape, and that organisms that are vulnerable due to limited tolerance levels may not adapt fast enough to survive the changing climate. If people were to connect to the places and the natural resources that exist around their homes, they may understand the connections between climate change and changes in the environment as well as be moved to address creating solutions to combat climate change.

Studies on climate change are abundant in the scientific community and focus on a variety of topics including, but not limited to, natural resources, landscape, weather events, and effects on humans. While all the listed topics are in the personal places of all people, very few people understand the cause and effect that climate change has on the topics mentioned. People's experiences with places have shown to have the most influence on people's perceptions of climate change risks. Indigenous Peoples, especially those who live on and use their Treaty Rights on Reservations, have experienced negative impacts to health and culture because of climate change on natural resources and changes to historically important places (Stults, et al. 2016, pp. 1-15). It is suggested in various studies that people's perceptions of risks of climate change are insufficient and this disconnect can greatly reduce people's reactions to climate change or willingness to implement solutions to climate change (Brody, et al. 2008; Linden, 2014; Raymond and

Brown, 2011). Since climate change affects people over time, it can be difficult for people to realize that they are being directly impacted by climate change. It is therefore difficult to study how climate change will ultimately affect people, as studies are ongoing. Studies have primarily focused on the impact climate change has on people, but there has been little discussion of how to connect people to place to raise awareness about the direct effect climate change can have on a place. Thus, little research has been done to investigate the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Restorative Practices

In this section will be the discussion of what defines restorative practices and the goals of restorative practices. In addition, the definition of circle talks and how circle talks promote restorative practices will be discussed in this section. Circle talks and their ability to support people, especially young females, will be examined. Lastly will be the discussion of how restorative practices support at-risk youth who have or are experiencing trauma.

What are restorative practices *and what are the goals of these practices?*

Throughout the United States, schools have seen increases in violence, drug and alcohol abuse, and conflict between school staff and students. With schools being scrutinized for state standards, state testing, preparing students for future careers, and managing student behavior, many schools have started to reconsider their current practices regarding discipline and supporting students. This has led some schools to turn to restorative practices in the hopes that it can address the negative actions and behaviors

of students while getting to the root of the problem that's causing their negative behaviors and supporting the students (Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, & Broderick, 2015; Schumacher, 2014). Restorative practices focus on restoring relationships after a harm has been committed, typically done in the form of circle talks (Disney, 2017; Gaarder & Hesselton, 2012; Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, & Broderick, 2015; Lustick, 2017; Schumacher, 2014). During these circle talks, the victim, the offender, a mediator, and support systems for both the victim and the offender meet in a circle to talk about the situation, how both parties feel about the situation, how it could have been handled differently, and what needs to be done to repair the harm and rebuild the relationship (Gaarder & Hesselton, 2012; Mansfield, et al. 2018; Schumacher; 2014). Although the concepts of restorative practices started in the justice system and was termed *restorative justice* (Kane, et al. 2009, p. 233), schools have found the methods to be successful not only in addressing negative behaviors of students, but also in creating a community within schools by rebuilding relationships (Kehoe, et al. 2018; Short, et al. 2018) and helping students develop coping skills to deal with the root of their behaviors, which can often stem from trauma-related experiences (Gaarder & Hesselton, 2012; Schumacher, 2014). In addition to the social and emotional benefits that restorative practices has through building relationships and helping students develop coping and social skills, students have also shown to have increased state assessment scores and be more likely to graduate with restorative practices being implemented (Sporleder & Forbes, 2016, p. 9). The challenges that at-risk youth have is rebuilding relationships with family, friends, or community

members after a harm has been made, and this can leave the individual feeling rejected. Furthermore, at-risk youth have often experienced trauma which makes it difficult for students to feel comfortable in building relationships with others. If students are able to find themselves and find their identity while finding their role in their place, perhaps students can further the benefits that restorative practices have shown to have with at-risk youth, such as increased self confidence, empathy, and social skills (Gaarder & Hesselton, 2012; Mansfield, et al. 2018; Schumacher, 2014). It's also possible that at-risk youth will be more open to find solace in nature, thus building a stronger relationship with nature faster than with people, because they are able to self-reflect and communicate with themselves versus having to communicate with others, especially if communication is with a person they have been harmed by or have harmed.

What are* circle talks*, how do they promote restorative practices, and why are they more supportive, especially for young females?

Circle talks are a common practice for implementing restorative practices and are utilized for a variety of purposes including repairing a harm/addressing a negative action or behavior, practicing open communication to build trust and rapport, developing coping skills, and creating a safe, respectful, and inclusive space where individuals can express their needs or emotions (Disney, 2017; Gaarder & Hesselton, 2012; Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, & Broderick, 2015; Lustick, 2017; Schumacher, 2014). The concept of circle talks originated from Indigenous practices, in which the justice system adopted the practice and labeled it *restorative justice* (Disney, 2017; Gregory & Evans, 2020; Lustick, 2017; Short, Case, & McKenzie, 2018).

Restorative justice uses circle talks as a means to address and correct negative actions and behavior while getting to the root of what caused the action or behavior (Gaarder & Hesselton, 2012; Gregory & Evans, 2020). During these circle talks, individuals are able to express how they have been hurt or why they caused the harm and the goals of the talks are to practice "developing self-control, stress management, responsible decision making, social problem solving, and communication skills (Karp & Breslin, 2001, p. 254)," in the hopes that behaviors are not repeated and the individual can heal. Furthermore, these talks can help the affected individual feel empowered and create "caring climates that prevent further harm and conflict" (Gregory & Evans, 2020). Circle talks can also be preventative in which they are used to help an individual heal before a harm or negative behavior is committed by creating positive relationships among peers and staff and a respectful and equitable environment (Disney, 2017; Gregory & Evans, 2020; Kehoe, Bourke-Taylor, & Broderick, 2017; Schumacher, 2014; Short, Case, & McKenzie, 2018). In a study conducted by Schumacher in 2018, many circle talk participants commented on how the talks helped them in "not feeling alone with their problems" (p. 5) and that the circles gave them "a little oval protecting us from the rest of the world (Schumacher, 2018, p. 10), which is perhaps the most important aspect for youth. It is this component of circle talks that makes restorative practices, implemented as circle talks, crucial for addressing the emotional and social needs of girls (Gaarder & Hesselton, 2012; Schumacher, 2014). Circle talks use *talking pieces*, which is an object that is passed around and signifies which individual has the time to speak (Disney, 2017; Gaarder & Hesselton, 2012; Lustick, 2017; Schumacher, 2014), and this not only creates

a space for the speaker, but it encourages the other participants to listen closely. The talking piece used in Schumacher's study in 2014 was like *a microphone*, which helped the girls feel empowered and supported them in sharing their personal stories (pp. 9-10). Circle talks also have a Circle Keeper, usually an adult mentor, who can redirect or ask thinking questions if conflict begins (Disney, 2017; Gaarder & Hesselton, 2012; Lustick, 2017; Schumacher, 2014). For the girls in Schumacher's study in 2014, this Circle Keeper not only helped the girls reflect more deeply, but also provided support by being a *role model* (Schumacher, 2014, p. 10). Circle talks can be used for a variety of reasons, but the primary goal of circle talks is to create a safe, inclusive, and equitable space that allows individuals to share their emotions and to be heard by others. These circle talks include tools that can help individuals feel empowered by creating a controlled yet respectful environment that supports self-reflection, develops empathy, practices social and emotional skills, and helps to repair harm (Disney, 2017; Gaarder & Hesselton, 2012; Lustick, 2017; Schumacher, 2014). All of these components of circle talks are especially supportive of young girls who may feel unheard and may need help developing social skills to communicate with peers and family members (Gaarder & Hesselton, 2012, p. 254). Most importantly, circle talks for girls can help them "get a better handle on a lot of their issues" which can help them learn how to "handle their responsibility with more maturity, especially after they make sense of their own victimization" (Gaarder & Hesselton, 2012, p. 259). Restorative practices implemented as circle talks can support all individuals, but especially those that have experienced trauma or have been victimized

and may struggle to cope with the experience and, thus, results in negative actions or behaviors.

How do restorative practices support at-risk youth and youth who have or are experiencing trauma?

Restorative practices can create environments that support development of social and emotional skills for youth while also helping them develop coping skills, especially in the context of circle talks with peers and mentors. While these outcomes are supportive of all individuals, it can have a huge impact on at-risk youth over extended periods of time and continual use of restorative practices because of the relationships and trust that is build (Disney, 2017; Gaarder & Hesselton, 2014; Gregory & Evans, 2020; Kehoe, Bourke-Taylor, & Broderick, 2017; Lustick, 2017; Schumacher, 2014). The goal of restorative practices is to prevent further negative behaviors, which is a major concern with female juveniles given statistics about juvenile female arrests. While juvenile arrests have declined in the last forty years, the amount of female juvenile arrests has increased since 1980 (Puzzanchera, 2019, p. 1). More concerning is that females accounted for one of every five violent crime arrests for juveniles (Puzzanchera, 2019, p. 8). The theory for the shift in arrests involving more juvenile females is "the various adversities many girls face as well as their unique responses to trauma that place them at risk for entering the system" (Ehrmann, Hyland, & Puzzanchera, 2019, p. 2). Restorative practices have been sought after for working with at-risk and delinquent juveniles, primarily females, because of the holistic benefits that not only address holding the juvenile accountable for their actions, but also evaluates what is causing the behavior (Gaarder & Hesselton, 2012;

Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, & Broderick, 2017; Schumacher, 2014). Restorative practices also strives to empower the individual while helping the individual heal, and this is the most important factor in supporting at-risk and delinquent females, as programs for these youth "should be devoted to the promotion of empowerment and building self-esteem so that the juvenile justice system does not simply revictimize this vulnerable population" (MacDonald & Chesney-Lind, 2001, p. 190). Circle talks can create a space that helps individuals in deepening their understanding of one another and essential *existence"* (Disney, 2017, p. 53). The more individuals practice circle talks, the closer they feel with their peers, which is "often associated with participants' willingness to share and story-tell" and this can help with "the release and regulation of emotions" (Disney, 2017, p. 79). Gaarder and Hesselton (2012) found that circle talks could be used to improve relationships between the girls and their families or the people they harmed, which supported the girls in creating "healthy boundaries, and balancing care for self with care for others. It also used trauma-informed practices to build safe and trusting relationships between girls and staff" (Gaarder & Hesselton, 2012, p. 259). These relationships can provide a *"*sense of community*"*, as one girl explained in a study done by Kehoe, Bourke-Taylor, and Broderick in 2017, and this can promote a safe space for youth (p. 198). Safe spaces can help individuals heal by providing "a space for them to release and acknowledge their hurt" and give them "an opportunity to share and express their emotions" from past trauma (Disney 2017, p. 59). In the study conducted by Schumacher (2014), girls not only felt a sense of community among their peers, but they wanted to help each other.

The girls felt a deep sense of safety in the fact that they had support of the circle, which helped girls in "not feeling alone" because they could trust each other (Schumacher, 2014, p. 5). Restorative practices, according to Gaarder and Hesselton (2012), "when most fully actualized, provides tremendous benefits to girls" that find themselves in the juvenile justice system (p. 261). Perhaps the most inspiring benefit of restorative practices and circle talks for at-risk female juveniles is that it promotes empathy, deepens relationships with peers, and creates a higher sense of awareness (Schumacher, 2014, pp. 6-7). Circle talks and restorative practices have been shown to promote healing in young girls who have experienced traumatic events and, in the process, these individuals become more connected with the people around them by showing higher levels of awareness and empathy while placing more value in relationships with their community.

Restorative practices have many holistic health benefits for people, and many studies have been done to examine how restorative practices can best be implemented for at-risk youth as well as the impacts these practices have for the youth in their social and emotional healing and development (Disney 2017; Gaarder & Hesselton, 2012; Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, and Broderick; Schumacher, 2014). However, few if any studies have been done to see how connecting at-risk youth to place can be used as a restorative practice. While at-risk girls tend to be resistant to developing relationships with others because of the trauma they experienced (Gaarder & Hesselton, 2012; Schumacher, 2014), perhaps they would be more comfortable with connecting to a place and creating a relationship with a place. The concepts of safety, respect, and inclusion that are found in circle talks could be related to

actions of stewardship: an individual needs to feel safe in engaging with the outdoors, as previously discussed, and interactive activities would help the individual feel included in nature. This could lead the individual to developing respect for the place through interactions through learning and stewardship, and could also elevate levels of self-awareness and empathy for the environment, both of which are outcomes that are seen in people who engage in restorative practices and circle talks.

Conclusion

By deepening a relationship with nature, an at-risk youth could start to reflect on their behaviors and self-identity as well as become aware of their place. In the process of connecting with place and engaging in stewardship activities, an at-risk youth could become more aware of impacts to the place they are connecting to, such as climate change, and may start to think about how to help repair the place in which they find solace. The goals and outcomes of connecting to a place and taking part in circle talks are very similar, which causes one to ponder whether these two processes could be intertwined to help at-risk youth heal while healing the natural place they connect to and consider to be a place of solace. Due to the similarities between connecting to place and restorative practices, there arose the question of *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* While studies have been conducted to examine connection to place, connecting youth, especially at-risk youth, to place as a method of restorative practices has not yet been investigated. Furthermore, while studies have shown that a connection to place is often associated with an increased awareness of local climate

change, few, if any, studies have been conducted to determine how creating a connection to place can increase learner awareness of local climate change. Lastly, no studies have been conducted to examine the relationship between building a connection to place and rebuilding relationships through restorative practices for at-risk youth, nor have any case studies or programs been implemented to determine if this is a process that can combine connecting people to place and utilizing restorative practices. The question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* will examine four topics that have been studied separately and will determine if there are correlations between using restorative practices through connecting at-risk youth to place and if it will increase learner awareness of local climate change during the process.

Chapter three will discuss the methods and procedures that will be used to observe and evaluate at-risk youth as they learn about place while engaging in restorative practices through circle talks, in the hopes they connect to place, become more aware as learners, and become more aware of local climate change impacts to their place.

CHAPTER THREE

Methods

Introduction

Chapter Three describes the methods in which the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* was investigated and analyzed. The study focused on a small cohort of at-risk girls, aged 13-18 years old, who were court ordered into the program at Woodland Hills for treatment and programming. In addition to addressing holistic health needs of the youth and young adults, the program also aimed at empowering the youth while they make changes in their lives (The Hills, n.d.). Given the nature of the setting for the research, confidentiality was crucial and while observations, audio files, and reflections may have included confidential information, participants were referred to by number in the publication to protect the youth in the study. Thus, this study met the requirements and was thoroughly reviewed by the Hamline University Institutional Review Board via the Full-Board Review Protocol Application in order to ensure the safety of the participants in the study.

The topics of learner awareness, holistic responses to connecting to place, and engaging in restorative practices required data collection tools that involved both quantitative and qualitative research methods to evaluate progress over time as well as personal input from the participants. Interviews, reflections, and observations were

valuable in working with the at-risk youth, as well as observations from the researcher and the Unit Manager who oversaw the youth group at Woodland Hills. Numerical data was collected via weekly Questionnaires, Initial and Final Surveys, and guiding questions for circle talks. Additional research tools intended for the study included audio from circle talks, and pictures from outdoor activities, however these data collection tools were not allowed at Woodland Hills to ensure confidentiality for the youth. While the data would have allowed additional means of recording reflections and behaviors throughout the study, written observations had to suffice. Data analysis included both qualitative and quantitative research to develop a conclusion for the case study and, as described in Chapter four, to further questions or research. The quantitative data showed trends and relationships throughout the study while the qualitative data validates the quantitative data and provided a more meaningful evaluation of the case study for the participants and their holistic progress, as will be discussed in Chapter four. The data were used to evaluate the progress toward answering the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Though quantitative research was best for determining self-reflected reports of learner awareness of local climate change, it still required reflective observations and comments from participants in the form of a qualitative research method. The same process can be said for qualitative research of participant progress in regard to circle talks and restorative practices: while reflections and verbal input through qualitative research gave insight to progress of restorative practices for the youth, there are quantitative

research tools that were used to determine holistic changes in response to restorative practices. Thus, the data was obtained and analysed with both research methods in a convergent mixed methods design, using an intersecting mixed methods framework application.

Research Paradigm and Methodology

The question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* comes from a pragmatic worldview. This not only allows for mixed methods research and different worldviews, but also allows the researcher to "look to the *what* and *how* to research based on the intended consequences--where they want to go with it" (Creswell & Creswell, 2018, p. 11). The goal of the case study was to determine if connecting youth to place, specifically at-risk youth, can also double as a restorative practice and, thus, support the at-risk youth in a manner that may also help address local impacts of climate change to the environment. As discussed in Chapter Two, there are similarities between the two concepts that could meld as one process to address crime rates among youth while also addressing climate change to local areas. Thus, convergent mixed methods were appropriate for this case study, given the pragmatic worldview, as it allows the researcher to converge "quantitative and qualitative data in order to provide a comprehensive analysis of the research problem" (Creswell & Creswell, 2018, p. 15). Due to the fact that this case study was a new process of using outdoor education, place-based education, inquiry-based learning, and restorative practices, using qualitative and quantitative methods was appropriate, as both methods provided a broad insight of the program

(Hammond, 2005). The mixed methods approach determined if connecting at-risk youth to place could improve learner awareness of local climate change while also being a potential method for restorative practices. The research design was a convergent mixed methods design, in which both qualitative and quantitative data was collected simultaneously, analyzed separately, and then combined (Creswell, 2018, p. 217; Fetters, Curry & Creswell, 2013, p. 2137). Quantitative data was used to determine the influence that connection to place had on the at-risk female youths' self-reported learned awareness of local climate change and the self-reported holistic changes in response to circle talks conducted at Woodland Hills. Qualitative data examined the impact that connecting the at-risk female youth to place had on their holistic well-being, their self-identified connection to place through observations and reflections, and the role that circle talks and connection to place have on their relationships with the local environment, their community, and the people close to them, including the relationship they have with themselves. Using a convergent mixed methods design not only provided numerical evidence of progress and the reflections of self-reported progress, but also provided a comparison of the results to determine that the qualitative and quantitative data both support a general conclusion and also provided a more credible conclusion (Fetters, Curry & Creswell, 2013, pp. 2135-2143).

The convergent mixed methods design utilized the benefits of quantitative research to numerically evaluate trends and progress while also including the social and emotional role that the case study had by examining qualitative research collected from the participants. The results of the mixed methods design provided comparisons and

created a means to analyze similarities and differences between the datasets. Though the quantitative research was crucial for the reliability of the study in measuring the participants equally, the qualitative data provided validity by comparing self-reflections to the quantitative research. The case study therefore provided results that addressed the question *Can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* and also appeared to provide a meaningful, life-changing experience for the at-risk female youth.

Connecting the Literature Review to the Methods

The subjects discussed in Chapter Two have been studied in their respective fields and areas of focus, but have rarely, if ever, been studied for the correlations that exist between them in an applicable program. Since the case study highlights a new process, using mixed methods to collect data provided comparable results to validate the findings while also providing a broad interpretation of the process (Hammond, 2015). While quantitative data collection is often used in examining perceptions of climate change (Brody, et al., 2008; Linden, 2014; & Raymond & Brown, 2011), qualitative data creates a deeper connection between the impacts of climate change and the people (Stults, et al., 2016). Meanwhile, connection to place often involves peoples' emotional feelings or stories, a means of qualitative data collection (Albrecht, et al., 2007; Capaldi, et al., 2015; Cumming & Nash, 2015; Goggin, et al., 2017; Reese & Myers, 2012; Scannell & Gifford, 2017). Yet place can involve quantifiable information, such as a place on a map or increased cognitive function with time spent outdoors (Berman, et al., 2008; Dentzau, 2013). Self-reported learner awareness can be measured using surveys with numerical

scales (Kelly & Garland, 2016; Lymeus, Lundgren & Hartig, 2016; Mittelstaedt & Jones, 2009; Sandi-Urena, Cooper & Stevens, 2010), though evaluation of metacognition, self-efficacy, and mindfulness typically involves qualitative data collection (Weaver, 2015, p. 82) because it can allow for deeper reflection for the participant. Restorative practices are most often examined by terms of success for students, which can include increased grades, decreased absences, increased graduation rates, and decreased referrals or suspensions (Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor & Broderick, 2015; Schumacher, 2014). However, more and more studies are focusing on the deeper value that restorative practices can have on participants, the relationships they mend, and the life skills in communication and expression that restorative practices can provide (Gaarder & Hesselton, 2012; Mansfield, et al. 2018; Schumacher, 2014). The literature review in Chapter Two illustrated the need for a mixed methods approach, as well as the converging of qualitative and quantitative data, which was the best method to examine and analyze the results from the case study.

The topics of climate change, restorative practices, connection to place, and learner awareness have all been studied separately with qualitative, quantitative, and mixed method data collection approaches by many different studies that focused on specific problems or observations. Due to the complexity of combining the four seemingly different subjects into a new concept that was applied as a program to a cohort of young girls, a convergent mixed methods design was best. The design was suitable to gather sufficient data to compare qualitative results with quantitative results, which then created a broad explanation of the outcomes. Mixed methods data collection and the

application of the various research tools was necessary for a thorough investigation of how the four subjects discussed extensively in Chapter Two correlated to one another.

Setting, Participants, and Human Subject Research Review Process

Woodland Hills is a youth and family services facility located in Duluth, MN that focuses on providing support through trauma-informed practices to improve the lives of the at-risk youth that apply for the residential program. Treatment in the residential program uses gender responsive techniques to promote positive behaviors, social skills development, and anger management. The program is open to 12 to 18-year-old individuals, with an extended program including those aged up to 21 years old (The Hills, n.d.). The group that was part a of the study was expected to have girls aged 13-18 and had a study size of about ten or so participants, depending on how many girls applied and were accepted into the treatment program. While this made the study size small, it created a smaller student-to-teacher ratio. These girls were considered to be *at-risk* of becoming part of the prison pipeline, which is why they were enrolled in the program at Woodland Hills by their parents/guardians. The Unit Manager, who worked with the youth daily throughout their program, joined in the study to supervise the youth, and assisted with observations as he worked more closely with the youth for a more extended amount of time and thus observed more than the researcher. Due to the nature of the study, the case study was subjected to the full-board review process as reviewed by the Hamline University Institutional Review Board (IRB) for Human Subjects Research. This required that the Institutional Review Board, or IRB, application was completed and human subject training was completed by the researcher. Both the researcher and the Unit

Manager completed the Hamline IRB training. The Unit Manager made the informed consent form part of the application process for the program at Woodland Hills, thus ensuring the return of the needed forms for the human subject research to take place. A letter was given with the consent form to briefly describe the purpose of the study and of the consent form. Consent forms were returned to the Unit Manager in a sealed envelope (see Appendix G). Research tools were submitted to and reviewed by the IRB, and included the End-of-Week Questionnaire, Initial Survey, Final Survey, questions to be asked during the Final Interviews, prompt questions for reflections (contained in lesson presentations), Observation Questions (to guide researcher and Unit Manager observations during outdoor activities), and the guiding questions for the circle talks. A signed Approval for Study form (Appendix M) from Woodland Hills management and a Roles and Responsibilities form (Appendix N) from the Unit Manager at Woodland Hills was also submitted to the IRB, which detailed the roles at the facility, the roles in the study, and what the study provided for the girls and for the program at Woodland Hills.

The overall goal of the case study was to support the girls through restorative practices and reflection while also raising their awareness of local climate change by encouraging positive and safe interactions with place. Working with youth required a thorough process by the IRB to ensure the safety and wellbeing of the youth during and after the study. The study hoped to combine connecting the youth to place and restorative practices to create a holistic program that addressed the needs of the youth while providing coping mechanisms for them through interacting with nature, which also increased the youth's awareness of local climate change.

Methods, Research Tools, and Data Analysis Methods

The case study at Woodland Hills involved a variety of qualitative and quantitative methods of data collection. Methods included written and verbal formats for the participants to provide their self-reported holistic stances and progress throughout the study as a way to account for varied literacies among the youth. Having multiple tools in both qualitative and quantitative methods provided broader results with more data to compare results in both methods.

The study consisted of 14 meetings, each lasting approximately an hour and a half per meeting, with the intention that each session would have approximately 25 minutes of lesson, 35 minutes of outdoor activities, and 30 minutes of circle reflections/End-of-Week Questionnaire. Due to COVID-19 restrictions and weather conditions, this was not the case for every session. Each week, participants completed an End-of-Week Questionnaire (see Appendix B) which consisted of questions in the form of a Likert scale. A Likert scale provided a rating system for participants to rank their feelings in response to a set of questions, and provided a numerical and quantitative data collection tool. Five points were used to provide simple ratings for the participants where there were enough options for ranking but not too many to confuse the participant or complicate the results. The results provided numerical data to compare to the other data collection tools. The Questionnaire determined progress with climate change awareness, connection to place, holistic wellbeing, relationship building, and thoughts of circle talks by analyzing self-reported values for each set of questions focused on each of the progress areas. The Questionnaires were ten questions in length so the participants could quickly review the

questions. Participants could then provide a number that reflected their feelings regarding their status for each question and had a scale of one to five to choose from for each question. The purpose of this Questionnaire was to provide a check-in each week with numerical data for each participant, in which the median and average scores were evaluated and used to highlight changes and trends in the participant responses. In addition to determining the median and average scores each week for both individuals and for the group, t-tests were conducted to determine relationships between participants and standard deviations were evaluated. The purpose of looking at the data for each individual and for the group was that trends can be compared from participant to participant to look for anomalies or extremes in the data set for the group trends. Using a Likert scale for a Questionnaire provided quick weekly data to analyze participant responses to the study in the subject areas the study was focusing on in order to provide general trends and progress among the participants.

The Initial and Final Surveys (see Appendix A and Appendix D, respectively) used the questions from the End-of-Week Questionnaire with additional, open-ended questions at the end of the Questionnaire which allowed participants to elaborate on their responses to the Questionnaire. This mixed methods approach gave the participants the opportunity to explain their reasoning for their responses to a numerical answer. The Initial Survey (Appendix A) had open-ended questions that gave participants the opportunity to share their opinions and feelings of the study which provided insight to the deeper meaning of the study for the participants. These open-ended questions also provided an opportunity for the researcher to address any preconceived misconceptions

or confusion about the study. The Final Survey (Appendix D) had different open-ended questions than the Initial Survey and had questions that focused on topics related to future goals, final thoughts, or aspirations gained from the study. The quantitative portion of the Surveys were analyzed using t-tests, average, standard deviation, and median comparisons to determine trends or frequencies. These trends and frequencies were compared from participant to participant and participant to the whole group. The Initial and Final Surveys provided the start and end quantitative data that was compared as such and also compared with the progress over time via the End-of-Week Questionnaires. Qualitative data obtained by open-ended questions on the Surveys allowed for participants to elaborate on answers and reflect on the impact the case study had on them and their life. These answers were used to compare and support the quantitative data from the Surveys and also to the End-of-Week Questionnaires to examine progress of participants. Both the Initial and Final Surveys consisted of qualitative and quantitative collection methods and were key points in assessing progress or changes from before and after the study while also striving for deeper thinking responses from the participants, which allowed the participants to reflect on the study and the impact it had on their lives.

During the study, multiple methods of qualitative data collection took place during activities and circle talks to create sufficient data for the analysis of the study. The intention was that each meeting would start with a lesson involving an outdoor, place-based, and inquiry-based activity that provided an opportunity for the youth to engage in nature around the facility to allow the youth to connect to place through these experiences. The directions and questions for each activity were contained on a slide

titled “Going Outside: Today’s Challenge” and these slides were intended to be printed off for participants to put into their journaling folders to reference during the activity (see Appendix I). However, due to COVID restrictions and weather, this was not always the case, and the questions remained on a screen for participants to refer to while engaging in the activity. Additional questions or prompts were given by the researcher during the lesson or during the activity to follow up or clarify on questions or comments that the participants had during the lesson or activity. While taking pictures was intended to be a data collection tool, Woodland Hills did not allow pictures to be taken in order to protect the youth in terms of confidentiality. Pictures from the activities would have been a means for storytelling to reflect on for the researcher to elaborate on in the conclusion of the study. The observations of the researcher and of the Unit Manager described major events, changes in behaviors, or proclaimed realizations of the youth as they interacted with nature and reflected on their own experiences. Each session, the Unit Manager and researcher used the Observation Questions as a guide for their observations (see Appendix F). The purpose of using observations from the Unit Manager was that they interact more with the participants on a daily basis and provided an unbiased set of observations. The researcher also reflected on each session to examine the observations from each session, however the researcher may have had a more biased approach given that the researcher knew the details of the study. During the outdoor activity, participants explored the natural setting to answer or ponder the questions presented by the lesson, which had been approved by the IRB, and were intended to be handed to participants in paper form during outdoor sessions. This paper copy of the questions was put in their

three-ring binder journals to make recording observations and reflections easier for the participants. While the intention was to have participants who struggle with their writing skills or who would prefer an alternative method of reflection, such as a video to reflect on the questions, Woodland Hills would not allow video footage to be taken of participants. In these situations, the researcher would attempt to work one-on-one with each participant who needed assistance in order to write down reflections and observations for the participant. The information from the reflections and/or videos were examined for themes from each participant and provided evidence of the program for the participants individually and as a collective group. After each outdoor activity, the participants, researcher, and Unit Manager convened in a circle talk to discuss how the activity went, what each participant learned or observed, how the interaction in nature made each participant feel, and what each participant had as a take-away from the activity that can be applied to daily life or future goals. Each circle talk utilized the Circle Talk Guiding Questions to connect the outdoor experience to the lesson and this provided an opportunity for the youth to reflect on their experience (see Appendix E). These questions were printed for each participant so they could hear and see the questions. Additional questions were added during circle talks to clarify or encourage reflections. While the Circle Talk Guiding Questions were approved by the IRB, additional questions, comments, or thoughts were expressed by the researcher to follow up with participant responses or to allow for clarification. The hope was to use audio files to record the circle talks, which would have provided an opportunity for the researcher to focus on the circle talk and the participants while having the ability to review audio files after each session.

However, Woodland Hills would not allow audio to be recorded and thus the researcher had to take notes during circle talks. Finally, an end-of-study interview with each participant took place and the researcher took notes to allow for review of the interviews. The interviews took a maximum of 15 minutes using the Interview Questions for each participant to answer (see Appendix C). Additional questions or comments were presented by the researcher to clarify or follow up on a response provided by participants. Participants received the questions prior to being interviewed so they could write down any thoughts to be prepared for the interview. Participants were pulled aside in the same room as the group for the interview to ensure that the Unit Manager could remain in the same room as the guest speaker (the researcher) and the rest of the participants, in accordance with Woodland Hill's policies and procedures. If the participant preferred to provide just written answers to the questions to maintain confidentiality or if they simply chose not to verbally express their answers, they were able to do so. The interview questions were similar to those in the Final Survey, which allowed participants to elaborate on answers, though these questions focused more on the participant individually so they could share the deeper meaning of the study to them and their outlook on place, local climate change, circle talks, and their relationships with their community. Furthermore, the interview provided a better opportunity for participants to elaborate on their final thoughts as some struggled with writing skills. Field notes were written by the researcher to assist with data analysis. The observations, journal reflections, oral reflections from circle talks, and interviews were analyzed separately by comparing themes, similarities, differences, and concepts. When common themes and concepts were

apparent, overall, with the group, the data was created into a table, which was then compared across all qualitative data collection results to have a convergent approach to analyzing all the qualitative data. After the extensive analysis of the qualitative data, the results were converged with the results from the quantitative data. The multitude and variety of qualitative data collection provided many opportunities for youth to self-report throughout the study as a way to create valid and reliable data for the case study which was then compared to the quantitative data to create a detailed conclusion of the study.

Risks, Confidentiality, Steps to Minimize Risks, and Benefits to Participants

Every study has the potential to involve risks to the participants and steps need to be taken to ensure risk is minimized, the rights and privacy of participants are protected, and that there is a benefit to the participants agreeing to the study. Woodland Hills allowed the study to be conducted as an additional opportunity to connect the participants with the Unit Manager, and the researcher was considered a guest speaker/teacher on the premises. A background check was conducted on the researcher prior to Woodland Hills considering the researcher to be a guest speaker to ensure the safety of the participants, as is required by Woodland Hill's policies and procedures. Woodland Hills is responsible for protecting the safety and interests of the participants, including those that participated in the study. As was required by the IRB, the researcher addressed all potential risks to the participants, described all efforts to minimize the risks, described all efforts to protect privacy and confidentiality of the participants, and protected the rights and safety of the participants.

The privacy and confidentiality was required of the researcher by Woodland Hills due to the participants being minors and being enrolled in the program at Woodland Hills, as the researcher was viewed as a guest speaker/teacher for the duration of the study by Woodland Hills. For this reason, all documents, journals, handouts, audio files, video files, pictures, observations from researcher and Unit Manager, and any other additional confidential documents were collected each meeting and uploaded immediately after each meeting to an external hard drive. Any emailed or digital files on any data collecting tool (camera/audio recorder/laptop/computer) were immediately and permanently deleted from the devices after having been uploaded to the external hard drive. This data was not shared with anyone except Woodland Hills with the understanding that the data will be permanently deleted within six months of the study being published and the researcher having graduated. The purpose for this was to allow the Unit Manager to continue to use the methods of the study with the youth while continuing to observe changes in behaviors. Any written/documented data with identifying information had the identifying information removed and replaced with a number that corresponds with that student. The key was kept separate from the de-identifying data on a flash drive. Though the intention was to use pictures and, if the youth preferred, recorded videos to further analyze results of the study, Woodland Hills would not allow the use of cameras in the facility to protect youth confidentiality. While the hope was that audio would be recorded to later transcribe, Woodland Hills did not allow any audio recording in order to protect the confidentiality of the youth. Hard copies with identifying information were kept in a locked box with the researcher with the flash drive of the key. The external hard drive

was kept in a separate locked box. Information from or about the study was not discussed outside of Woodland Hills unless with direct communication (email/phone/text) with Unit Manager or other Woodland Hills staff as needed to ensure the safety and privacy interests of the subjects, as was required by Woodland Hills.

Although the study was not invasive, physically, to the participants, there were still potential risks and feelings of discomfort that could have been experienced by participants even with steps to minimize risks being implemented. There was a small chance participants would experience uncomfortable feelings either in the circle talks where participants reflected on their experiences during the study or when they engaged in outdoor activities. The loss of confidentiality was always a risk, but measures were taken to avoid loss of confidentiality to protect the participants, as required by Woodland Hills and by the IRB. As with any outdoor activities, there was always the risk of minor injury from tripping/falling, the risk of insect bites/stings, the risk of allergic reactions to insects or plants, the risk of sunburn, the risk of being uncomfortable due to temperatures, and the possibility that participants could have been caught in the rain. In addition, there was always the chance of risks that were unknown or unforeseeable. Participants were encouraged to participate in discussions and activities, but could choose not to answer questions or reflect on their learning experiences during lessons, activities, and circle talks. If at any time a participant felt uncomfortable, they had the right to refrain or pass the opportunity to share their thoughts or emotions. During the first circle talk, the researcher worked with the participants to create a Community Agreement that provided insight from the participants as to how the circle talks could be safe, inclusive, respectful,

supportive, and encouraging. The researcher addressed how to be safe while outside and worked with the Unit Manager of Woodland Hills to ensure and create a safe and inclusive atmosphere for all participants. If needed, bug spray and sunscreen were kept on hand by the researcher. Participants were encouraged to be prepared for the outdoor elements by dressing appropriately; this included wearing comfortable walking shoes, shorts/pants as needed, wearing t-shirt/hoodie/jacket as needed, and bringing a water bottle to stay hydrated as needed. All efforts were made to address the risks of going outside and participants were not expected to participate in outdoor activities during severe weather conditions or rainstorms. Since the first nine lessons were designed to be outdoor lessons because they focus on observation skills and identifying tree species, which requires leaves to be on the trees, the researcher gathered samples and pictures of trees to preserve so participants could still participate in the activities indoors if needed. This was indeed the case given that the study was conducted in late fall/early winter. If an emergency had occurred, Woodland Hills would have been responsible for contacting parents/guardians and tending to the needs of the participant, which included determining the appropriate health services facility to use in case of any physical injury. If a participant had been in need of mental health services, participants were encouraged to contact their Unit Manager or other staff at Woodland Hills first, but additional resources were also provided. By being prepared and working with and adhering to Woodland Hills' policies and procedures, the risks to participants were minimized to ensure that participants were safe, comfortable, and that their rights and privacy were protected.

Despite the risks involved with the study, the participants and the community received far greater benefit from this study than the previously discussed risks. The benefits included snacks at each meeting (which were decided on by majority vote from the participants), being able to socialize with their peers, getting to know peers more through circle talks, getting to experience safe, welcoming, and enjoyable outdoor, place-based, and inquiry-based activities, and learning about our local biome, climate, plant species, and how to identify plant species. Further benefits included providing a sense of empowerment, leadership, and stewardship to address issues regarding local habitat and climate, developing interpersonal skills, awareness of local citizen science opportunities, and having a sense of place in the community and the environment. The risks associated with the study were minimal and were risks that the participants would experience with everyday activities. The benefits were that participants had the unique opportunity to experience lessons and activities that would normally not be offered at Woodland Hills, and were rewarded for their participation with snacks of their choosing. Furthermore, it helped them develop socioemotional skills, interpersonal skills, intrapersonal skills, and a better understanding of the local environment and climate. The study helped participants feel a sense of encouragement, accomplishment, empowerment, stewardship, and connectedness with peers, community, and place. While participants may have had the risk of feeling uncomfortable, they did have the option to refrain from speaking if they chose to in order to feel part of a safe and inclusive environment. The researcher worked with the participants to create “Community Agreements” that helped participants feel safe, included, and respectful, and assisted in mitigating the minimal

risks participants may have experienced in the circle talks. Participants also experienced going into the outdoors and engaging with nature in a safe, inclusive, and enjoyable manner, which have hopefully created lifelong habits of interacting with nature, and can have lasting positive holistic impact.

Alternative Plan in Response to COVID-19

The COVID-19 pandemic has been traumatic for people across the world and has greatly impacted gatherings, including classrooms, and has caused much of what was normal life to become virtual meetings and events through platforms such as Zoom, Google Meetings, and FaceTime. The nature of the pandemic is unpredictable and dynamic with each day bringing new cases and new procedures to protect the safety. Governor Walz (Minnesota) was, at the time of the study starting, allowing schools, colleges, universities, and other institutions to proceed with reopening to the public with the strong suggestion of staying at home if possible and making online learning the preferred format. As of August 12th, 2020, Woodland Hills was still allowing guest speakers to visit in person, however, when the number of cases continued to increase in St. Louis County, Minnesota, Woodland Hills put a hold on allowing guests into the facility to protect the health of the staff and youth that attend Woodland Hills. Prior to shutting down to visitors, the procedure was to do screenings to ensure guests had no symptoms of COVID, that they wore a mask during the duration of their visit, that their temperature was normal, and that they had not been in contact with someone who had tested positive for COVID. Due to the pandemic, all youth, the researcher, and the Unit Manager followed the safety guidelines put in place by the Minnesota Department of

Health and the Center for Disease Control to protect the health and safety of all involved. This included, but was not limited to, wearing face masks, maintaining a social distance of six feet, washing hands regularly or using hand sanitizer, and staying home when feeling ill. Unfortunately, this also included conducting the study in an online format for most of the study, as Woodland Hills had prohibited guests and visitors when COVID cases increased for Minnesota during the holiday season. Despite the changes COVID presented in terms of conducting the study, Unit Manager and the researcher remained flexible to conduct the study with both in person and online formats.

During the time of visitors being prohibited from Woodland Hills, the study was converted to online methods, as was approved and encouraged by the Unit Manager given that the timeline for remaining closed to guests and visitors was unknown. The lessons were done via an online meeting platform which, in this case, was Zoom. The Unit Manager had full responsibility for bringing participants outside prior to the lesson. Although this format was different than intended, it allowed the participants to enjoy a short walk in nature prior to the lesson, learning activity, and circle talk that were conducted via Zoom by the researcher. All Surveys and Questionnaires were still completed by the participants and were picked up by the researcher at the main doors. Woodland Hills opened up toward the end of the study, which allowed the final sessions and assessments to be done in person. The Unit Manager was supported by the researcher to ensure the lessons and activities were prepared to support learning needs and understanding of the participants. Additional handouts and resources, such as scanned images of tree leaves, were created by the researcher to further support learning for the

participants. While this was not the optimal method for the study and required a large increase of responsibility from, as well as constant communication with, the Unit Manager, it was the best possible method to deliver the study in a way that protected the welfare and health of the participants and the staff at Woodland Hills.

Conclusion

The variety and multitude of the research tools not only provided a mixed methods approach that assisted in validating results from each type of data collection method, but also provided a differentiated approach for the participants to express their self-reported progress throughout the case study. Ultimately, the impact that the case study had for the youth was the most important determining factor for the success of the study as an applicable program. Therefore, the input from the participants about how the study supported or encouraged them was invaluable. Moreover, the results from the qualitative data collection were used to determine the validity and reliability of the quantitative data, and vice versa.

Climate change, connection to place, restorative practices, and learner awareness have been studied thoroughly, though separately, which made combining the four as a program for at-risk female youth a new concept for a case study. Therefore, using mixed methods for data collection was most effective because collecting quantitative data observed trends and changes over time while the qualitative data provided a deeper insight as to the experience the participants had overall. Utilizing a convergent mixed methods design for analysis was beneficial because the data was compared to ensure validity and reliability of the results. Having multiple means of collecting both

quantitative and qualitative data provided a broad scope of examining the case study and provided differentiated means of expression for the participants to ensure that participants could express their reflections throughout the study. Chapter Four will analyze the results of the case study first by examining qualitative and quantitative data separately before discussing the results comparatively.

CHAPTER FOUR

Results

Introduction

Data collected analyzes the study that examined the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* Throughout the study, there were many challenges that arose due to the COVID-19 pandemic that impacted the data collection and the sessions of the study. Additional challenges at Woodland Hills, that were out of the control of the researcher, also impacted the study and data collection. Chapter four analyzes the data collected throughout the study using methods discussed in Chapter three and utilizing additional means to best analyze and compare the qualitative data to the quantitative data.

Chapter four begins by discussing the setting of the study, the challenges caused by the COVID-19 pandemic, additional challenges that arose during the duration of the study, and then analyzes the data collected throughout the study. An analysis has been conducted for each participant using their qualitative and quantitative data, both as individual datasets and as a whole for comparison. Examining each participant's background with the environment, circle talks, climate change, and the place of study provides a starting point for each participant's in comparison to the Initial Survey (Appendix B) answers. The group quantitative data from the Initial Survey (Appendix B),

End-of-Week Questionnaire (Appendix C), and Final Survey (Appendix E) explores each participant individually and discusses any trends or relationships in the data. Chapter four then explores quantitative data analysis, the qualitative data from the Initial Survey, Final Survey, and Final interview (Appendix D) individually before discussing any trends or relationships in the data. Observation data from both the researcher and the Unit Manager provides valuable information that explores changes in the participant's behaviors throughout the study. The analysis of the observations is done separately and in comparison comparing the two observers' results to determine any similarities or differences. The qualitative data collected through circle talks will determine if there are trends, relationships, or an overall impact that the study had on participants. A final result compares the group data from the Surveys, Questionnaires, and interviews to the observations and circle talk reflections while including connections to the literature review. Data was collected as described in Chapter three and Chapter four discusses the analysis of the data from the study.

Study Setting, Challenges due to COVID-19, and Additional Challenges

The study was conducted at the Woodland Hills facility with one of the adolescent female groups. Though the original estimate for the number of participants was ten to fifteen girls, the actual number of participants was seven, with only three to four consistently attending sessions. These participants were not in the 13 to 18 year-old age range as predicted, but rather the 16 to 18 year-old age range. Woodland Hills has an open enrollment program which can create variety in the ages, backgrounds, and number of youth in the program. The group was diverse in prior experiences, ethnicity, and

demographics, but for confidentiality purposes, these details were not obtained for the study. In addition, Woodland Hills would not allow audio, pictures, or videos of the youth to be collected in order to protect the confidentiality of the youth. Though this data would have allowed for further analysis and allowed the researcher to be more present during the sessions by providing an opportunity to review audio, pictures, and videos afterward, Woodland Hills has strict requirements to protect the youth and their confidentiality. Participants were considered "at-risk youth" given that they can only enroll at Woodland Hills if it is court ordered or, as was later discovered, hospital ordered, such as if there are ongoing mental health concerns. The participants came from different locations throughout Minnesota, had enrolled in the program at Woodland Hills, and were placed in the group that was the focus for the study.

The COVID-19 pandemic has caused unpredictable changes to daily life for people across the world, and it also presented challenges in the delivery of the study. Only three out of the fourteen sessions were conducted in person due to Woodland Hills prohibiting guests from visiting the facility during a spike in COVID-19 cases. The facility still operated as normal, but would not allow visitors past the front door as a way to limit the potential exposure of COVID to the youth in the facility. More sessions would have been in person, but the first and second week of sessions was delayed due to both the researcher and the Unit Manager having been exposed to COVID. Both the researcher and the Unit Manager received negative tests, but waited for results to confirm that the participants would be safe. Due to the researcher and the Unit Manager having had exposure to COVID and the shut down of the facility, the researcher was only in-person

at Woodland Hills for the first session and last two sessions. The other eleven sessions were done via Zoom, where the researcher would still go through the slideshows and would sometimes use additional resources or send additional resources to the Unit Manager to ensure the participants still received support in their learning. The delays also caused the study to be conducted later in the fall season than originally planned. Due to shorter days in the late fall/winter, participants did not get outside for each session as was originally expected, in order to address safety concerns of limited vision in the dark and icy conditions at Woodland Hills. Despite the challenges that were presented by the COVID pandemic, the study was completed on the timeline that the researcher and the Unit Manager had proposed and the study was able to end with having the researcher visit Woodland Hills.

The program at Woodland Hills is an open enrollment program in which youth can enroll or graduate at any time and this, coupled with other unpredictable events, presented additional challenges to the study and data collection process. When the researcher and Unit Manager set up meeting times for the first few sessions, it was expected that there would be five participants. After the delay in the start date, one of the youth ran away from the facility. Thus, the study started with only four participants. Through the duration of the study, there were two youth that enrolled in the program, bringing the number of expected participants to seven. However, there were three youth transferred or pulled from that group. The Unit Manager did end up pulling one participant from the study because the participant attended the sessions just for the snack and then would try to cause fights in order to be pulled out of the session. This participant

ran away part way through the study, was returned to Woodland Hills during the final session, and completed the final session materials. For the first half of the study there were two consistent participants, one of which graduated the program and was replaced by one of the new enrollees. Therefore, there were only about three participants that consistently attended sessions, though none of the participants attended all of the sessions. Figure 1 displays the attendance for each participant, total participants per session, and total sessions per participant. This figure shows that only two participants, P2 and P6, attended more than half of the sessions whereas the other participants attended less than 40% of the sessions.

Participant	P1	P2	P3	P4	P5	P6	P7	Total Participants per Session
Session 1	yes	yes	yes	yes	no	no	no	4
Session 2	no	yes	yes	yes	yes	no	no	4
Session 3	no	yes	no	no	yes	no	no	2
Session 4	no	yes	no	no	yes	yes	no	3
Session 5	no	yes	no	yes	no	yes	no	3
Session 6	no	yes	no	yes	no	no	no	2
Session 7	no	yes	no	yes	no	yes	no	3
Session 8	no	yes	no	no	no	yes	no	2
Session 9	no	yes	no	no	no	yes	no	2
Session 10	no	no	no	no	no	yes	yes	2
Session 11	no	no	no	no	no	yes	yes	2
Session 12	no	no	no	no	no	yes	yes	2
Session 13	no	no	no	no	no	yes	yes	2
Session 14	no	no	no	*	no	yes	*	1
Total Sessions per Participant	1	9	2	5	3	10	4	

Figure 1: Participant Attendance. Participants are identified by the letter "P" and a number. Displays attendance for each participant, total participants per session, and total sessions per participant. The asterisks signify that the participants were only in attendance for the assessments and not the lesson.

The graduate participant was sent the final session materials in the hopes that she would return them to provide more data, but the paperwork was not returned. Participant attendance to each session will be discussed later on in Chapter four. Unexpected challenges are not uncommon for programs at Woodland Hills, though it did present difficulties in the study and collecting data for the study.

Analysis of Each Participant and Comparison to Data Collected

The seven youth from Woodland Hills that participated in the study come from different experiences involving the outdoors, nature, climate change, restorative practices, and circle talks, which became apparent after analyzing the Initial Survey (Appendix B) results. For this reason, the Initial Survey qualitative data and each participant's expressed experiences with the environment, climate change, the place of study, and circle talks will be analyzed for each participant. This will be compared to the qualitative data from the Final Survey and the Final interview (Appendix E and D, respectively). Next, an analysis of the quantitative data from the Initial Survey, End-of-Week Questionnaires (Appendix C), and the Final Survey will be conducted. Lastly, the qualitative data will be compared to the quantitative data to determine any trends or relationships between the two methods of data collection. The quantitative data was collected using a Likert scale survey method. This Likert scale method of self reporting in the Initial Survey, End-of-Week Questionnaire, and Final Survey ranged from 1 (Nope) to 5 (Absolutely). Though a one to ten scale may have shown a greater difference throughout the study, the goal was to make the Likert scale survey easy for the participants to use by keeping it short and simple. This is also why there are only ten questions for the Likert scale portion of the Initial and Final Surveys as well as the End-of-Week Questionnaire. The goal was to make the data collection process user-friendly for the participants so they would not become frustrated with completing the Surveys and Questionnaires. Each participant is a unique individual with different experiences regarding the topics focused on during the study and, thus, each participant's

data will be analyzed individually by first examining the qualitative data, then examining the quantitative data, and, finally, by comparing the two methods of data collection.

Participant One is not able to be thoroughly analyzed, as she participated in only the first session before running away from Woodland Hills and not returning to the program, thus there is no additional data beyond the Initial Survey for Participant One. Comments from the Initial Survey's qualitative data includes feeling that they will gain "more nolage [*sic*] (knowledge) about outside" by being part of the study. The participant had participated in circle talks before and described them as "akward [*sic*] (awkward)" and had "no clue" about being concerned with climate change or feeling if climate change is a big deal for the area they live in. The average of the ten questions for the Initial Survey for Participant One was 3.67 while the median was 4, which suggests several things for this participant. First, it shows that the participant enjoys learning outdoors, being in nature, and has positive opinions of nature prior to the study. These results also suggest that the participant has some awareness of climate change impacts in the local environment. The lowest score chosen was a two for question seven of the Initial Survey "Circle talks have helped me to reflect on my own life", which suggests that the participant either hasn't participated in circle talks often or has not found them to be helpful. Due to the lack of quantitative data, a t-test was not conducted and a p-value was not obtained to determine changes from the Initial and Final Surveys. A complete analysis of Participant One cannot be completed since the participant only attended the first session and only completed the Initial Survey.

Participant Two was one of the more consistent participants in the study and was the participant that graduated from the Woodland Hills program earlier than expected, thus causing her to miss the last five sessions, including the Final Survey and Final interview. Due to attending most of the sessions, Participant Two also completed the End-of-Week Questionnaires conducted in sessions three and seven. According to the qualitative data from the Initial Survey, the participant has not participated in circle talks before, that they feel the study "is going to [*sic*] (be) great", and that they don't spend time in nature because "I hate nature and outside." Furthermore, the participant expressed not knowing or caring about climate change or how the local area is impacted by climate change. The Initial Survey for the participant had an average number of 2.22 and a median of 2. This supports the opinions and feelings expressed in the qualitative portion of the Survey because the qualitative data relates to the average and mean number which, in the Survey, two represented a "kind of" or "disagree" value for the Likert scale. The End-of-Week Questionnaire for session three showed no change in the median number selected, but the average did increase to 2.6 from 2.2 on the Initial Survey. There was an increase for the End-of-Week Questionnaire for session seven where the median rose to 4 and the average rose to 3.9. Though Participant Two did not complete the Final Survey, the Initial Survey was compared to the session seven End-of-Week Questionnaire via a t-test and the p-value was determined to be approximately 0.0011, which shows statistical significance between the initial and session seven self-reported data for Participant Two. Thus, the results strongly suggest that the study created a more positive outlook of nature for the participant rather than hating nature, as they initially noted, and that they had

more awareness of climate change in the local place. Furthermore, the participant now had experienced circle talks and appeared to find them helpful, as noted in the session seven End-of-Week Questionnaire. The results from this participant strongly suggests that the methods of the study can be used to answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Participant Three only attended the first and second sessions, only completed the Initial Survey, and thus, can not be analyzed completely to determine changes throughout the study. The qualitative data from the Initial Survey provides the participant's input that states they hoped to gain "good information" from the study, has not participated in circle talks, and loves "being outside". In regards to climate change and if it is a big deal for the area the participant lives in, the comment was "I'm not sure I'm not currently home" and this illustrated that the participant was not from this part of the state and, therefore, was unaware of how or if climate change impacted the local area. These comments support the quantitative data reported by the participant in the Initial Survey, as the average of the Survey was 3.11 and the median was 3. The numbers are not surprising when compared to the fact that the participant ranked lower for circle talk and climate change related questions, something they did not have experience or knowledge of, and ranked higher with nature and environment related questions, which is something the participant "loved". Due to the participant having only completed the Initial Survey, a t-test could not be conducted and a p-value not obtained. A complete analysis cannot be conducted as Participant Three only attended two sessions and only completed the Initial Survey.

Participant Four attended five sessions throughout the duration of the study, not including the final session, and was present during the final session only for the final assessments and not the lesson. During the study, this participant was observed by the Unit Manager to only join the sessions for the snack and would then cause disturbances or attempt to fight with the other participants intentionally, as was discovered when the Unit Manager talked with the participant, in order to get kicked out of the sessions. Thus, the participant was pulled from the study for sessions three and four. The participant rejoined the study for sessions five through seven, but then ran away from Woodland Hills and did not attend sessions eight through thirteen. Participant Four was returned to Woodland Hills after the lesson of the last session, session fourteen, and therefore completed the Final Survey and Final interview, though this was not counted as having attended the session. Due to the sporadic attendance, Participant Four only completed the Initial and Final Surveys and was not able to complete any of the End-of-Week Questionnaires, which were used as checkpoints throughout the study. The qualitative data from the Initial Survey shows that the participant had experience with circle talks and that it made them feel “depressed, sad,” and “relieved” while spending time in nature made them feel “active, speedy,” and “crazy”. In regards to climate change and impacts to the local area, the participant stated that they are not concerned “because it doesn’t bother me.” The comments about being part of the study and what may be gained by being part of the study were that the participant felt “peaceful, nervous,” and “weird” while noting it would allow them to get “stuff of [*sic*] (off) my chest.” These results support the quantitative data from the Survey since the participant had prior experience

with circle talks and the outdoors while also not being concerned about climate change locally. The average from the Initial Survey was 3.56 while the median was 4, thus showing, again, that the participant had prior experiences and knowledge with nature and circle talks that the participant was in agreement with in regards to the Initial Survey's questions. Participant Four was able to complete the Final Survey and Final interview despite not completing any End-of-Week Questionnaires, as she was dropped off at Woodland Hills just moments before completing the final assessments and this appears to have impacted her reflections of the study. The response to question twelve of the Final Survey regarding climate change and the impact locally was that climate change might be happening "because it's different down south than here", as she had just returned from the southern part of the state. Her comments about circle talks remained similar to those from the Initial Survey: "they can help me get stuff off my chest and help me boil some stress off." This was also the case for the question looking at thoughts of being in nature and the frequency in which she feels she'll go outside now, after the study: the frequency won't change because "I go outside every other day" and "I like getting outside." When asked what a big take-away from the study was and how this would be used in daily life, she responded "Going outside and going on nature walks, and bringing my little sister on walks." The qualitative data results support the quantitative data, though the quantitative data from the Final Survey was less in agreement with the questions than the Initial Survey, as the average and the median for the Final Survey were both 3. Part of this could be due to the excitement the participant felt about being back at Woodland Hills and the fact that they were preoccupied with chatting to the other participants and the Unit

Manager. A t-test was conducted to compare the initial quantitative data to the final quantitative data and the p-value was determined to be 0.302, which does not show any statistical significance and further supports the results of little to no change between the start of the study and the end of the study. Participant Four's Initial Survey scored higher than the Final Survey, though the qualitative data suggests little to no change, and this is expected given that the participant only attended five of the fourteen sessions and was distracted during the final assessments.

Participant Five only attended three of the fourteen sessions and completed only the Initial Survey and the session three End-of-Week Questionnaire, which does not provide enough data to conduct a complete analysis of the participant. The participant joined the study for the second session, which is when they completed the Initial Survey, and completed the End-of-Week Questionnaire during the third session. After the fourth session, the participant was not part of the group at Woodland Hills and, therefore, did not attend more sessions during the study. The qualitative data strongly supports the quantitative data from the Initial Survey. Participant Five commented that being part of the study made them feel "happy, sad," and "mad", but also commented that they thought they would gain "less stress and getting [*sic*] my life better" from the study. In regards to concerns about climate change and its local impacts, the participant stated "yes because in the winter time you don't go out as much but that makes you more sad", showing that climate is important to the participant, but may have misconceptions about what climate change is and how it plays a role locally. The participant has participated in circle talks prior to the study and remarked that the outdoors makes them feel "love, kind," and

"calm." This supports the quantitative data, in which the average was 4.11 and the median was 4. The participant had positive experiences in the outdoors and with circle talks, which was apparent both in the qualitative data and by the average and median numbers from the quantitative data. Despite the fact that the Initial Survey and the next data point, the End-of-Week Questionnaire, were completed consecutively, there were changes noted between the two quantitative datasets. The average of the session three End-of-Week Questionnaire was 4.7 while the median was 5, which was an increase in both cases from the Initial Survey. A t-test was conducted to compare the Initial Survey with the session three data and the p-value was determined to be 0.051, which suggests statistical significance. Considering the fact that the two datasets were consecutive and the participant only attended three sessions, the sessions appeared to have an impact on Participant Five and thus supported that the study could suggest an answer for the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Participant Six attended ten sessions and had completed the Initial Survey, End-of-Week Questionnaires for sessions seven and twelve, and the Final Survey and interview, thus Participant Six has one of the more completed datasets from the group. Though Participant Six did not join the study until session four and missed session six, this participant was in attendance for more sessions than the other participants. For the qualitative data from the Initial Survey, the participant only answered the question regarding concern of climate change and the impact to the local area: "I wanna [*sic*] know why it is changing so damaticly [*sic*] (dramatically) and worsening. And I'm

thinking it's changing because the people are not taking care of the world and the fums [*sic*] (fumes) in the air that's making the temperatures (change)." According to this information the participant appears to have a decent understanding of climate change and a respect for nature. The average for the quantitative data was 4.78 while the median was 5, showing that the participant had strong feelings regarding climate change, circle talks, nature, and going outside. By session seven, the participant had an average and median of 5 for the End-of-Week Questionnaire, and this remained constant for the session twelve End-of-Week Questionnaire and the Final Survey. A t-test was conducted to compare the Initial Survey to the Final Survey and a p-value of 0.169, which shows a weak statistical significance. Given that the Surveys and Questionnaires only had a Likert scale of one to five, numerical change is difficult to show, especially in cases like this where the participant already had strong agreements toward the questions regarding climate change, nature, and circle talks. Despite this, the qualitative data from the Final Survey confirms the participant's views did change when reflecting on climate change, getting outside, and participating in circle talks. The participant responded to the quantitative part of the Survey for question ten to elaborate and stated "I now realize that there is more life other then [*sic*] (than) human." When asked if climate change is a big deal for the area, the participant responded "it's deffintly [*sic*] (definitely) a change in where I live" showing that the sessions had provided information to the participant. The participant also felt that "circle talks are great because people gets [*sic*] (get) to say there [*sic*] (their) opinions," which suggests that the participant found the circle talks to be valuable in the experience. While the Initial Survey showed Participant Six was in strong agreement of the questions

in the Survey, the Final Survey showed that the study still provided Participant Six with positive experiences and information that helped made the individual even more in agreement with the topics focused on in the study.

Participant Seven participated in four sessions toward the end of the study and completed the Initial Survey, End-of-Week Questionnaires for session twelve, and the Final Survey and interview. Although Participant Seven joined Woodland Hills later in the study, she did attend sessions ten through thirteen and completed the final assessments during the final session, though she did not join for the lesson during session fourteen. However, the participant did not complete any of the qualitative questions of the Initial Survey and only completed nine of the ten Likert scale questions for the Initial Survey. The average for the quantitative data from the Initial Survey was 4.875 while the median was 5, thus showing that the participant strongly agreed with the topics of learning about climate change, learning in nature, and participating in circle talks. Participant Seven completed all of the questions for the session twelve End-of-Week Questionnaire and had an average of 4.8 and a median of 5. Though there was a slight change of the average, the numbers stayed relatively constant in comparison to the Initial Survey. The Final Survey obtained an average of 5 and a median of 5, again showing little change from the Initial Survey. A t-test was conducted to compare the Initial Survey to the Final Survey, and the p-value was determined to be 0.351. The p-value suggests a weak statistical significance, which is to be expected given the high values chosen in the Initial Survey. Participant Seven's responses to the qualitative section of the Final Survey provide an explanation as to why the averages and medians of the Surveys and

End-of-Week Questionnaire stayed relatively constant throughout the study. Her comments about going into nature and if her time spent outdoors would change were "I love getting outside. I am an outdoorsy person," which explains why her Initial Survey values were already in strong agreement with the topics being studied and why her values remained consistent throughout the study. Furthermore, the participant felt that circle talks "are a good reflection talk" and that the climate is changing because "it's getting warmer." The big take-away for the participant is that they now know "how I affect mother nature," which suggests that the individual is more aware of the impact she has on nature. Participant Seven may have only attended four sessions toward the end of the study, but the qualitative data from the Final Survey strongly suggests that these sessions did have an impact on the level of awareness the individual now has in regards to how her actions can play a role in changes in nature, including in the changing climate.

Analysis of Group Quantitative Data

The group size for the study was seven participants, smaller than the expected ten to fifteen, yet this group still provided both qualitative and quantitative data that will be analyzed as a whole and be compared to each participant's data individually. Examining the group data as a whole will determine if there are trends or relationships overall and will determine if the methods of the study answers the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* First, the quantitative data from the Initial Surveys, End-of-Week Questionnaires, and Final Surveys (Appendix B, C, and E, respectively) will be analyzed for trends and relationships. Next, the qualitative data will be evaluated

for similarities and differences, as well as frequency of responses. These two datasets will then be compared to determine if there are trends, relationships, and if the two datasets support one another in the separate results. After the group data has been analyzed as a whole, each participant's data will be compared to the group data to determine if the participant's results display the same trends and relationships as the group dataset.

As discussed previously, participant attendance was sporadic, which impacted the amount of data that was collected from each participant and, in turn, impacted the group data. All participants completed the Initial Survey (Appendix B), only participants P4, P6, and P7 completed the Final Survey and Final interview (Appendix E and D, respectively). P2 and P5 completed the Questionnaire during session three, as they were the only ones to participate in the session. P2 and P6 completed the Questionnaire for session seven while P4 did not due to being pulled from the session because of disruptive behavior. P6 and P7 completed the Questionnaire for session twelve. The sporadic and limited participation due to unpreventable challenges at Woodland Hills resulted in gaps in the data, though the quantitative data can still be analyzed to determine some trends and relationships in the data.

The Initial Surveys provided the most complete set of data from the participants and created a starting point for determining changes in the participants through the study. After compiling the Initial Surveys, it was noted that question one of the Initial Survey did not print on the participant copies and thus no data was collected. Question one is still present in the Initial Survey in Appendix B. Figure 2 illustrates the compiled data of the Initial Survey and the analysis of the group data. The standard deviation determines that

the participants were in the same agreement, with the max deviation being 1.62 and the average deviation being 1.29, thus showing that the group started off on a similar level of agreement for the topics. On average, the participants varied from 3.43 (question 7) to 4.00 (question 4), with the overall average being 3.74, showing that the group started with a moderate agreement for the topics of the study. This can be confirmed by the median, which was 4 out of 5 for each question. As seen in Figure 2, the group started off with a moderate agreement ranking for the Initial Survey, which may show little to no change given that the Likert scale was chosen to be 1-5 for the Survey. This may not show changes over time as well as a 1-10 scale may have, though simplicity for the Survey was an important factor for this data collection tool. The Initial Survey provided insight as to the starting point for the group in regards to their level of agreement with the topics being focused on for the purpose of the study.

Participant	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
P1	*	4	4	4	4	4	2	4	5	2
P2	*	1	1	4	2	1	3	1	4	3
P3	*	3	3	4	2	2	2	4	3	5
P4	*	5	3	2	4	3	5	4	2	4
P5	*	4	5	4	4	5	4	4	3	4
P6	*	4	5	5	5	5	4	5	5	5
P7	*	5	5	5	5	5	4	5	5	null
Standard Deviation	n/a	1.38	1.50	1.00	1.25	1.62	1.13	1.35	1.21	1.17
Average	n/a	3.71	3.71	4.00	3.71	3.57	3.43	3.86	3.86	3.83
Median	n/a	4	4	4	4	4	4	4	4	4

Figure 2: Initial Survey Data.
The Likert scale ranking (scale of 1-5) for each participant for each question. Questions are identified as the letter "Q" with a number. See Appendix B for questions. Also shown is the standard deviation, average, and median for each question. The asterisk signify that data for question 1 was not obtained and, therefore, a standard deviation, average, and median cannot be determined. "Null" signifies that the participant did not answer that question.

The End-of-Week Questionnaire (Appendix C) was used to determine checkpoints throughout the study to examine any potential changes over and to provide some consistency rather than just relying on the Initial and Final Surveys to determine trends or

relationships. However, the limited and sporadic attendance of participants made it difficult to obtain consistent End-of-Week Questionnaire data. Figure 3 exhibits the End-of-Week Questionnaire data for each session a Questionnaire was completed, as well as the responses from participants for each question. Despite the limited data due to various challenges that prevented participants from joining the sessions, averages for each question and the average for each session's Questionnaire was calculated, as seen in Figure 3. Though the Initial Survey average for the group is 3.74, it included all seven participants, some of which having stronger agreements towards the topics discussed in the Survey and Questionnaire. While the average for the Questionnaire for session three is less than the Initial Survey at 3.65, it is only using data from two participants, one of which chose lower numbers on the Likert scale for both the Initial Survey and the session three Questionnaire. Therefore, it is expected that the session three average is less than the Initial Survey average, though the difference between the two is negligible since the difference between the two is 0.09. When comparing the session seven Questionnaire average to both the Initial Survey average and

Session 3	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
P2	2	1	2	4	3	2	5	2	4	1	
P5	5	5	5	4	5	5	4	5	5	4	Total Average
Average	3.5	3	3.5	4	4	3.5	4.5	3.5	4.5	2.5	3.65
Session 7	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
P2	4	3	3	5	5	4	5	2	4	4	
P6	5	5	5	5	5	5	5	5	5	5	Total Average
Average	4.5	4	4	5	5	4.5	5	3.5	4.5	4.5	4.45
Session 12	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
P6	5	5	5	5	5	5	5	5	5	5	
P7	5	5	5	5	5	5	4	5	5	4	Total Average
Average	5	5	5	5	5	5	4.5	5	5	4.5	4.9

Figure 3: End-of-week Questionnaire Data.
The data for the questionnaires for sessions 3, 7, and 12, including each participant's responses to each question. Averages for each question as well as the average for each questionnaire was calculated and included. Only two participants per session completed the questionnaire.

the session three Questionnaire, there is an increase over time, as seen in Figure 3. The increase from the average of session three to session seven is almost a full point (0.80) while the increase in average from the Initial Survey to session seven is 0.71. Though the increase from session seven to session twelve is only a 0.55 increase, given that a 5 is the highest number a participant can select and the average for session twelve was 4.9, this is still a substantial increase from session seven. In comparing session twelve to session three, there is over a full point increase with a 1.25 difference between the two sessions. The trend in the Initial Survey data and the End-of-Week Questionnaires data is an overall increase for the group from a neutral/maybe opinion of the topics to a strong agreement of the topics focused on in the study.

The Final Survey only had three participants' input, as the other participants had either been pulled, transferred, or graduated from the program at Woodland Hills. As discussed previously, one of the participants had just arrived back at Woodland Hills after having ran away, which may have impacted the group data results. Figure 4 displays the Final Survey results for each participant and for each question, as well as the additional analysis that was conducted to analyze the data.

As shown in Figure 4, two of the participants had chosen the same numbers for each question (all 5's, which is the highest number for the Survey), while P4, who had just arrived back, had answers that were in the neutral or "maybe" agreement level. P4 caused a greater deviation for each question and for the Survey as a whole by an average of 1 point deviation. The group average for the Final Survey increased from the Initial Survey by 0.66 and decreased from the session twelve End-of-Week Questionnaire by

Participant	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
P4	null	3	3	3	2	3	3	4	4	2	
P6	5	5	5	5	5	5	5	5	5	5	
P7	5	5	5	5	5	5	5	5	5	5	Total Averages
Standard Deviation	0	1.15	1.15	1.15	1.73	1.15	1.15	0.58	0.58	1.73	1.04
Average	5	4.33	4.33	4.33	4.00	4.33	4.33	4.67	4.67	4.00	4.4
Median	5	5	5	5	5	5	5	5	5	5	5

Figure 4: Final Survey Data
The results from the three participants that completed the final survey for each question of the survey. The standard deviation, average, and median was calculated for each question as the averages for the whole survey for the standard deviation, average, and median. "Null" indicates that a participant did not answer the question.

0.50. However, the median of the Final Survey increased from the median of the Initial Survey by a full point, showing an increase in agreement to the topics from "moderately agree" or "a little" to "strongly agree" or "absolutely". It appears that P4 is an outlier in comparison to the other two participants, and that this had an impact on the Final Survey data. Excluding P4 from the Final Survey dataset, the standard deviation becomes 0, the average becomes 5, and the median remains at 5. However, this would change the increase in the average of the Final Survey from the Initial Survey to be 1.26 while the increase from the session twelve Questionnaire would only be 0.1. This would show a consistent trend, as the participants that completed the session twelve Questionnaire were the ones that had an increase to straight 5's on the Final Survey. P4 was an anomaly to the dataset for the Final Survey, which, when examining the Final Survey data to the rest of the quantitative data, shows less of an increase and even a decrease in the level of agreement to the topics. The quantitative data shows an upward trend in agreement, meaning that the participants, as a group, felt more strongly toward the topics at the end

of the study than at the start of the study and thus support the theory that the methods of the study can be used to answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Analysis of Group Qualitative Data

Qualitative data was collected through the Initial Survey, Final Survey, and Final interview and allowed participants to elaborate on their answers provided through the Likert scale portion of the Survey as well as elaborate on any final thoughts during the Final interview. As noted in the quantitative data analysis, while all the participants completed the Initial Survey, only three participants completed the Final Survey. One of those participants, P4, was distracted during the Final Survey since they had just arrived back at Woodland Hills after having been gone due to running away from the facility, and this very well could have impacted the responses provided in the Survey as well as the Final interview. To analyze the qualitative data, frequency of words will be determined and word clouds will also be used to illustrate this frequency. Trends among the qualitative data will be determined by comparing the number of negative words, such as "scared", "hate", and "confused", to positive words such as "love", "understand", and "enjoy". These frequencies and trends will be compared to each dataset to determine overall relationships throughout the study. The qualitative data from each data collection tool will be analyzed individually and then compared together to determine any trends or relationships prior to finally being compared to the overall quantitative data to determine

if the datasets support each other and if there are trends or relationships between the qualitative and quantitative data.

The qualitative data from the Initial Survey will be examined for frequency of word choice as well as evaluated for the number of negative and positive words used in participant responses. To illustrate the frequency of words, word clouds will be created using the participant responses. Sentence structure words, or other non-significant words such “the”, “and”, and “to” will be removed from the analysis, as will words such as “I”, “we”, and “it’s”. Some phrases or words were combined for the purpose of the word cloud, for example “I don’t know” became “don’tknow” and “I hate nature” became “hatenature” because the word cloud would otherwise separate these words. While all seven participants completed the Initial Survey, P6 only answered one of the questions and P7 answered none of the questions for the Initial Survey. Image 1 illustrates the frequency of the words participants used in responses for the Initial Survey. The larger the word, the more it was used by participants. The phrase “don't know” was used four times while “love”, “sad”, and “Yes” were each used four times. “Not really” was used two times, and the rest of the words were used only once. Figure 5 represents the word cloud data as categories: negative, neutral, and

Image 1: Initial Survey Word Cloud.
The word cloud illustrates the frequency in which words were used in responses. The phrase “don’tknow” was used the most.

Figure 5: Initial Survey Word/Phase Frequency and Category.

Positive Words/Phrases (20 total):
love (x3), Yes (x3), betterlife, calm, careofworld, Freedom, gettingstuffoffchest, Good, great, Happy, Inspiring, kind, Lessstressed, lovebeingoutside, Peaceful, relieved

Neutral Words/Phrases (18 total):
don'tknow (x4), notreally (x2), active, crazy, environment, Family, information, knowledge, Learning, local, outside, schooling, speedy, weird

Negative Words/Phrases (10 total):
sad (x3), awkward, changingclimate, depressed, hatenature, mad, nervous, worseningclimate

positive. This data provides more insight as to the starting point level the group is at in regards to agreement towards the topics focused on for the study. The totals for each category was determined by counting the number of words/phrases and including multiples where a word was used more than once. There were more positive words than neutral words and negative words, however, the numbers for positive and neutral words were similar, as seen in Figure 5. Figure 5 examines the data more closely than Image 1, as the qualitative data can be quantified and compared further for frequency by categorizing the words and phrases. To fully quantify the data and get a number to represent the responses, each positive number can be denoted by a +1, each neutral by 0, and each negative by -1. Thus, the number to represent the qualitative data is 10 since there are +20, 18x0, and -10 for the ranking. By quantifying the data, it provides more concrete evidence that supports the initial starting point for the group in that the group, overall, is in moderate agreement with the topics being focused on during the study.

The qualitative data for the Final Survey was examined in the same fashion that the qualitative data for the Initial Survey was and resulted in both a word cloud (Image 2) and a quantification of the data to further analyze the results (Figure 6). Only three of the participants completed the Final Survey. P4 may have been distracted during the Final

Survey and, therefore, the answers may have been impacted as a result. Image 2 illustrates the frequency of the words participants used in responses for the Final Survey. The words "Yes", "good", and "great" were each used twice, while all the other words were used only once. This data can be quantified and further analyzed, as shown in Figure 6. Figure 6 illustrates the Final Survey results by categorizing words and phrases as positive, neutral, or negative. While there are fewer positive words than neutral words, there are only two negative words throughout the responses for the Final Survey, as observed in Figure 6. When applying the same numeric significance as discussed previously where a positive word is denoted by +1, a neutral word by 0, and a negative word by -1, the number results in 13 since +15, 17x0, and -2 equates to 13. The

Image 2: Final Survey Word Cloud.
The word cloud illustrates the frequency in which words were used in responses. The words "good", "great", and "Yes" were used the most, each being used twice throughout all the responses for the final survey.

Figure 6: Final Survey Word/Phase Frequency and Category.

Positive Words/Phrases (15 total):
good (x2), great (x2), Yes (x2), fun, getstuffoffchest, hopeful, likeoutside, Loveable, loveoutside, optimistic, refreshing, well-treated

Neutral Words/Phrases (17 total):
affectMotherNature, careful, change, circletalks, definitely, different, Goingoutside, Influenced, life, live, Maybe, opinions, outdoorsy, people, realize, reflection, talk

Negative: (2 total):
warmerclimate, Worrying

overall numeric ranking for the Final Survey is three points more than the Initial Survey, showing that the group felt more positive about the topics and more in agreement with the topics after the study than prior to the study.

In addition to the Final Survey qualitative data, a Final interview was conducted to allow the participants to further elaborate on their responses, reflections, and thoughts from the study. As noted before, only three individuals completed the Final interview and one of which was distracted after having just been dropped off at Woodland Hills. Nevertheless, the Final interview allowed participants to more deeply reflect on their experiences throughout the study and it provided an opportunity to gather more insight from the participants. Image 3 illustrates the frequency of the words participants used in responses for the Final interview. The words "yes", "good", and "help" were used the most by participants. No negative words were used by the participants in describing their reflections of the study or their views of the topics being focused on during the study. The participants used many of the same words multiple times, as can be seen in Image 3 with how large most of the words are compared to words such as

Image 3: Final Interview Word Cloud. The word cloud illustrates the frequency in which words were used in responses. The words "yes", "good", and "help" were used the most. No negative words were mentioned by participants for the final interview data.

"world" which was only used once. In comparison to Image 1 and Image 2, the participants used more phrases such as "make a difference" and "learning helped". Overall the reflections looked at the bigger picture of how they have a role in the environment, climate change, and the world. Figure 7 illustrates the Final interview results by categorizing words and phrases as positive, neutral, or negative. As noted above, there were no negative words used by participants. When applying the same numeric significance as discussed previously where a positive word is denoted by +1, a neutral word by 0, and a negative word by -1, the number results in 28 since +28, 40x0, and -0 equates to 28. There is an improvement in the agreement and positive outlook from the participants throughout the study, as the Initial Survey started at 10 and ended, with the Final Survey, at 13. Although the Final Survey and Final interview were done consecutively during the same session, there was a great difference between the numerical significance of 15 when comparing the Final Survey and the Final interview. The Final interview questions allowed participants to reflect more and dig deeper into what the study had changed in regards to their opinions about nature, the environment, circle talks, and their own lives, and this provided a better analysis of the changes that occurred for the group because of the study.

Figure 7: Final Interview Word/Phase Frequency and Category.

Positive Words/Phrases (28 total):
yes (x4), good (x3), help (x3), connect (x2), calm, feellikehero, getoutside, getstuffoffchest, glad, healthy, learninghelped, letoffsteam, like, likecircletalks, makeadifference, moreaware, refreshing, relaxed, relieved, thinkclearer

Neutral Words/Phrases (40 total): climatechange (x2), feel (x4), hear (x3), know (x3), people (x3), trees (x3), chance (x2), express (x2), grow (x2), learn (x2), think (x2), changed, don'tknow, identify, joingroups, nature, opinions, outside, pollution, resources, talking, talktoeveryone, world

Analysis of Qualitative Data from Observations

In addition to the self-reported data from the participants, the researcher and the Unit Manager recorded observations of each session to determine additional changes in behaviors of the participants throughout the study. The purpose of having both the researcher and the Unit Manager conduct observations is that the researcher naturally has biases, as she knows what the study is being analyzed for, specifically, while the Unit Manager only has a general knowledge of the study. Furthermore, the Unit Manager spends more time with the participants and would be able to better evaluate changes in behaviors. For each session's observations, the responses will be compiled and analyzed for frequency and category of the words and phrases, just as the qualitative data from the Initial Survey, Final Survey, and Final interview were analyzed, though only the categorized figures will be displayed rather than having word clouds for each session's observations. The observations of the researcher and the Unit Manager will be evaluated individually before comparing the two to determine if there are similarities or differences in the observations.

The observations from the researcher were compiled into a list to determine key words and phrases, the frequency, and the category to determine a numerical significance for each session's observations. Appendix Q contains the list of categorized words and phrases, as well as the frequency and numerical significance, for each of the fourteen observations recorded by the researcher. The list contains key words and phrases from the observations. These words and phrases were counted for frequency and categorized as "negative", "neutral", or "positive" to assign a numerical significance for each session.

Some sentences were paraphrased to maintain the meaning behind the word or phrase, and this assisted in assigning the proper categorization for each word and phrase. The number of negative, neutral, and positive words from the list in Appendix Q were used to create Figure 8, which displays the results by examining the frequency of each category for the observations from the researcher for all fourteen sessions. The numerical significance value is the sum of the categories, for example session one has a numerical significance value of +5 because +9, 9x0, and -4 equate to +5. To better understand why each session had varying values rather than there being any apparent trend throughout the study, the topic of each session and any challenges or external circumstances will be discussed briefly while analyzing the numerical significance value for each session. Session one was in person and there were four participants, who were very excited for the session. However, conflicting personalities caused some "disruptive" and "rowdy" activities, which were two of the negative words used to describe the situation, thus causing the numerical significance value to be +5. The topic of session one was "Getting to Know You," and can be found in Appendix I. Session two focused on

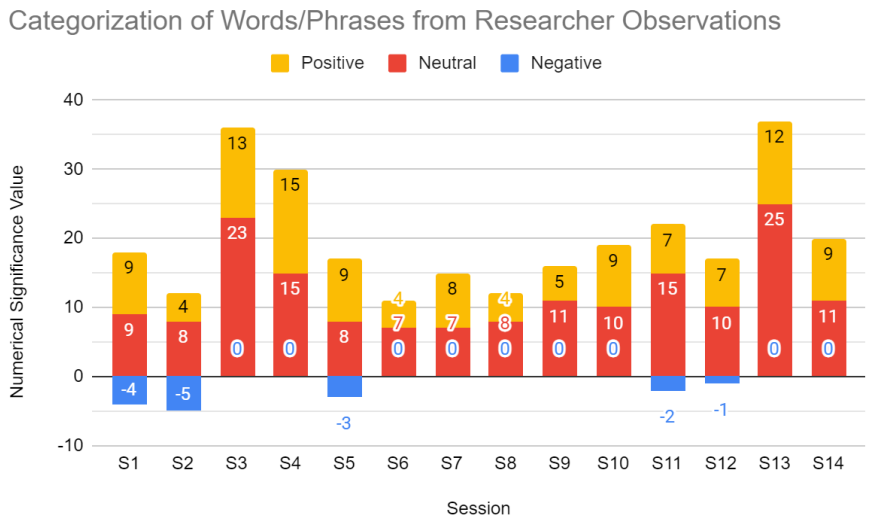

Figure 8: Graph of Results-Observations from Researcher.
The bar graph illustrates the number of negative, neutral, and positive words/phrases from the observations of the researcher for each session.

“Phenology” and the negative words and phrases used were in the context of having negative feelings, such as sadness and depression, due to the changing seasons. The conflicting personalities also caused some of the negative words and phrases, as the participants were “verbally aggressive”, and it resulted in canceling the session after the lesson but before the circle talk could be conducted. Overall the session had a numerical significance value of -1. Session three only had two participants, as the third youth in the program was not allowed to join due to behavioral issues and the topic of the session was “Types of Trees in Minnesota” (see Appendix I). The numerical significance value for this session was much higher as a result at +13, as there were fewer disruptions and arguments. Session four continued with this pattern, with a numerical significance value of +15, as there were three participants who were excited to join the session to learn new things. Most of the words and phrases came from observations and reflections of the participants as they discussed the topic of “Biomes”. Session five had two of the excited participants and the participant who often caused disruptions, which explains the decrease in numerical significance +6. The topic for this session was “Seeing is Be-leaf-ing” in which the participants learned more about tree leaves (see Appendix I). Session six focuses on “Identifying Tree Families" and had only two participants, one of which was known for regular disruptive behavior. Though no negative words or phrases were recorded in the observation, there were only four positive words, thus resulting in a numerical significance value of +4. Session seven had three participants, including the disruptive participant, and explored “Tree Species”. The numerical significance of session seven increased to +8 as the participants became excited with being able to

identify tree species. Session eight focused on “Getting to know...Trees?” and had the participants learning more than reflecting. Thus, the numerical significance of session eight was only +4. Session nine focused on “Tell me, what’s your story”, which had the two participants examine their life as if it was a tree’s life by putting their life timeline into tree rings after discussing tree rings briefly (see Appendix I). As participants reflected on their life, no negative words or phrases were recorded, but the mood of the lesson was more neutral and resulted in a numerical significance value of only +5. Session ten explored “What do Trees Tell Us?” and had the two participants examine what can be learned from tree rings, including what can be learned about the climate from tree rings. The participants were excited to learn and the one participant was a “leader”, as observed, to the newer participant by helping them understand what they had missed from the previous lesson. This resulted in a numerical significance value of +9. Session eleven, “Fire, Flood, and Local Climate” connected the concepts from previous sessions and connected what had been learned from tree cookies with local climate data. The newer participant expressed that she “felt dumb” because she had learned these concepts before but had “forgotten”, which account for some of the negative words observed, however it was a positive experience as she had felt safe enough to express her feelings and she was supported by the researcher and her peer. This explains why the numerical significance value was only +5. Session twelve, “Climate Change and Pests...it’s a Dangerous Life for Trees!” discussed the various challenges that trees face when trying to survive. The only negative word was “worried”, yet the tone of the session had an impact on the participants and resulted in a numerical significance of +6. Session thirteen started

with a reading of “The Lorax” for the session “Science is like Sunshine...a Ray of Hope”, and caused a lot of negative emotions toward the topic of deforestation, yet the participants remained “optimistic”, as observed. The positive feelings and responses to the negative situation resulted in a numerical significance value of +12. The final session, session fourteen, explored “The Next Steps”. Only one participant attended the lesson while the other two participants, including the disruptive participant, showed up for the final assessments. Despite the sessions coming to an end, the tone was neutral to positive overall and resulted in a numerical significance value of +9. The ending of the sessions may have impacted the overall numerical significance as well, as the participants looked forward to the sessions because they enjoyed learning new things and meeting with the researcher. However, these observations only reflected what the researcher witnessed, and must be compared to the observations of the Unit Manager to fully determine the data.

The Unit Manager works with the group, that was part of the study, five days a week and for approximately eight hours a day and therefore knows the behaviors and habits of the participants more so than the researcher. For this reason, the observations from the Unit Manager will be a better judgement of any changes in the participants. Unfortunately, the Unit Manager did not complete an observation for session twelve. Surprisingly though, the Unit Manager decided to complete the extra copy of the Final Survey and the Final interview, which will be analyzed and included in the results after discussing the sessions and the numerical significance values. The process for analyzing the observations from the researcher will be used to analyze the observations from the Unit Manager. Some sentences were paraphrased to maintain the meaning behind the

word or phrase, and this assisted in assigning the proper categorization for each word and phrase. The number of negative, neutral, and positive words from the list in Appendix R were used to create Figure 9, which shows the results of the categorizing of the words and phrases from the observations of the Unit Manager. Session one had a high numerical significance value with +8, and the observations were similar between the Unit Manager and the researcher. Both found the girls to be excited, though the researcher described the group as "rowdy" while the Unit Manager focused on behaviors after the session. After the session, the Unit Manager explained that the group was calm and it was "the first smooth bed time" they had all week. Session two had very different observations, as seen in Figure 9, as the "underlying social drama" became an issue and caused the session to end prior to the circle talk, resulting in a numerical significance value of -9. This is comparable to the -1 value observed by the researcher. Due to the session being cut short, the "participants remained agitated and escalated throughout the remainder of the evening," according to the Unit Manager. After the events of session two, the disruptive participant, as

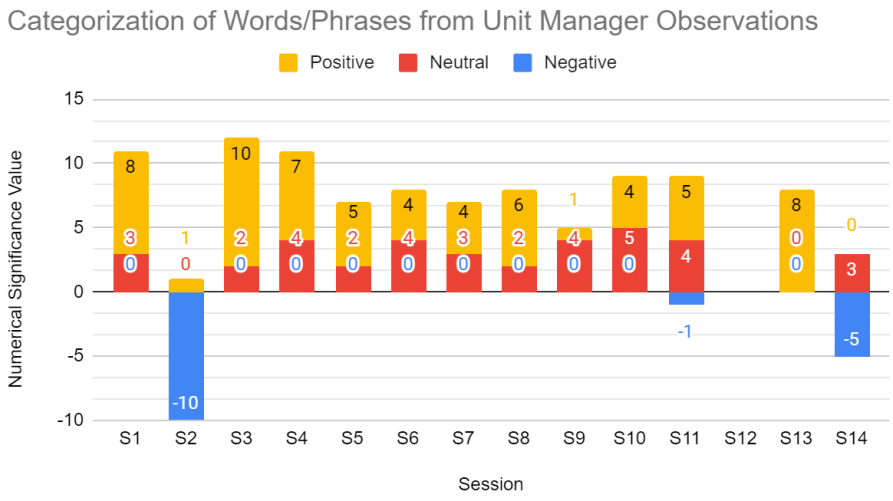

Figure 9: Graph of Results-Observations from Unit Manager.
The bar graph illustrates the number of negative, neutral, and positive words/phrases from the observations of the unit manager for each session.

mentioned by the researcher, was not allowed to join for session three. The observations were thus very positive, as the participants in session three did not focus on drama but rather the learning and experience. After the session, the participants had a "smooth transition" and "a heightened level of respect/compliance for staff," as noted by the Unit Manager, and this resulted in a numerical significance value of +10. This number is comparable to that of the observations from the researcher, of +13, as both observers noticed a change in behaviors with the focus switching from internal group drama to the learning at hand. During session four, the Unit Manager "noticed a higher level of focus" and "active engagement" with the activities. These observations were noticed even after the session where participants were "overall calmer and more focused." The consistency in behaviors caused the numerical significance value to decrease to +7 while the number from the researcher increased to +15 from +13. Session five had some "goofiness," which caused the numerical significance value to decrease to +5, and is comparable to the numerical value of +6 from the observations of the researcher. Sessions six and seven had consistent numerical significance values of +4 as observed from the Unit Manager. Session six was similarly observed by the researcher while session seven was seen as more positive at +8 by the researcher. The Unit Manager noticed a particular calm mood in one participant, though that individual struggled with group drama later in the night after the session. For session seven, though there was a high energy level "due to the big personalities," there was, nevertheless, an observed "heightened level of focus" by the Unit Manager. Session eight remained relatively constant for both the Unit Manager, with a value of +6, and the researcher, with a value of +4. However, the Unit Manager

remarked that there was “an increase in focus and desire to learn when they walk through the door” and “while the goofiness is constant, it is less disruptive both during and after” the sessions. Interestingly, the numerical significance value for session nine decreased for the Unit Manager to +1 while the value for the researcher increased to +5. The explanation from the Unit Manager is that two of the participants “were attempting to ‘front’ for the new girl” who was attending the sessions for the first time. In talking with the participants after the session, the participants “promised to do better.” Despite the change in behavior, the opportunity provided a moment of self-awareness for the participants and allowed them to reflect on their behaviors. Session ten resulted in an increase in the numerical significance value for both the researcher, with a value of +9, and the Unit Manager, with a value of +4. The Unit Manager noticed that the new participant was “indifferent and calm” and that the one participant that was graduating soon was benefiting from the session because it gave her “something in nature to focus on” and “seemed to help” despite the stress she was experiencing outside of the session. Session eleven resulted in similar numerical significance values for the researcher, with a +5, and the Unit Manager, with a +4. While the value decreased for the researcher, the value for the Unit Manager remained the same. The observations from the Unit Manager remarked that “both clients maintained positive and calm attitudes before, during, and after” the session. There were no observations from the Unit Manager for session twelve. Session thirteen saw an increase in the numerical significance values for both the researcher, with an increase to +12, and the Unit Manager, with an increase to +8, and both observed the change was likely due to the session being in person. The excitement

turned into an “overall calming effect” which “lasted well into the end of the [Unit Manager’s] shift.” Session fourteen saw a decrease in the numerical significance value for both the researcher, a slight decrease to +9, and the Unit Manager, with a strong decrease to -5. Both observed that this decline was due to the participants expressing that they were “sad” due to it being the last session and that there were feelings of “frustration” and “agitation” due to one of the participants having just arrived back at Woodland Hills, which caused drama among the group. The Unit Manager had to deal with the participant returning in addition to another participant having had a meeting prior to joining the session, and this could also contribute to the overall negative value for the session as the Unit Manager may have felt negative emotions in response to the events taking place. While neither the researcher nor the Unit Manager had consistent trends in their data, as seen in Figures 8 and 9, the results were very similar in the increases and decreases of the numerical significance values from session to session. Major increases or decreases in the values were apparent in both sets of data and the composition of the group as well as external group “drama” appeared to have the biggest impact on the numerical significance value for each session, though overall both the researcher and the Unit Manager observed positive changes in behaviors throughout the sessions that continued even after the sessions.

As mentioned above, the Unit Manager completed the Final Survey and the Final interview, as he felt he had learned new information and that the study had changed him in the process of working with participants for the study. The quantitative data from the Unit Manager is shown in Figure 10, and the results are comparable to the Final Survey

results for the participants. The average for the Unit Manager was determined to be 4.3 while the average for the group was 4.4 and the median for the Unit Manager was 4 while the median for the group was 5. Due to there being no Initial Survey data or End-of-Week Questionnaires completed by the Unit Manager, a conclusion cannot be determined or compared to the data in Figure 10. However, the qualitative data from the Final Survey and the Final interview provide some insight as to how the study changed the views of the Unit Manager. The Unit Manager felt "wisened, reflective and observant" while mentioning that he "enjoyed and learned a lot." In regards to climate change, the Unit Manager explained that the local climate is indeed changing and wished that people "knew how dangerous our weather is actually becoming" in addition to expressing that climate change "needs more media coverage." The circle talks helped the Unit Manager to "reflect on connections between my life and nature" while also viewing it as an opportunity to "facilitate discussion and orient individuals to talking about specific topics." In regards to nature, getting outside, and how it made the Unit Manager feel, the comments included that it makes him "feel calm and centered," that he feels "more aware at all that can be learned by observing nature closer," and he encourages "others to get outside at least once a day if not more." The big take-away for the Unit Manager is that "everything is interconnected and nature is extremely calming" while expressing that the study has "taught me to be more aware of what nature and trees can tell/teach us overall" and has provided the motivation to help him get "outside for a

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average	Median
Unit Manager	5	4	4	5	4	4	3	5	5	4	4.3	4

Figure 10: Final Survey Results for Unit Manager
The quantitative data from the final survey for the unit manager, including the average and median of the survey.

change.” It is apparent that the study had a positive impact on the Unit Manager and it not only changed how he viewed circle talks, nature, the outdoors, and climate change, but also changed behaviors in observing and enjoying nature.

Analysis of Qualitative Data Collected from Circle Talks

Circle talks were used to allow participants to reflect on their own experiences while connecting with new information through the sessions of the study, and this provided qualitative data in the form of reflections, comments, and insight from the participants. To analyze the qualitative data, frequency and category of the words will be determined to create a comprehensive word cloud that will be used to illustrate this frequency. Trends among the qualitative data will be determined by comparing the number of negative words to positive words, much like the qualitative data from the Initial Surveys, Final Surveys, Final interviews, and observations of the researcher and Unit Manager were analyzed in order to determine trends and relationships. The circle talk data will be analyzed as a group rather than an individual participant dataset, and in part this is due to most of the sessions being through online platforms due to COVID. During the online sessions, it was often difficult to identify which participant provided the specific responses as the participants were in a conference room at Woodland Hills while the researcher used a laptop at home. As the sessions progressed, the participants had a routine and would often proceed through the questions as the researcher recorded observations and notes from the circle talks, thus making it even more challenging to identify the speaker for each reflection, comment, or insightful remark.

The circle talk reflections were brief for session one due to the fact that the circle talk focused on creating a space, understanding, and community agreements for future circle talks and being that it was the first session, the participants did not have much to reflect on in regards to the specific questions for the study. For the purpose of confidentiality, the story of past experiences that explained why P4, the "disruptive" participant was recommended to attend Woodland Hills will not be discussed and this was the major event that took place during the session one circle talk. Session two was cut short due to conflicts that arose between participants and thus, there is no circle talk data for session two. The number of negative, neutral, and positive words from the list in Appendix S were used to create Figure 11, which shows the results of the categorizing of the words and phrases recorded during the circle talks. As discussed previously, sessions one and two did not have any recorded information from the circle talks, and there was also no circle talk conducted for session fourteen. The topics of the sessions had the largest impact on the reflections and

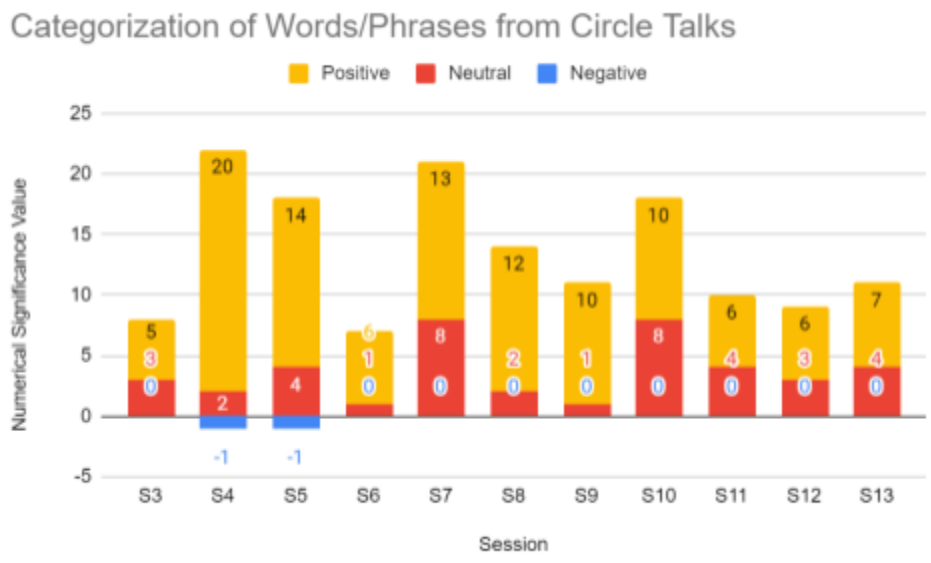

Figure 11: Graph of Results-Words/Phrases Recorded during Circle Talks. The bar graph illustrates the number of negative, neutral, and positive words/phrases that were responses from the participants during circle talks. Since there was no data recorded for sessions one, two, and fourteen, they were not included in the graph.

comments of the participants. Participants would express negative feelings when they reflected on their concerns for nature, the environment, or climate change and would express positive feelings when they felt empowered or learned about new information that could help them create change to better the environment. Session three, "Types of Trees in Minnesota" (see Appendix I), discussed the types of trees the participants may experience locally and the numerical significance of +5 was therefore rather neutral, as there were no strong feelings involved in the reflections during the circle talk. Session four discussed "Biomes" and had a numerical significance of +19, as the participants were able to connect their prior experiences with new learning and also commented that they could help in "taking care of the world" to "make the world better." "Seeing is be-leaf-ing" was the topic for session five and while there was the concern that the "environment is being killed off," most of the reflections during the circle talk were positive. The numerical significance for the session was +13 and the reflections included participants feeling that they "want to go outside," that the sessions are "opening my eyes," and they "feel smarter." Session six focused on "Identifying Tree Families," which was a challenging session for the participants since there was so much to learn and practice. Due to this, the numerical significance value decreased to a more neutral level of +6 and the focus for the reflections was that the participants "want to look at leaves more." The numerical significance value increased, to +13, for session seven in which participants explored the topic of "Tree Species" for Minnesota. The reflections discussed change, specifically how the session "changed my life" and changed the "perspective of [the] natural world." One participant expressed that the sessions gave her "something to

do when sad or depressed." The numerical significance value stayed relatively the same through sessions eight (+12), nine (+10), and ten (+10). Session eight focused on "Getting to Know...Trees?" and allowed the participants to explore more about trees (see Appendix I). During the circle talk reflections, participants made comments about how they "feel great," "feel happy," and want to "keep learning more." While session nine was another session with a lot of new information, the participants still expressed high positive reflections, including that they "feel connected" and "like learning about trees." Session ten had participants explore "What do Trees Tell us?," which allowed them to explore what tree rings can tell people about a tree's life. The circle talk reflections included participants thinking about being "more considerate of trees" and thinking "more about living things in nature" while realizing that "I have scars but also good times" much like trees reflect with their rings. Session eleven had a numerical significance value of +6, which could be attributed to the fact that the discussion of the session focused on "Fire, Flood, and Local Climate," which can sometimes be a harsh reality for people to reflect on and discuss. Nevertheless, the participants expressed during the circle talk that they "love nature" and they are "getting more knowledge." Session twelve explored "Climate Change and Pests...it's a Dangerous Life for Trees!" As seen in session eleven, though the topic was a harsh reality to discuss, the participants still had a neutral experience and were still "excited to learn about trees." The numerical significance value for session twelve was the same as session eleven, with a value of +6. This value only increased by one to session thirteen with a value of +7. Session thirteen explored the topic "Science is like Sunshine...A Ray of Hope" and discussed ways

participants could address and be actively involved in creating change for the environment and climate change (see Appendix I). While the reflections from the circle talk were rather serious given the topic, the participants did express that they were "happy" and "feel good" in regards to what they had learned in session thirteen.

The list in Appendix S was used to create two word clouds to illustrate the circle talk reflections from the study, as seen in Image 4 and Image 5, and, as noted above, do not include data for sessions one, two, and fourteen. Image 4 illustrates all of the responses from the participants during circle talk discussions and reflections.

Image 4: Circle Talk Word Cloud.
The word cloud illustrates the frequency in which words were used in responses. The words "cool", "changed", and "realize" were a few of the most used words.

As illustrated in Image 4, phrases had to be denoted as a full word in order for the phrase to remain together in the word cloud. While most of the words reflected on the learning that participants experienced throughout the study, some of the reflections also noted how the study "changed my life" or made them "feel great." Any negative words or phrases referred to concerns for the climate and nature, such as "environment is being killed off," which shows an improved awareness of nature and, in part, climate change. Other negative words or phrases addressed how the participants felt "depressed before" sessions and engaging in nature gives them "something to do when sad or depressed" to make them "feel better," thus showing connections to place through the natural environment. The study also helped empower the participants, which can be seen in the reflections where participants acknowledge that they "need to take care of nature" and that "taking care of the world" can "make the world better." In addition, the study gave the participants a chance or a means of healing from previous trauma, as participants remarked that the study makes them "feel acknowledged" and that "nature can heal." The circle talk discussions strongly support that the methods used for the study can answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* while also providing a means for at-risk youth to feel empowered and develop techniques to heal from trauma by using restorative practices to connect the youth to place.

Due to there being many unique responses, the results that formed Image 4 were reduced by removing any word or phrase that was only used once and this dataset was used to create Image 5 in order to create a more organized and conclusive image for the

circle talks. Image 5 shows the words and phrases (see Appendix S) from the circle talks, though only the words and phrases that had a frequency of two or more. This format makes the concepts more apparent by highlighting the frequently used words from circle talks. As seen in Image 5, the words used the most were "didn't know," "changed," "knowledge," and "realize." The reflections from the participants showed an increased awareness of nature and climate change, as can be seen from the remarks "love trees," "feel educated," "like learning about trees," and even the frequency in which "climate change" is mentioned in circle talks. Image 5 also highlights that the sessions and circle talks utilized restorative practices, as noted in the reflections such as "feel great" and "changed my life." The word that was used the most was "changed" and illustrates how the study, overall, has impacted the participants. It is clear through the circle talk reflections from the participants that the methods of the study can indeed answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Image 5: Reduced Circle Talk Word Cloud.
The word cloud illustrates the frequency in which words were used in responses. These words were derived from the same list as Image 3, but only use the words with a frequency of two or more.

Conclusion

The variety of methods for data collection, as discussed in Chapter three, was valuable in gathering information about trends and relationships, through quantitative data, and in gathering information about the effectiveness of the study to answer the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* Despite the many challenges that arose before and during the study due to COVID-19 and the challenges of working with at-risk youth, the data supported the value of the study not only for the participants, but also for the Unit Manager and the researcher. The quantitative data from the Initial Surveys, End-of-Week Questionnaires, and the Final Surveys provided cumulative information that was used to determine relationships and trends for the group as well as for the individual participants throughout the study. Though most of the participants already had moderate agreements and positive outlooks on the topics of nature, going outside, the benefits of being outdoors, and circle talks, there was an improved agreeance throughout the study, as seen through the Likert scale data from the Initial Surveys, End-of-Week Questionnaires, and the Final Surveys. The numerical significance values, or the quantification of the qualitative data, did not result in any specific trend for the research observations, Unit Manager observations, or the circle talk reflections. Rather, the information reflected the ups and downs of group conflict unrelated to the study as well as the learning throughout the study. Sessions with group conflict often resulted in neutral to negative numerical significance values. During sessions with a vast amount of information or sessions with concerning information about

the realities of climate change, the sessions were overall neutral to somewhat positive. However, the quantification of the qualitative data did not show the significance of the study in the way that was seen in the observations and reflections.

The purpose of the study was to determine how, and if, connecting at-risk youth to place could improve learner awareness of local climate change and be used as a method for restorative practices. As discussed in Chapter two, to connect people to place, people need to experience the place because experiences, interactions, and memories are the largest component of an individual's connection to place (Capaldi, et al. 2015; Dam and Eyles, 2012; Mendoza & Morén-Alegret, 2012). The lessons and activities during the study allowed the participants to experience nature in a more hands-on and experiential format rather than their previous experiences of walking in nature or camping. Each lesson focused on a particular topic that required the participants to observe and become involved with nature in a safe and inclusive environment that allowed them to enjoy the sessions (see Appendix I).

The lessons and circle talks also allowed the participants to examine their metacognition, self-efficacy, and mindfulness by providing opportunities for them to reflect on prior knowledge and experiences to connect it to new learning and experiences. As expressed in the circle talks (as illustrated in Images 4 and 5), the participants expressed knowing more, having the ability to make the world a better place, and wanting to learn more about trees and nature. These reflections show an increase in metacognition, which is the actions or processes of self-knowledge (Cikrikci & Odaci, 2015, p. 978), and self-efficacy, which is what the individual knows they are capable of

doing (Cikrikci & Odaci, 2015, p. 980). The participants practiced mindfulness as they focused on what is currently happening in nature, the environment, and their lives. Mindfulness, which is the state an individual feels in the "here and now" without worrying about the future (Zolkoski &Lewis-Chiu, 2019, p. 47) was expressed by the participants. The participants would sometimes express concerns about the environment or nature, but more often they expressed how they felt empowered and that they could create change to make the world a better place, thus showing an increase of mindfulness.

Restorative practices were integrated into the sessions through the use of circle talks and it became apparent rather quickly that the restorative practices were improving behaviors and emotions of the participants. Participants utilized the circle talks to express their concerns, even outside of the topics of the sessions, and improved their social skills by creating an inclusive space for their peers to talk. At times, they would even remind each other or the Unit Manager that a peer was talking, thus showing empathy toward their peer. These observed events illustrate the benefits that restorative practices can have on youth, especially at-risk youth (Gaarder & Hesselton, 2012; Mansfield, et al. 2018; Schumacher, 2014). As shown in Images 4 and 5, the participants expressed knowing more, feeling acknowledged, and noticing that everyone goes through things in life. Some of the most crucial restorative practices benefits for at-risk youth, especially at-risk female youth, are an increase in empathy for others, an increase in empowerment, and an increase in self-esteem (MacDonald & Chesney-Lind, 2001, p. 190), and these are results that were shown in the participants through observations and circle talk reflections.

The results of the study demonstrate the need for mixed methods data collection when working with socioemotional situations such as the study presented by examining how connecting at-risk youth to place can improve learner awareness of local climate change while being used as a method for restorative practices. While the quantitative data from the Initial Surveys, End-of-Week Questionnaires, and Final Surveys provided an insight as to the trends and relationships throughout the study for both the group as a whole and for each individual, it does not adequately represent the holistic impact the study had on the youth. Through the qualitative data from the Initial Surveys, Final Surveys, observations, and, most importantly, the circle talk reflections, the holistic impact that the study had on the youth shows a great deal of change and awareness. Not only does this awareness include being aware of nature and climate change, it also includes awareness of self and empathy toward others. The mixed methods data collection created a holistic view of changes in the youth throughout the study and provides evidence to support that the methods of the study can, and did, connect at-risk youth to place to improve learner awareness of local climate change while being used as a method for restorative practices.

CHAPTER FIVE

Conclusion

Introduction

Chapter five will discuss the conclusion by revisiting the literature to connect to the findings of the study, reflect on major learning by reviewing the overall results from the study, discuss limitations of the study, discuss implications of the study, and reflect on how the study relates to Hamline University's School of Education's Conceptual Framework. The chapter will start with the review of the literature examined in Chapter two while connecting the results of the study to the literature review, highlighting how the study used methods or key concepts from the literature. Next will be a reflection on major learning that occurred during the study and during the analysis of the study. This will utilize the results of the study to create a conclusion while examining overall trends, additional questions, and thoughts from the researcher. Limitations of the study will be discussed by considering the challenges that were noted in Chapter four, as well as additional limitations of the study. Implications of the study to educational organizations, in the context of methods for teaching environmental education, will be discussed to address how the study can be communicated or used in the future while also providing recommendations for future research. Lastly, the researcher will reflect on the study and its connections to Hamline University's School of Education's Conceptual Framework. Despite the many challenges that impacted the study, there was much to be learned and

obtained from the study, though there is a great need for further research and utilizations of the methods from the study to better understand and support at-risk youth in environmental education.

Connecting the Literature Review to the Study

The study results support previous studies, which will be discussed by examining how the Surveys, Questionnaires, and observations data underscore methods and theories discussed in the literature review of Chapter two. A final connection of the topics of the study and the relationship to the literature review will be concluded by examining the relationships between the circle talk results, the topics of the study, and the literature review. To best describe how the study underscores the literature review, each topic of the literature will be explored individually to the data from the Surveys, Questionnaires, and observations conducted during the study.

Connection to Place Literature Review and Study Results

Chapter two discussed the definition of *place*, important factors for connecting people to place, how interactions with nature and connection to place can change a person holistically, and how local climate change can impact a person who is connected to place. One task of the study was to determine the level of connection to place the participants had while creating deeper connections to place by using the definition of place and important factors for connecting people to place as a guideline. Lessons and activities were then created (see Appendix I) to create safe and inclusive environments for participants to interact with nature to develop holistic connections to place. During the last several sessions of the study, the discussion of climate change and the impact it has

on the trees in the local area was a focus for the lessons and activities. Participants self-reported their level of connectedness and awareness through the Initial and Final Surveys, End-of-Week Questionnaires, and Final Interviews. Observations were obtained by both the Unit Manager and the researcher. Notes from the circle talks were also obtained, which will be used to connect the topics of the study with the literature review later in the chapter.

While the overall self-reported level of connectedness to place and nature was neutral to moderate, some participants did express wanting "more knowledge of nature" and that they "hated nature," more so because of the germs and insects being bothersome to previous outdoor experiences. This connects to the literature review, in which previous studies determined that interactions with nature not only influences connections with place, but can create positive associations even if there are previous negative associations with place and nature (Capaldi, et al., 2015; De Bell, et al., 2018; Dentzau, 2013; Mendoza & Morén-Alegret, 2012; Stedman, 2002). The evidence from question two of the Initial Survey and Final Survey displayed an increase from the start of the study to the end of the study, an increase from 3.71 on average to 4.33 on average, also supporting the literature review in proving that interactions with nature created a more positive association with nature for the group. Question five of the Initial and Final Surveys also showed an increase from 3.71 on average to 4 on average, supporting the literature in that safe and inclusive interactions with nature through an engaging activity that is also enjoyable can have the best results for connecting people to place and nature (De Bell, et al., 2018; Goggin, et al., 2017; Stedman, 2002).

The Final Survey further supported that the interactions the participants had helped them develop positive associations with nature and place by having responses from participants include that they "like outside" and even "love outside," which again supports the studies conducted by Capaldi, et al. (2015), De Bell, et al. (2018), and Goggin, et al. (2017). Studies have shown, as discussed in Chapter two, that spending time outdoors can improve an individual's awareness of their surroundings (Reese & Myers, 2012, p. 402), reduce stressed while creating positive emotions (Capaldi, et al., 2015; Googin, et al., 2017), create a sense of connectedness, and create a sense of solace when needed (Albrecht, et al., 2007, Capaldi, et al., 2015; Cumming & Nash, 2015; Goggin, et al., 2017; Reese & Myers, 2012; Scannell & Gifford, 2017). The results from the study strongly support these conclusions, as seen in both the quantitative and qualitative data. Participants expressed an improvement in appreciating and enjoying the environment after the study, as seen with the increase from 3.71 for question five for the Initial Survey (Appendix B) to 4 for the Final Survey (Appendix E). Question six of the Surveys saw an increase of 0.76, which determined that participants were more observant of nature after doing outside activities. However, the greatest increase was for question eight, which had an increase of 0.81, and found that participants expressed finding peace and comfort, or solace, by being outside.

In addition to the increases in self-reported values for the Likert scale portion of the Surveys, participants expressed in the qualitative data of the Final Survey that they "like" and "love" the outdoors, getting outside makes them feel "good" or "great" with feelings of hope and optimism, and that they realize they "affect Mother Nature." The

Final interview further reported these findings, as participants expressed that the sessions and outdoor activities helped them feel relieved, changing, glad, calm, and healthy while also being refreshing and helping them feel connected. Both the researcher and the Unit Manager observed these emotions as well, even after each session where participants had a more positive experience at Woodland Hills. These emotions also impacted how the participants viewed the health of the environment, as they described themselves as being "more aware" and able to "make a difference," which aligns with the research conducted by Capaldi, et al. in 2015 and Galway, et al. in 2019.

Through most of the sessions, participants developed a positive connection with place and an appreciation of nature, though the sessions toward the end of the study introduced the topic of climate change and this did cause some negative emotions in the participants, which supports findings from Albrecht (2005) and Kemkes and Akerman (2019). Albrecht's term "solastalgia," the melancholy feeling connected to a lack of solace and intense desolation caused by changes to place, was observed in the participants during the end of the study. Comments from the Final Survey results mentioned that participants were worried about climate change and a warmer climate, stating that "climate change is a big deal" that "needs to change." However, overall was a feeling of hope and optimism as participants expressed feeling "influenced" to make the world a better place in response to feelings of solastalgia, supporting Kemkes and Akerman's (2019) theory.

The study highlighted much of the same theories and observations of studies discussed in the literature review of Chapter two. Perhaps the most important finding, in

support of the literature review, was that participants, though feeling worried, felt a higher level of hope and optimism in the face of climate change and the impacts climate change has to the place in which they connected to and in which they found solace. The data from the Surveys, Questionnaires, and Final interview creates a conclusion that correlates to prior studies conducted by other researchers and highlights the importance of the study for addressing connecting people to place and providing hope in the face of solastalgia.

Learner Awareness Literature Review and Study Results

Chapter two describes *learner awareness*, examines the role nature has in awareness, and how metacognition, self-efficacy, and mindfulness can be measured while addressing how it influences learning and self-reflection. As discussed previously, the qualitative and quantitative data from the Initial Survey, Final Survey, Final interview, and observations have been analyzed to examine results and evaluate how the data underscores the literature review. The data from the circle talks will be discussed later to connect the topics of the study with the literature review of Chapter two.

Learner awareness is often studied through measuring and examining metacognition, self-efficacy, and mindfulness, as discussed in Chapter two. Metacognition, the processes or actions of self-knowledge (Cikrikci & Odaci, 2015, p. 978), improved for the participants, as seen in both the qualitative and quantitative data. Question four of the Initial and Final Surveys showed an increase of 0.33 in regards to participants feeling more aware of the impacts of climate change because of the learning they engaged in throughout the study, and further supported that metacognition had

increased by commenting, in both the Final Survey and Final interview, that they "realize," "reflect," "know," and are "more aware" after participating in the study. In addition self-efficacy, which is what individuals know they are able to do, improved among participants (Cikrikci & Odaci, 2015, p. 980). Participants remarked in the Final interview that they could "make a difference" and, as the researcher observed, the participants were confident in identifying trees, thus showing an improvement in self-efficacy as well as mindfulness.

Mindfulness, or being present while not dwelling on the future, was shown to improve through both the qualitative and quantitative data (Zolkoski & Lewis-Chiu, 2019, p. 47). Furthermore, practicing mindfulness has shown, through previous studies, an improvement in self-control, lowered levels of stress, and an awareness of self in the world as a whole (Barbaro & Pickett, 2016; Dzhambov, et al., 2019; Kelly & Garland, 2016; Lymeus, Lundgren, & Hartig, 2016; Zolkoski & Lewis-Chiu, 2019). Question two of the Initial and Final Surveys increased by 0.62 while question six increased by 0.76, determining that outdoor activities helped individuals connect to nature and become more observant of nature, respectively, and thus mindfulness improved. Question nine increased by 0.81, showing a large improvement in mindfulness as participants showed an improvement in feeling that climate change is impacting them locally. Comments during the Final Survey addressed that participants felt influenced and realized more about the natural world while comments during the Final interview noted that "learning helped" and they felt they could "make a difference." These statements correlate with studies discussed in the literature review in which participation in learning and personal

development causes an improvement in awareness whether the learner fully realizes the change in awareness or not (Cikrikci & Odaci, 2015; Dahlin, 1999; Dzhambov, et al. 2019; Mittelstaedt & Jones, 2009; Torres, Whitebread, & McLellan, 2018). This changed awareness can also lead to changed behavior, as is the case in practicing mindfulness, and is associated with less stress and more self-reflection (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Kelly & Garland, 2016; Lymeus, Lundgren, and Hartig, 2017; Zolkoski & Lewis-Chiu, 2019). Question seven of the Initial and Final Surveys supports these findings by showing an increase of 0.90 when examining how much participants feel circle talks helped them to reflect on their own lives before and after the study. The Final interview (Appendix D) further supported the studies by allowing participants to express that the study helped them to feel "relieved," "relaxed," "glad," "healthy," and "calm." Both the researcher and the Unit Manager observations further supported the literature review information by noting that participants had a higher level of calm and transitioned better throughout the session and after sessions.

The inclusion of nature can support learners in practicing mindfulness, and the study strongly supports the literature review in examining the connections between mindfulness success and natural influences (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Lymeus, Lundgren, & Hartig, 2017). Reflections from participants during the Final Survey included statements of being "hopeful," "optimistic," feeling "influenced," experiencing "change," having time to "reflect," and feeling overall refreshed after having been part of the sessions and the activities that involved learning about nature. The Final interview also included some of the same remarks from participants, as well as

adding that participants felt a sense of “calm” while being able to “connect,” not only supporting the Final Survey data, but also the research discussed in Chapter two. More importantly, research has found that mindfulness involving nature can increase pro-environmental behaviors, such as stewardship and sustainable practices (Barbaro & Pickett, 2016; Dzhambov, et al. 2019; Lymeus, Lundgren, & Hartig, 2017; Weaver, 2015; Zolkoski & Lewis-Chiu, 2019). The ideals of stewardship and sustainable practices were observed when comparing the results from the Initial and Final Surveys (Appendix B and E, respectively) for questions eight and ten. Question eight found that participants had an improved sense of peace and solace when being outside while question ten found that going outside and doing circle talks has changed how participants view their interactions with the world, thus supporting that mindfulness practices involving nature increases pro-environmental behaviors. The Final Survey and Final interview (Appendix D) continues these feelings of pro-environmental thoughts by revealing that participants felt “optimistic,” “influenced,” and that they could “help” to “make a difference.” Observations from the researcher also illustrated the change in participant behavior to more pro-environmental behaviors as participants commented during sessions about wanting to know more about trees and how climate change can impact trees.

The study not only supports the literature review in that learner awareness can be measured by examining metacognition, self-efficacy, and mindfulness, but it also strongly supports research concluding that mindfulness practices in combination with interactions in nature can create pro-environmental behaviors. Through interactions with nature, the participants not only had an improvement of mindfulness and awareness of self in the

larger picture of the world and the environment, but they also felt influenced to change behaviors or to continue learning about things in nature. These strong correlations between the study and the literature review provide evidence to support that the study answers the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Climate Change Literature Review and Study Results

The focus of the study involved examining if learner awareness of climate change could improve through connecting at-risk youth to place while being used as a method for restorative practices, and thus while the literature review discussed climate change to better understand the role of the topic for the study, the topic of climate change was a small focus in comparison to the larger picture and goal of the study. However, the literature review did examine peoples' perceptions of climate change, what influences these perceptions, and how climate change can holistically impact people. The largest connection of the study to the literature review was in the analysis of perceptions of climate change.

Initially, the participants could describe very little as to the impacts of climate change locally but could elaborate on the impacts climate change has worldwide. The participants discussed melting ice caps, starving polar bears, flooding in the southern part of the United States, and fires in the western part of the United States, as observed by the researcher. However, as the study went on and the participants engaged more with the local nature while connecting to place, the researcher noted in observations that the participants began to wonder how climate change connected with what they were

learning about trees. Eventually, the sessions focused on climate change and the local impacts of climate change, and this greatly changed the perceptions of the participants. As research has found, people's perceptions of climate change and the risks of such are low, thus meaning that people are less likely to react or implement solutions (Brody, et al., 2008; Linden, 2014; Raymond and Brown, 2011). Though the participants expressed feelings of being worried and feeling concerned about climate change, the results disagreed with the literature review. Participants felt influenced and optimistic, feeling that they could make changes to make a difference with climate change. Overall, the participants felt that climate change was a large issue, as seen with the increase in their responses for question four of the Initial and Final Survey (Appendix B and E, respectively) where participants expressed that learning more about the local environment has helped them in being more aware about the impacts of climate change. Despite the harsh realities of climate change, participants were not discouraged and were rather encouraged to be the change they felt was needed to make a difference in climate change and in the health of the environment.

Restorative Practices Literature Review and Study Results

The literature review in Chapter two discussed what restorative practices are, how circle talks are used as a restorative practice, and how restorative practices can be used to support at-risk youth, which were topics heavily examined in the study. Restorative practices aim to help rebuild relationships that have been damaged due to conflict and to help reconnect people to their communities. Often, a common application of restorative practices is through the use of circle talks, as was the case for the study.

Circle talks have been beneficial in helping people develop coping skills for the root cause of their behaviors, which often stem from trauma previously experienced by the individual (Gaarder & Hesselton, 2012; Schumacher, 2014). The study found that this is indeed the case, supporting the research on circle talks, as the participants remarked that circle talks helped them feel "relieved" and "calm," according to responses from the Final interview (Appendix D). Furthermore, question ten in the Initial and Final Surveys (Appendix B and E, respectively) increased from 3.83 to 4, showing that participants felt more strongly about how going outside and doing circle talks changed how they view their interactions in the world.

In addition to assisting individuals develop coping skills, circle talks also create a safe, inclusive, and respectful environment for people to express their emotions and needs (Disney, 2017; Gaarder & Hesselton, 2012; Gregory & Evans, 2020; Karp & Breslin, 2001; Kehoe, Bourke-Taylor, & Broderick, 2015; Lustick, 2017; Schumacher, 2014). The Final Survey (Appendix E) data supports this research, as participants expressed that circle talks helped them get stuff off their chest, helped them reflect, made them feel well treated, and allowed them to share opinions. Researcher observations further support the literature review, as one participant felt safe in saying she "felt dumb" because she had forgotten previously learned information, which also allowed others in the session to support her and encourage the participant. Not only do circle talks help with expressing emotions, they can help individuals manage stress, develop social skills, and help with social problem solving skills (Karp & Breslin, 2001, p. 254). Circle talks have been associated with creating leadership roles for individuals and a higher sense of awareness,

as noted by Schumacher in 2014, where the girls in the Schumacher's study addressed potential conflicts or disagreements while expressing empathy for one another. The data from the study strongly illustrates the connection to the literature review in this theory. During the Final Survey and Final interview, participants expressed how talking helped them realize new ideas, it made them feel able to talk to people while sharing opinions, and it created a safe and inclusive space for the participants to express themselves during circle talks. The researcher observed that one participant in particular developed strong leadership skills and was able to assist other participants in learning and understanding topics, as it was often hard to assist participants virtually. Observations from the Unit Manager provides the strongest evidence in support of the literature examined in Chapter two. From the earliest sessions, the Unit Manager observed that participants were calmer, had easier transitions to bed time, had higher levels of focus, were more focused on learning than group drama, actively engaged in sessions, had a desire to learn, and had a heightened level of awareness of their own behaviors. The circle talks appeared to have the largest influence on the participants' behaviors throughout the study and can be attributed to supporting the learning and improved level of awareness throughout the study. All of the observations and feedback from participants strongly supports the various studies that examined the impacts circle talks can have on individuals, particularly young females who have experienced prior trauma and may be considered at-risk youth.

The study provided sufficient evidence to support the benefits of circle talks for the youth at Woodland Hills, and was perceived to be a useful tool for future conflict

resolution and communication techniques by the Unit Manager. Data from the study strongly correlates with and highlights the benefits of restorative practices as discussed in the literature review in Chapter two. It was through the circle talk reflections that participants seemed the most engaged and empathetic toward one another while also taking full advantage of the opportunity to reflect and share their experiences, emotions, and opinions both from the sessions and from prior experiences. The circle talks were arguably the most effective part of the study and were used to connect at-risk youth to place which not only raised learner awareness of climate change, but also had additional benefits for the youth at Woodland Hills.

Circle Talks: Bringing together Connection to Place, Learner Awareness, Climate Change, Restorative Practices, the Literature Review, and the Study Results

As previously mentioned, the circle talks were a tool in connecting the topics of the study, and provided valuable insight from participants about their learner awareness of climate change and their connection to place, and it was from the circle talks that the strongest evidence for the study to support the literature review of Chapter two. Responses from the circle talks were compiled, the frequency of each word or phrase was determined, and each word and phrase was categorized into the topic or topics it best related to in context of the conversations (see Appendix T). It was during the circle talks that participants freely expressed their opinions and emotions of the topics while also reflecting on previous experiences, sometimes even the traumatic experiences they had faced in childhood. The circle talk reflections and comments created a great amount of overlap of the topics of the study, thus showing that the method of restorative practices,

specifically circle talks, were crucial for connecting at-risk youth to place and increasing their learner awareness of climate change.

Connection to place was the topic most discussed during the circle talks and, thus, had the longest list of mentions by topic (see Appendix T). The most frequently used word was “changed,” with a frequency of twenty five times throughout the circle talks of the study. This term connects connection to place, learner awareness, climate change, and restorative practices, as participants expressed having a changed perception of the natural world, now enjoying outdoor experiences, being more observant of nature, being more aware as to the local impacts of climate change, and having changed observed behaviors, as documented by the researcher and the Unit Manager. Given the frequency, it is fair to say that the theme of the results of the study is “changed,” as the participants, as well as the Unit Manager, have very changed perceptions and behaviors in regards to all of the topics focused on for the study. Some of the words and phrases associated specifically with connection to place include “look at trees,” “love trees,” “really like trees,” “appreciate trees,” “excited to learn about trees,” “love nature,” and “look outside a lot.” These words and phrases expressed by participants showed their changed view of nature and the outdoors as they connected to place through the sessions and the hands-on experiences that allowed them to learn about and observe nature, which supports the research discussed in Chapter two,

Learner awareness was the third longest list of words and phrases that were mentioned in the context of learning, awareness, and observations. As noted above, “changed” is the most frequent word for learner awareness and is connected to the topic

of connection to place. Some of the key words and phrases that were specific to the topic of learner awareness were “feel educated,” “learned,” “getting more knowledge,” “learned a lot,” and “keep learning more.” This shows that the participants reflected heavily on that they had learned a lot throughout the study, though some remarked that they wanted to learn more about nature and trees, thus connecting the topic of learner awareness to connection to place. Some of the words and phrases that connected learner awareness and connection to place were “opening my eyes,” “realization,” “want to look at leaves more,” “want to talk about trees more,” “like learning about trees,” and “be considerate of trees.” Participants enjoyed the activities in which they could investigate and interact with things from nature, such as the leaves and tree cookies (see Appendix I). In learning about trees, they became more aware that trees were living things that should be respected, as seen in the comment about being considerate of trees. Learner awareness, as measured and examined by means of metacognition, self-efficacy, and mindfulness, showed improved awareness for the participants in regards to being observant and empathetic to nature, and connects to the literature review in Chapter two. The participants enjoyed learning more about trees in order to identify or understand more about the natural world around them, which shows levels of improved metacognition and self-efficacy. Mindfulness in the participants improved the most as participants compared their own lives and struggles to the lives and struggles of the trees they had grown connected to. Despite the struggles that the participants learned trees faced, including climate change, one theme arose: nature can heal. The phrase “nature can heal” appeared

to have two meanings for the participants as they described how being in nature gave them positive feelings and that trees could survive in the face of climate change.

Climate change was the shortest list of the four topics and only had one phrase specifically designated to climate change while all of the other words and phrases on the list related to climate change and other topics (see Appendix T). The word specifically expressed by participants for the topic of climate change was that "climate is changing," which in the context was a statement of realization about the state of climate change. Other words and phrases connected the topic of climate change to the topic of connection to place or learner awareness. Often, climate change connected to more than one or all of the other topics of the study. For example, in the cases where climate change connected to connection to place, learner awareness, and restorative practices, participants expressed words and phrases such as "make the world better," " need to take care of nature," "taking care of the world," and "thinking more about living things in nature." These phrases show an improved connection to place, improved learner awareness, awareness of climate change, and self-empowerment as practiced during circle talks and contradicts the research regarding peoples' perceptions of climate change and ability to react to climate change as discussed in Chapter two. Despite climate change being the least talked about topic in the circle talks, the participants connected climate change to all the other topics of the study and showed changed perceptions and behaviors regarding climate change.

Restorative practices was the key in connecting the topics of the study together through the circle talk reflections and was the second longest list (see Appendix T). As

noted before, “changed” was the most commonly used word during circle talks and is connected to the other topics of the study. While most of the words and phrases associated with the topic of restorative practices focused on feelings, such as “feel acknowledged,” “feel connected,” and feeling a variety of positive emotions, other comments were that participants “realize I have scars but also good times” and engaging in nature can give them “something to do when sad or depressed.” Restorative practices in the form of circle talks not only provided a safe and inclusive space where participants could share their thoughts, feelings, and opinions, but it also helped them develop communication skills and empathy toward others, as discussed in the literature review in Chapter two.

The quantitative and, especially, the qualitative data from the study strongly supports many of the theories and conclusions studied by other researchers in the field of each of the topics that this study focused on and connected. Participants became more aware, not only of climate change and nature, but of their place in the world as well. Through the sessions, participants developed a stronger, more positive attitude towards nature and the outdoors, which also made them more emphatic about nature. Circle talks demonstrated how restorative practices can be merged with connecting at-risk youth to place to help improved learner awareness of climate change and answers the question of the study, which asked *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?*

Reflecting on Major Learning

The Master of Arts in Education: Natural Sciences and Environmental Education program at Hamline University provided a life changing journey of learning and exploring for the researcher, which eventually led to the question of the study: *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* As discussed in Chapter one, the researcher's prior experiences and observations led to the question of the study and, through the reflections during the various courses through Hamline University, was the creation of the outline for the study. The study provided a learning experience, a reconnection to environmental education and teaching, and a challenge of coordinating a study in the midst of a pandemic, something that, despite the challenges, was an invaluable experience. Through the various challenges and unforeseen circumstances, the study was conducted at Woodland Hills to determine if blending restorative practices with connecting at-risk youth to place could improve learner awareness of climate change and be an effective and beneficial program for the youth.

Chapter four discussed the trends and relationships in the data from the study, and proved that using a mixed methods data collection process was best for this type of study. While the quantitative data provided insight to the trends for the individuals and as a group throughout the study, the qualitative data provided the strongest evidence of change in behavior and success of the study for the participants. The quantitative data created evidence that the overall perceptions and feelings toward circle talks, nature, connection to place, being outdoors, and awareness of climate change started at a

moderate level and improved to a stronger level. Thus, participants had stronger positive connections to place, were more observant of nature, had more positive feelings towards nature and the outdoors, were more aware of climate change and local impacts, and were more supportive of circle talks. The qualitative data presented deeper insight as to how the study changed perceptions and feelings for the participants, and it's clear that the participants have a stronger connection to place and nature while also having developed communication skills and mindfulness practices through the circle talks, as noted by the reflections of the participants and the observations from the researcher and Unit Manager.

The data collection methods were successful, though if the methods of the study were to be duplicated or retested, one change would be to create the Initial Survey, Final Survey, and End-of-Week Questionnaires as a one through ten Likert scale rather than a one through five scale. The reason for this would be that it may present larger changes in the reported perceptions and feelings from participants. A one through five scale does not allow for much room for improvement, and thus a one through ten scale may be more effective. In addition, other methods of qualitative data collection throughout the study, such as a more consistent process of recording information from circle talks, would be beneficial. While the data from the circle talks was collected and analyzed in a way that quantified data and provided important information, creating a multiple choice questionnaire for each circle talk or having a set list of words and phrases for participants to choose from may provide more focused data. At the same time, allowing open ended questions did allow participants to freely express their opinions, however it created a wide variety of answers that were then interpreted by the researcher through the context

of the conversations. This analysis could have some bias included, whereas a multiple choice or more directed means of obtaining qualitative data would remove any chance of bias, however, it could also limit participant reflections at the same time.

More research would need to be conducted to determine other methods of qualitative data collection as well as other means of quantitative data collection related to a Likert scale may be able to better show changes in reported results over time. Though the data collection methods for the study were sufficient, there may be room for improvement if the study were implemented as a program again in the future. Additional tools for determining the specific level of understanding and awareness of the topics for participants may also be included in future applications of the study, depending on the location and setting of retesting of the study, such as if a retesting of the study was conducted in a after school or classroom setting versus where the setting and location of the original study.

In addition to the challenges presented due to the nature of Woodland Hills and due to the study taking place during a pandemic, the combined role of researcher and teacher made it challenging to gather qualitative data while teaching the lessons, leading the activities, and leading the circle talks. However, the Unit Manager was helpful in assisting during the activities, especially during the sessions that were held via online platforms because of the pandemic that causes visitor restrictions at Woodland Hills. As the sessions continued, the participants started to lead the circle talks, which made qualitative data collection easier for the researcher since the participants could continue the conversations with the support of the Unit Manager without much intervention from

the researcher. Nevertheless, the combined role of researcher and teacher presented a challenge in collecting data during some occasions and suggests that, if the methods of the study were repeated for another program, having two separate people would be beneficial so one could be a more involved and focused teacher while the other could be a more diligent data collector.

In conclusion, the study provides evidence to support that combining restorative practices with environmental education, focusing on connecting youth to place, can improve learner awareness of climate change while being an effective method of teaching and implementing restorative practices in a learning environment. Thus, the study answers the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* Despite the many challenges that changed the initial format of the study for a short time due to the pandemic, the data supports that the methods of the study were successful. It would be beneficial to apply these methods to additional settings to better determine if the methods could create an applicable program for additional settings, or if these methods are only appropriate for settings similar to Woodland Hills. For example, the methods worked as intended for a residential facility in which at-risk youth were enrolled for, but conducting the study in an afterschool program setting or a classroom setting may show different results or have additional challenges that could impact the methods of the study. In the setting of a residential program for at-risk youth, the study worked as intended and demonstrated that connecting at-risk youth to place could improve learner awareness of climate change and be used as a method for restorative practices.

Limitations of the Study

Chapter four examined the many challenges that were presented during the study, causing limitations to the availability of data, the presentation of the study, and the ability to conduct the study as originally planned, as discussed in Chapter three. The setting of the study also created limitations for the study. Due to the timing of the study, which was later in the fall that originally expected, participants were limited to how often they were able to get outside while maintaining a safe environment for participants. Each of these limitations impacted the study and the data collected throughout the study.

The COVID pandemic caused limitations in the delivery of the study, as Woodland Hills restricted guests and visitors from entering the facility for a time, which resulted in only three of the fourteen sessions being in person. Figure 12 shows information about each session including the date, whether the session was conducted in person or online, and if the participants had a chance to get outdoors. The limited ability for the researcher to fully interact with the participants, due to most of the sessions being in an online format, forced the researcher to create additional handouts and resources to support learning. Furthermore, it forced the activities described in the lessons

Session	Date	Format	Outside Time
S1	11/12/2020	In person	No
S2	11/19/2020	Online	No
S3	11/24/2020	Online	No
S4	11/25/2020	Online	No
S5	12/1/2020	Online	No
S6	12/3/2020	Online	No
S7	12/4/2020	Online	Yes
S8	12/8/2020	Online	No
S9	12/9/2020	Online	Yes
S10	12/15/2020	Online	No
S11	12/17/2020	Online	Yes
S12	12/18/2020	Online	Yes
S13	12/21/2020	In person	No
S14	12/22/2020	In person	No

Figure 12: Session Dates, Formats, and Setting
The information for each session includes the date, whether it was in person or online, and whether participants were able to get outdoors.

(see Appendix I) to be conducted inside where the researcher could explain concepts and provide support for learning. While the Unit Manager would occasionally bring the participants outside for a nature walk to incorporate one of the primary activities originally planned, the number of outdoor experiences was limited, as seen in Figure 12, due to the study being conducted later in the year than anticipated.

The study was delayed in part because of the Institutional Review Board process and edits having to be made and in part because the original Unit Manager had resigned in September of 2020 and a new Unit Manager was not available to start the study until October of 2020. Upon the study start date being defined, the pandemic caused a delay in the study. Both the researcher and the Unit Manager had been exposed to COVID and had to wait for negative COVID tests to come back before the study could continue, thus the original start date of the study was delayed a week and the following session was delayed for a week after the first session. However, the largest delay in the study was caused by a personal loss for the researcher, which caused emotional distress during the lesson planning period prior to submitting documents to the Institutional Review Board. While the setback caused by the emotional distress to the researcher delayed the submission to the Institutional Review Board and delayed the start of the study, it did make the study and engaging with the youth more fulfilling and rewarding to the researcher.

The setting of Woodland Hills also caused limitations that impacted the size of the study and the data collection during the study. While the initial study size was expected to be ten to fifteen girls aged thirteen to eighteen years old, the study size varied throughout

the study with girls aged sixteen to nineteen years old. There were seven different participants throughout the study, with only two to four girls attending each session. The small study size is a limitation for the study and the inconsistent attendance caused a limitation in the data collection. Despite the limitations with the study size and the consistency of attendance, the data collected does provide strong evidence that the methods of the study worked as intended for the group.

Implications of the Study and Future Pursuits

The study can have many implications on the field of environmental education, in mental health services for at-risk youth, in general programming for youth, and in the application of restorative practices for existing programs. Further research could be conducted to determine if the methods of the study could be implemented in other settings and still provide results that support the methods of the study. In addition to a different setting, such as an afterschool program, a classroom setting, a juvenile detention center, or other youth programs, whether the youth be at-risk or not, implementing the methods of the study for a larger study size would be beneficial to further examine the effectiveness of the methods. While the goal of this study was to focus on at-risk youth, a process that can connect youth to place, raise awareness of climate change, and support socioemotional skill building is a process that can benefit all youth regardless of their background.

The setting for the study was a residential facility for at-risk youth who had experienced trauma and/or were on a path that could potentially lead them into the prison pipeline (see Chapter two for more information). While the participants in the study were

enrolled in the residential program at Woodland Hills, the participants did not join the program, or graduate from the program, at the same times. Some participants also ran away from the facility. Different settings for application of the methods of the study may change the outcomes in comparison to the original study. Future research should be conducted in other settings. One such setting may be a classroom setting, though this would be met with the challenge of ensuring state and local standards are met by the study. By implementing the methods of the study in a classroom setting, the population size of the study would be larger and the attendance of the participants would be more consistent. Another setting would be an afterschool program, which would also have a larger population size for the study and more consistent attendance without the restrictions of having to adhere to strict state and local standards, though most afterschool programs do adhere to some state and local standards. A juvenile detention center could also be a setting to apply the methods of the study, which would provide a larger population size for the study and consistent attendance, however, youth in such a setting often have limitations preventing youth from going outside of the facility. Applying the methods of the study to a summer camp setting would perhaps be the application of the methods, especially if the camp was focused on at-risk youth. With a summer camp, the population size of the study would be larger than the original study, attendance would be consistent, and the focus of supporting at-risk youth would be readdressed if future research implemented the methods of the original study in this fashion. The possibilities for the application of the methods from the study are endless and it would be beneficial to test different settings to determine if the methods could create a program to assist not

only at-risk youth, but youth in general with using restorative practices connection to youth to place and improved awareness of climate change.

The results of the study will be published through Digital Commons in the Bush Memorial Library as well as within the network of the researcher in the hopes that the information, methods, and results could assist educators, mental health workers, and even families with connecting youth to place through restorative practices to raise awareness of climate change. Publishing the thesis through Hamline will allow current and future students to explore the methods to decide if they would like to continue the research in another setting or format, or if it can be a framework for a new methodology relating to one or several of the topics of the study. The researcher is part of a network of educators, students, scientists, and outdoor enthusiasts who may be interested in the methods and results of the study upon being published, and the researcher intends on sharing the publication within her network for anyone who may be interested in the thesis. Though no plans have come to fruition, the Unit Manager at Woodland Hills and the researcher discussed having the researcher return as a guest to continue working with the youth at the facility. Due to COVID, no plans have been made, but the Unit Manager believes the methods of the study were beneficial for the youth that participated and would like to utilize the methods in the future. In the case of the researcher using the methods of the study again at Woodland Hills, the researcher would not collect any data by any means and would only visit Woodland Hills to teach the lessons and guide youth through the activities. Any and all data, if Woodland Hills were to want to collect data, would be collected by, compiled, and analyzed only by staff at Woodland Hills. However, the

researcher is more than willing to share blank copies of all the data collection tools used during the study, along with the handouts, lessons, and circle talk guiding questions (see Appendix A, B, C, D, E, F, G, I, J, and K) with Woodland Hills to support the youth and to supplement teaching youth at Woodland Hills. The hope of the researcher is that the methods, results, lessons, handouts, and data collection tools can be used by an educator, mental health worker, scientist, student, or outdoor enthusiast to support youth in connecting to place through restorative practices while raising awareness of climate change.

Reflecting: The Relationship between the Study and Hamline University School of Education's Conceptual Framework

Hamline University School of Education focuses on a conceptual framework that students reflect on throughout their program, and the study reflects the values of the conceptual framework not only for the youth who participated in the study, but also for potential future work utilizing the methods of the study. The four concepts are promoting equity in schools and society, building communities of teachers and learners, constructing knowledge, and practicing thoughtful inquiry and reflection. These concepts were intertwined in the objectives and methods of the study, which influenced the participants of the study, as well as the researcher in creating and implementing the study methods. In the case where the methods or the results of the study are used by others, the hope is that the conceptual framework can be instilled in the process. The study incorporates the conceptual framework while using restorative practices to connect at-risk youth to place while increasing learner awareness of climate change.

Promoting Equity in Schools and Society

Promoting equity in schools and society has four subcategories, the first subcategory is that the learner, the researcher in this case, understands the role education has played and plays in shaping society. In the study, education played an important role in connecting the youth to place by providing lessons and activities that engaged the participants in learning about place, nature, and their own role in the environment, including the impact they have on climate change. Without education, whether in a classroom setting or in a public setting, such as summer camp or public event, environmental education would not be able to connect people, especially youth, to place and the environment would continue to be neglected. As the study examined in Chapter four, the participants learned about nature and the environment and, thus, had an improved awareness of the impacts of climate change to the local environment and, specifically, trees. Without education, the participants would not have had a changed perspective or feelings of nature and climate change, let alone the positive connections to place that help them create a sense of identity and purpose and thus the methods of the study are beneficial for shaping society's perspectives of nature and climate change.

The second subcategory of promoting equity in schools and society is to value all children and youth regardless of race, class, gender, exceptionality, home language, or other social, physical, or cultural characteristic. As discussed in Chapter two, at-risk youth have often experienced traumatic experiences that can lead them to the prison pipeline. Stereotypes for these youth can create problems in providing education and support for these youth, amplifying the effects of being an at-risk youth. The study

strongly reflects this subcategory by supporting, specifically, at-risk youth who may have otherwise continued to be disconnected from place. By providing a specialized experience to connect youth to place through restorative practices, the participants of the study were able to find solace, peace, calm, and healing in nature, something that can support them to heal and move on from the trauma they have experienced and helping them to reconnect in a positive manner with society. The methods of the study can be applied to youth of any background, despite the focus being at-risk youth, as all children deserve the chance to find peace and healing in nature.

The third subcategory is to utilize social and cultural background and the variety of ways individuals learn to enhance teaching and learning. In the process of developing lessons, handouts, questions, and data collection tools, differentiation was a focus for the researcher. As discussed in Chapter four, the Surveys (see Appendix B and E) and the End-of-Week Questionnaire (see Appendix C), utilized a one through five point Likert scale to simplify the quantitative data collection for the participants. Visuals, verbal instructions, handouts, and manipulatives, such as tree cookies, were provided to create a variety of ways for the participants to learn and enhance their learning of the concepts. While the original hope was that youth could choose to record video or audio rather than writing answers, to support their learning and reflections, Woodland Hills would not allow such data to be collected. In response to this, the researcher attempted to work individually with each participant, as needed, to write down their verbal answers to reduce frustrations from having to write answers. This was crucial for some of the participants who disliked writing answers. Due to the differentiated methods and

availability of other methods of differentiation, the methods of the study utilize the variety of ways individuals learn to enhance learning. In addition, the questions from the lessons were often conducted as verbal discussions rather than journal reflections and the circle talks also provided availability of verbal discussions, both of which utilized social backgrounds for the participants to enhance their learning and reflecting. The lessons and activities encouraged participants to continue to learn while the circle talks provided a unique opportunity for the participants to develop communication skills that will help them communicate and work with others in society throughout their lifetimes.

The final subcategory of promoting equity in schools and society is for learners to act as agents of change in their classroom and schools. While this subcategory is focusing more on the researcher, it also relates to the participants of the study, as they often reflected on how they would like to share what they learned in the study with their siblings or friends and that the information should continue to be shared with everyone. This is an important aspect of this subcategory: while having a educator be an agent of change is valuable, having the ability to encourage learners to become agents of change beyond the classroom and having them address change in society is a crucial part of promoting equity in society and was a discovered benefit of the study. By providing learners with skills and knowledge for connecting to place, becoming aware of climate change, and utilizing restorative practices, youth can become the next generation of agents of change while also incorporating their diverse backgrounds, perspectives, and experiences. The study strongly connects to the conceptual framework topic of promoting equity in schools and society by supporting youth to become the next generation of

educators, whether formally or informally, to encourage connecting to place, being aware of climate change, and practicing restorative practices.

Building Communities of Teachers and Learners

Building communities of teachers and learners is the second category of the conceptual framework for Hamline University's School of Education, and the first subcategory is to construct supportive communities with learners and colleagues. The study highlighted this topic primarily through the use of restorative practices, specifically through the use of circle talks. Within the circle talk, the participants were able to connect their previous experiences with the information they had learned all while building a community within their group at Woodland Hills. The circle talk provided an opportunity for all the participants to feel safe and included while being able to express their feelings, thoughts, and reflections, in the process of developing communication skills and socioemotional skills. In the results of the study, as examined in Chapter four, the participants expressed the importance of circle talks and felt that they could be useful in other settings. The skills learned in circle talks will support the youth in constructing supportive communities at Woodland Hills, at school, and in other aspects of their lives.

The second subcategory focuses on recognizing teaching and learning as a social and cultural process, which the study successfully includes in the methods through the use of discussions and circle talks. Throughout the study, social interactions were a large part of the learning process and vice versa. Participants supported each other in learning through social interactions and the lessons and activities provided a focus for positive social interactions among the youth. As the researcher and Unit Manager both observed,

the social interactions were helpful for the participants to experience backgrounds different than their own and while one individual would focus on the smaller details, the other individual would connect those details to the larger picture. The learning done by the participants during the study was an opportunity for the participants to communicate with each other to deepen their understanding and learning, highlighting the subcategory of the conceptual framework in recognizing that teaching and learning is a social and cultural process.

The final subcategory of building communities of teachers and learners is to create physically and psychologically welcoming environments that foster positive self-worth, and the study exemplified this subcategory best through the circle talks. By allowing each participant the chance to express themselves in a safe and inclusive environment that helped each person feel heard, circle talks created a physical and psychological welcoming environment. This environment not only allowed participants to reflect on their learning by connecting to their own experiences, it allowed them to connect with others and, as discussed in Chapter five, circle talks created the opportunity for participants to build socioemotional skills, create a sense of belonging, create a sense of empowerment, and feel a positive sense of self in the world. By use of restorative practices, an inclusive and welcoming setting can create the means for youth to feel safe in expressing themselves as they feel more included in the setting as a whole. The literature review from Chapter two, as reflected on and connected to the study in Chapter five, exemplifies the creation of a physically and psychologically welcoming

environment that fosters positive self-worth while connecting with others through the means of circle talks.

Constructing Knowledge

Constructing knowledge is the third category of the conceptual framework that Hamline University's School of Education incorporates into their curriculum, and the first subcategory is to understand that bodies of knowledge are constructed and interpreted. At the start of the study, participants had their own preconceived notions and experiences of which to draw information from, and though they felt moderately in support of the topics of the study, their perceptions and emotions changed throughout the study. Participants were exposed to a large amount of information throughout fourteen sessions that allowed them to learn new information and apply it to an activity, thus applying skills and making connections to prior knowledge while building new knowledge. This process throughout the study illustrates the understanding that bodies of knowledge are constructed and interpreted and to fully support learning for youth, the youth need to interact and experience the learning rather than just memorize information. The methods of the study incorporated the concept of understanding that large amounts of information must be scaffolded on previous knowledge through learning activities in order for youth to learn and interpret the new information.

The second subcategory of constructing knowledge requires the transfer of theoretical, foundational, and pedagogical knowledge to intentional practices, which relates to the study in a variety of ways. In the construction of the study, the researcher hoped to create a method of environmental education that not only raised awareness of

climate change for learners, but also used restorative practices to create a deeper connection to the learning and the place. The knowledge of each topic of the study, as discussed in Chapter two, was researched and reviewed to determine how best to use theoretical, foundational, and pedagogical knowledge to create methods for the study in which to practice what was learned by the researcher. In the process of applying these methods, it became apparent that the participants were also learning to use the theoretical and foundational knowledge to connect their learning to their lives and experiences, which then inspired them to want to practice their knowledge by teaching others. To the surprise of the researcher, while the researcher was applying knowledge learned from the Masters of Art in Education: Natural Science and Environmental Education program in the form of a study, the participants of the study were continuing the circle of learning and practicing learning by exploring the world around them beyond the sessions.

The final subcategory of constructing knowledge focuses on using best practices including technology, in the construction of learning, which was intentionally and unintentionally used in the methods of the study. Intentional use of best practices was implemented in the methods of the study by providing differentiated means of learning, instruction, and assessment, as discussed in Chapter three. Furthermore, the activities allowed hands-on learning experiences for the participants to explore and observe, which supported their learning. Lastly, as examined in Chapter two, the technique of including restorative practices through circle talks was implemented to support the participants in constructing knowledge by providing a platform to reflect, connect, share thoughts, and ask questions in a safe and inclusive environment that was crucial given that the

participants are considered at-risk youth. The unintentional use of best practices included technology, as the pandemic forced eleven of the fourteen sessions to be in an online format due to Woodland Hills prohibiting visitors on the premises in order to protect the wellbeing and safety of the youth. With the change in the format of the delivery of the study came the need to include additional resources, such as videos and websites, to support participants in the construction of learning. The learning needs of the participants was supported through the use of best practices, including technology, which provided the opportunity for participants to construct knowledge through scaffolding new information to previous experiences.

Practicing Thoughtful Inquiry and Reflection

The last category of Hamline University School of Education's conceptual framework is practicing thoughtful inquiry and reflection, the first subcategory of which being to reflect on practice to improve teaching and learning. As discussed in Chapter one, the researcher previously taught environmental education programs as an intern and, after graduation, was a teacher who taught middle and high school science. After the first year of teaching, the researcher participated in professional development that focused on restorative practices, and this transformed the way the researcher approached teaching. It was through this experience that the researcher began to wonder, as the study focused on, if connecting youth to place could improve learner awareness of climate change while utilizing restorative practices. The question became the motivation for the study, as the researcher wanted to determine if combining two effective practices, environmental education and restorative practices, to create a cohesive method of connecting youth to

place. In examining the results of the study, not only was it clear that the question of the study was answered by the study, but the methods created a deeper connection for the youth. Not only did the youth become more aware of climate change for the local area, but they were more connected to place and more observant and empathetic toward nature. Another benefit of the study was the connection the youth had to each other through the circle talks and the improved mindfulness and ability to reflect on their own lives and experiences while connecting to the world around them. Most surprisingly was the fact that participants were not discouraged by the realities of climate change and human impacts to the environment they had grown connected to, they were actually optimistic and felt that they could make a difference in the world now that they had knowledge to support actions. The results of the study made the researcher reflect on the importance of the methods of the study while encouraging the researcher to share the knowledge gained from the study in the hopes that additional research can be conducted to better understand how the methods could support learners in the future.

The second subcategory of practicing thoughtful inquiry and reflection is to research issues related to educational practice and theory, a practice that was necessary to formulate methods for the study that were supported by research, as examined in Chapter two. Although the researcher had experience in environmental education as well as formal teaching in a classroom setting, additional research was conducted to best formulate methods for the study. Methods for data collection that would be suitable for the learning scenarios that the participants experiences needed to be researched, as well as how best to ask the questions to obtain answers through data collection without

suggesting an answer in the process. Research was also conducted to determine how to utilize circle talks in a learning environment, which also led the researcher to obtain training through professional development on how to lead circle talks. The study required the researcher to research issues related to the topics of the study in order to create effective methods for the study, and this also included participating in professional development to ensure the practice of the research for the study would also be effective.

The final subcategory of practicing thoughtful inquiry and reflection is the use of practice as a basis for a more in-depth study. During the Masters of Art in Education: Natural Sciences and Environmental Education program, the researcher had the opportunity to reflect on her own experiences, emotions, and life as a whole to the knowledge she was learning. As a former environmental education intern and a former science teacher, the researcher had observed, first hand, the benefits of connecting youth to place and saw that it raised awareness of place, including impacts of climate change, human influences, and general awareness of changes and things in nature. The researcher had also explored the area of restorative practices and, after having applied some of the techniques in her classroom as a science teacher, she found that restorative practices were effective in creating a safe, inclusive, empathetic, and encouraging environment for her students. These observations, in combination with what was learned through the program at Hamline, made the researcher wonder if the two educational processes had been applied as a cohesive method. Upon doing research, the researcher found that while there was substantial evidence for the benefits of both processes, there was little, if any, research on the methods of combining the processes into one educational program. The

researcher was able to use the practices from her former experiences in teaching, restorative practices, and environmental education while applying the theories and knowledge she had learned through Hamline's program in order to create a more in-depth study that was able to examine and answer the question of if connecting at-risk youth to place could improve learner awareness of climate change while using restorative practices.

Conclusion

The study explored the question *How can connecting at-risk youth to place improve learner awareness of local climate change and be used as a method for restorative practices?* and the results of the study determined that the methods of delivery for the lessons, activities, and circle talks were deemed a successful method in answering the question. Topics of the study were of great importance to the researcher, especially because of life events that occurred throughout the researcher's time at Hamline University. The courses and seminars that the researcher took provided opportunities to reflect on education, the environment, the role the researcher had in these areas, and the researcher also deeply reflected on her life and future aspirations. Chapter one discusses the experiences and reflections of the researcher. The key topics of the study, as examined in the literature review of Chapter two, allowed the researcher to develop a means of focusing in her passions on the topics of climate change, connection to place, learner awareness, at-risk youth, and restorative practices.

As a former teacher and environmental education intern, the researcher had techniques in connecting youth to place and teaching about climate change, though the

courses at Hamline provided new knowledge and skills for effectively teaching environmental education. Research was required to support the researcher in understanding learner awareness, at-risk youth, and restorative practices. Additional research was needed to plan the methods, as discussed in Chapter three, in order to conduct the study. Knowledge and skills from prior experiences, learning, and applications supported the researcher in developing lessons, assessment tools, and activities to allow participants to explore and observe the natural world while reflecting on themselves and their connections to the world. The lessons, which can be found in Appendix I, were crucial for providing participants the opportunity to learn and practice skills.

Circle talks provided the glue to achieve the goals of the study by allowing participants to reflect deeper on their learning, to become more aware of nature and climate change, and to deepen their connections to place, nature, their peers, and themselves, thus achieving the benefits of restorative practices. After the study, an immense amount of data was available to analyze, which was examined in Chapter four. While the quantitative data determined that there was indeed an improvement in learner awareness of climate change, connection to place, and positive emotions toward the outdoors and nature, the qualitative data provides the most telling information about how the study impacted the participants holistically.

The results of the study provide incredible insight as to how the methods of the study could be replicated and used in other settings to benefit youth in connection to place, awareness of climate change, and tending to their holistic socioemotional needs.

Youth are the next generation of scientists, educators, and policymakers that can change the world to, as one participant commented about her feelings after the study, “make the world a better place.” By combining restorative practices with environmental education, as this study did, youth can build stronger, more meaningful connections with place, nature, their peers, and themselves, which can empower them to be the change they want to see in the world. If the goal of environmental education is to raise learner awareness of environmental issues, including climate change, while connecting youth to place to create meaningful learning experiences, then the methods of the study shed light on a possible solution for more effective environmental education: combine environmental education with restorative practices to holistically support the youth, the future of the world.

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APPENDIX A

BIBLIOGRAPHY

Handout: Bibliography for All Lessons

Appendix A

Handout: Bibliography for All Lessons

BIBLIOGRAPHY

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APPENDIX B

DATA COLLECTION INSTRUMENT

Initial Survey

Appendix B

Initial Survey

Initial Survey
Name:_____

Please read through each question and rank your feelings in response to the question with 1 being "nope" (strongly disagree) and 5 being "absolutely" (strongly agree).	Nope (1)	Kind of (2)	Maybe (3)	A little (4)	Absolutely (5)
1. Learning outdoors has helped me to enjoy nature	1	2	3	4	5
2. Doing activities outside has helped me to connect to the natural world I live in/near	1	2	3	4	5
3. Being in nature gives me positive feelings/vibes.	1	2	3	4	5
4. Learning about the local environment has helped me in being aware about impacts of climate change, besides changing temperatures	1	2	3	4	5
5. Learning about the local environment has helped me to appreciate and enjoy the local environment	1	2	3	4	5
6. Doing activities outside has helped me be more observant of nature	1	2	3	4	5
7. Circle talks have helped me to reflect on my own life	1	2	3	4	5
8. Being outside brings me peace and comfort (solace)	1	2	3	4	5
9. I feel that climate change is impacting us locally	1	2	3	4	5
10. Going outside and doing circle talks has changed how I view my interactions in the world	1	2	3	4	5

11. What are your thoughts about the study you are a part of? Write three words that describe how you feel.

12. What do you think you will gain from being a part of this study?

13. Are you concerned with climate change? Do you think climate change is a big deal for the area you live in? Briefly explain why or why not.

14. Have you participated in circle talks before? If you have, use three words to describe how you feel about them.

15. Take a moment to reflect on how you've spent time in nature. Use three words to describe how you feel about being in the outdoors.

16. Do you have any other questions, concerns, or comments you'd like to share?

APPENDIX C

DATA COLLECTION INSTRUMENT

End-of-Week Questionnaire

Appendix C

End-of-Week Questionnaire

End-of-Week Questionnaire
Name:_____

Please read through each question and rank your feelings in response to the question with 1 being "nope" (strongly disagree) and 5 being "absolutely" (strongly agree).	Nope (1)	Kind of (2)	Maybe (3)	A little (4)	Absolutely (5)
1. Learning outdoors has helped me to enjoy nature	1	2	3	4	5
2. Doing activities outside has helped me to connect to the natural world I live in/near	1	2	3	4	5
3. Being in nature gives me positive feelings/vibes.	1	2	3	4	5
4. Learning about the local environment has helped me in being aware about impacts of climate change, besides changing temperatures	1	2	3	4	5
5. Learning about the local environment has helped me to appreciate and enjoy the local environment	1	2	3	4	5
6. Doing activities outside has helped me be more observant of nature	1	2	3	4	5
7. Circle talks have helped me to reflect on my own life	1	2	3	4	5
8. Being outside brings me peace and comfort (solace)	1	2	3	4	5
9. I feel that climate change is impacting us locally	1	2	3	4	5
10. Going outside and doing circle talks has changed how I view my interactions in the world	1	2	3	4	5

APPENDIX D

DATA COLLECTION INSTRUMENT

Interview Questions

Appendix D

Interview Questions

Interview Questions

1. What have the outdoor activities meant to you? Can you describe how they made you feel?

2. What do you wish people knew about the local climate and environment? How can you help people learn about these topics?

3. What are your opinions about circle talks and do you think they should be used in other settings?

4. How does being in nature make you feel? Do you recommend getting outdoors to others?

5. Has participating in this study changed anything for you and your life?

APPENDIX E

DATA COLLECTION INSTRUMENT

Final Survey

Appendix E

Final Survey

Final Survey
Name:_____

Please read through each question and rank your feelings in response to the question with 1 being "nope" (strongly disagree) and 5 being "absolutely" (strongly agree).	Nope (1)	Kind of (2)	Maybe (3)	A little (4)	Absolutely (5)
1. Learning outdoors has helped me to enjoy nature	1	2	3	4	5
2. Doing activities outside has helped me to connect to the natural world I live in/near	1	2	3	4	5
3. Being in nature gives me positive feelings/vibes.	1	2	3	4	5
4. Learning about the local environment has helped me in being aware about impacts of climate change, besides changing temperatures	1	2	3	4	5
5. Learning about the local environment has helped me to appreciate and enjoy the local environment	1	2	3	4	5
6. Doing activities outside has helped me be more observant of nature	1	2	3	4	5
7. Circle talks have helped me to reflect on my own life	1	2	3	4	5
8. Being outside brings me peace and comfort (solace)	1	2	3	4	5
9. I feel that climate change is impacting us locally	1	2	3	4	5
10. Going outside and doing circle talks has changed how I view my interactions in the world	1	2	3	4	5

11. What are your thoughts about having been part of this study? Write three words that describe how you feel.

12. Do you think climate change is a big deal for the area you live in? Briefly explain why or why not. Do you feel you can change anything to help the environment?

13. What are your thoughts about circle talks? What do they mean to you?

14. How do you feel about going into nature or getting outside? Do you think the amount of time you spend outside now (after the study) will change? If so, how?

15. What is one big take-away you have that you will use in your daily life after being part of this study?

16. Please discuss any other final thoughts here:

APPENDIX F

DATA COLLECTION INSTRUMENT

Circle Talk Guiding Questions

Appendix F

Circle Talk Guiding Questions

Questions for First Circle Talk: Developing Community Agreement

1. Talking circles have a "talking piece" that gives the power to talk to whoever is holding it. Even I have to follow this agreement, unless things are getting out of hand. If you are handed the talking piece, you are welcome to pass and we can come back around to see if you have anything you'd like to share. Why do you think a talking piece is important?
2. This talking circle is an open space for people to share, if they feel comfortable doing so, their feelings, thoughts, opinions, and "lightbulb moments" or "moments of realization". That being said, what are some agreements we should have so everyone can feel safe, comfortable, welcomed, and listened to during our circle talks? I will write these down and bring them to every circle talk in case changes need to be made.
3. Do you have anything you would like to add or change to our agreements, or do you agree to the agreements that are in place?
4. For our talking circles, I will try to have objects in the center (usually objects from nature) that people can look at while reflecting, talking, and listening. Why do you think these objects might be helpful?
5. What is a value that is important to you, what does it mean to you, and how will you show this value in our circle talks?

Questions for Subsequent Circle Talks

1. How was your day before going outside? Do you feel the same or different now?
2. Are there any changes you would make to today's outdoor activity? If so, do you feel like sharing?
3. Was there a "lightbulb moment" or "moment of realization" you had about the climate, environment, or living things in nature? If so, do you feel like sharing it?
4. Have these lessons and outdoor experiences impacted you in your daily life and social interactions? If yes, do you feel like sharing?
5. Have your thoughts about the environment, this natural place, and local climate stayed the same or have they changed since the first activity outside? If yes, do you feel like sharing?

APPENDIX G

DATA COLLECTION INSTRUMENT

Observation Questions

Appendix G

Observation Questions

Observation Questions (for Unit Manager and Researcher)

Feel free to use names. This will be scanned into a folder that only the researcher will have access to and names will be removed and replaced with a number corresponding to that participant. Within six months of the study being published and the researcher graduating, the folder will be permanently deleted.

1. Were there any major events or common themes among participants that stood out to you about participant's interactions or engagement in the lesson, activity, or circle talk? What was the major event or common theme that you observed?

2. Were there any changes in behaviors from any of the participants that you observed? Did you witness this with just one participant or with multiple participants? Please briefly describe.

3. Did you observe any realizations, reflections, or other interesting reactions from participants as they interacted with nature and reflected on their own experiences? Please briefly explain.

4. Are there any other observations you'd like to share?

APPENDIX H

DOCUMENTATION

Letter to Parents/Guardians and Participant

Appendix H

Letter to Parents/Guardians and Participant

Families,

Below is an explanation about the research that a graduate student from Hamline University will be doing at Woodland Hills as a guest speaker for the program that your child is in. Woodland Hills will be coordinating with Ariel in order for her to complete her research. You will be able to meet with Ariel via Zoom or by phone, due to COVID, to discuss the consent form that will need to be signed and returned if you allow your child to participate in the study.

Please see the attached form for your review.

Hello,

My name is Ariel Johnson and I am currently a graduate student at Hamline University in the Natural Sciences and Environmental Education Master's program. I have been asked to be a guest speaker at Woodland Hills this fall as I conduct a study to examine how connecting youth to place while using restorative practices can have holistic wellbeing impacts and can increase learner awareness of the local environment. I would like to ask permission to observe your child's program during the next few months in response to the lessons and activities I will be providing.

I graduated from UW-Superior with double majors in Biology and Broad Field Science, as well as a middle/high school teaching license. I taught 7th-11th grade science at the Fond du Lac Ojibwe School for two years before accepting my current position in student services at the Fond du Lac Tribal and Community College. Although I love my current position and the opportunities I get to support college students, I greatly miss teaching. The courses I've taken through Hamline, my love of teaching, and my love of nature inspired me to study how connecting youth to place, through learning about the local environment, could impact them holistically and increase their knowledge of nature.

I will be teaching lessons and guiding outdoor activities for participants, which will be under the supervision of the Unit Manager, B. (name omitted for confidentiality), at Woodland Hills. Lessons and activities will allow participants to use observation skills to learn about and explore nature in a safe and inclusive environment. After each outdoor activity, we will gather as a group to reflect on the lesson and activity as well as connecting personal experiences to what has been learned to make learning meaningful. During the study, I will gather information about your child that will be in the form of surveys, interviews, observations, journals, pictures (that will not include any identifiable features), audio, and questionnaires. All names/identifiers will be removed from documents and audio transcripts and replaced with a number corresponding to each child. I'd like to connect with you via phone or Zoom to go over the consent form. I will return a signed copy of the consent form to you within one week of receipt.

If you have any questions, please feel free to contact me at (715) 817-0690 or at ajohnson134@hamline.edu or my professor, Dr Patty Born, at pselly01@hamline.edu.

Sincerely,
Ariel Johnson

APPENDIX I

TEACHING TOOL

Lesson Slides

Appendix I

Lesson Slides

Adventure 1:
Getting to Know You

Consent Form/Debriefing: Why am I here?

- To get your Masters degree, you have to do a capstone (like a final project)
- I chose to work with you all to create experiences in nature and practice restorative practices while learning about climate change and what actions can be done.
- But why?
  - I miss teaching and bringing students outside
  - Duluth is a cool place (literally and figuratively)
  - Going outside can be a great way to relax and reflect
  - Restorative practices can help build relationships

Who are you?

Take a moment to write down a bit about yourself before we share:

- Name/nickname (what do you like to be called)
- Age
- Favorite band/musician/singer
- Favorite song from that band/musician/singer (I'll be checking these songs out)

Who am I? (Academic/Professional)

- School
  - Attended UW-Superior from 2011-2016
    - B.S. in Biology (Fisheries and Aquatics) and Broad Field Science, Teaching certification for middle/high school
  - Currently at Hamline University
    - Master of Arts in Education: Natural Sciences and Environmental Education
- Work
  - Fond du Lac Ojibwe School in Cloquet (2017-2019)
    - Taught 7th-11th grade science
  - Fond du Lac Tribal and Community College
    - Nandagikendan (Seek to Learn) Academy Director

Who am I? (Personal)

- Live in Duluth, MN. Grew up in Solon Springs, WI
- Live with significant other and our three dogs
  - Mato (95 lbs, 4 yrs, German Shepherd/Husky)
  - Athena (55 lbs, 1 yr, German Shepherd)
  - Makwa (45 lbs, 2 yr, Shepherd/Blue Heeler/Dingo)
- Outdoor activities
  - Kayaking, hiking, boating, fishing, running, photography, rock climbing, gardening, camp fires

What does it mean for you?

- Each visit will have the same outline
  - 15-20 minute lesson inside
  - 20-30 minute activity and observation outside
  - 15-20 minute circle talk time to reflect (dependent on weather and comfort)
- Goals
  - Help you connect with and feel comfortable in exploring the outdoors
  - Support your social, emotional, and mental development through reflective activities
  - Teach you a few things about nature and climate change
  - Empower you and inspire you to take action to make our community a better place
  - Have fun doing something new
  - Get your input and suggestions about how to better my teaching/lessons
  - Learn from you all-we all have our own stories to tell

Quick Check (Thumbs up or down tally)

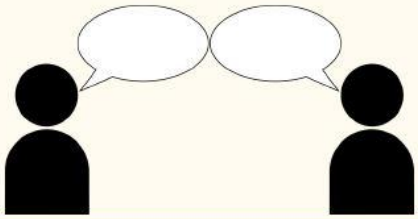
1. Do you enjoy going outside?
2. Would you say you spend time outdoors often?
3. Are you comfortable going to parks/trails?
4. Are you comfortable going off trails to do exploring?
5. Would you say you know about the plants and animals outside?
6. Have you ever been curious about a plant or animal outside?
7. Would it be interesting to learn about some of the common plants/animals?
8. Have you ever just sat and observed nature (such as watching the stars)?
9. Do you ever take time to reflect or day dream (inside or outside)?
10. Do you journal, blog, or do other frequent reflections/overviews (even videos of how your day went)?

What is nature?

Take a moment to write down five things that you think of when you hear the word "nature".

What are restorative practices/circle talks?

Take a moment to write down five things that you think of when you hear "restorative practices" or "circle talks"



What is climate change?

Take a moment to write down five things you think of when you hear "climate change"

Observations Outside

- How do we observe?
- How can we measure observations?

Observations Outside

- Observations use the 5 senses (but outside, we'll only be using 4):
  - Smell
  - Sight
  - Touch
  - Hear
- Qualitative observations (think quality)
  - Color, shape, size (big/small), comparisons
  - These use adjectives to describe something
- Quantitative observation (think quantity, or numbers)
  - Measurements (height, width, length, weight, volume)
  - Counting how many

Going Outside: Today's Challenge

1. Practice observation skills
   a. Pick and list five different natural things you found outside (leave space between each listed thing for observations)
   b. Use your four senses to make the following observations (can be a bulleted list):
      i. Make at least 3 qualitative (adjectives to describe) observations for each thing
      ii. Make at least 2 quantitative (numbers) observations for each thing
2. Practice reflecting
   a. How was your day today?
   b. How did you feel before coming outside?
   c. How do you feel now after making your observations?
   d. Did you enjoy this activity? Why or why not?

Risks to going outside

There's always the potential for risks when going outside, but there are also ways to prevent the risks from hurting anyone

- Sunburn (wear hat/sunscreen)
- Bug bites/stings (wear bug spray/avoid bees nests)
- Being too cold/warm (dress appropriately for the weather)
- Dehydration (bring a water bottle if you'd like)
- Tripping/falling/walking into a stick (be aware of surroundings/wear appropriate footwear)
- Every time we meet, we can discuss whether it's safe/comfortable enough to go outside. The hope is that we can be outside every time, but it depends on weather.

Example of observations of thing (try to guess!)

(Mystery thing):

- Qualitative
  - Small
  - Furry
  - Has long tail
  - Grey
  - Quick
- Quantitative
  - Four legs
  - One tail

Adventure 2: Phenology

Phenology?

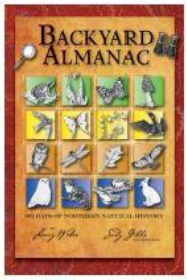
- Phenology is the study of how things in the natural world change as the seasons change
- What season are we in?
- How is this different than other seasons (thinking about temperature and precipitation)?

Phenology, Journaling, and You

Why should we care about phenology? It can be fun and relaxing to journal and reflect on the changes that happen throughout the seasons.

You know how people say "back in my day..." and will mention how the weather was different? Maybe someday that will be you!

I'm going to read today's Phenology Entry from Larry Weber, a former teacher here in Duluth who taught his science classes by focusing on studying phenology.



What's your favorite season and why?

- Take a moment to think about your favorite season and why it's your favorite.
- What activities do you like to do during your favorite season?
- Is there something you look forward to doing or seeing during your favorite season?

How do the seasons impact you?

- Think about the things you do during your favorite season
- Do these activities change throughout the seasons?

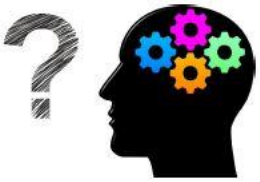
What changes occur in the natural world during this season?

- Take a moment to write down three things you have observed in nature during the summer that changes throughout the other seasons
- How do these changes in weather and in nature impact you?

What can we observe?

Some things in nature are easier to observe consistently than others.

What makes something easy to observe day after day? Write down at least three things that you think makes something easy to observe.



Traits of things that can be easily observed

- They are big enough to be seen without tools
- They are in the same place every day
- They are easy to find just by going outside
- They don't bite, sting, or attack
- They don't move

What does this describe?

Plants...Specifically Trees

- Trees are easy to observe because they can't run away
- There are plenty of trees in northern Minnesota (Duluth)
- Some trees change throughout the seasons
- A tree's bark is worse than its bite

What's a tree?

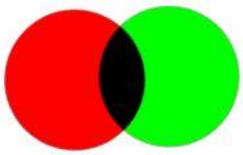
- Draw a picture of what you think a tree looks like (we won't be sharing these, so no worries about art skill)
- Write down five words that you think of when you think of a tree

Basic Parts of a Tree

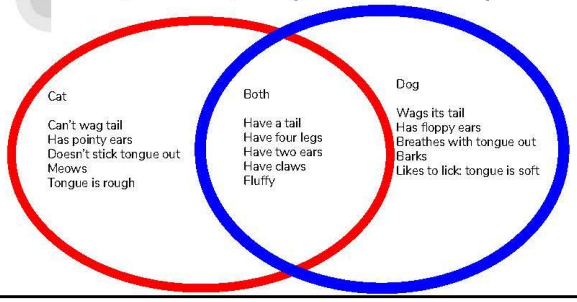
- Roots (can't always see, underground)
- Trunk (wood/bark)
- Branches
- Leaves or needles (modified leaves)

Going Outside: Today's Challenge

1. Observe two different trees (easy way to pick different trees is to find one with leaves and one with needles)
2. Make a Venn Diagram to compare (similar) and contrast (different)
   a. Try to have at least 5 similarities
   b. Try to have at least 5 differences
3. Be sure to use four of your five senses to help!



Example: Comparing a Cat and a Dog



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Adventure 3: Types of Trees in Minnesota

Trees and Seasons

Think about the trees you have seen in your life.

What two things could happen to them as the seasons change?

Deciduous Trees: Trees that lose their leaves

Compare winter to summer: why would a tree give up its leaves every year just to have to make new ones?

Deciduous Trees: Trees that lose their leaves

In the winter there is less sunlight (longer nights) and less moisture. While we get plenty of snow, frozen water (snow/ice) can't be used by the trees...until spring when everything thaws.

Deciduous trees lose their leaves to conserve energy and moisture during dry seasons.

Evergreen Trees: "Forever" green trees

Evergreen trees are the ones that are always green throughout the seasons, like a "Christmas tree". These trees have needles, which are modified leaves, that prevent moisture loss.

So what about coniferous trees?

Coniferous refers to "cones", so coniferous trees have cones that hold their seeds. Trees that don't have cones often have a fruit (like apples on an apple tree), nut (like the acorns on an oak tree), or other way to spread seeds (like the winged seeds from maple trees).

What do cones look like?

Usually when people think of a cone on a tree, they picture a pine cone. Other cones, like cedar cones, look a little different than what you'd expect.

Remember: fruits and nuts are not on coniferous trees.

Which type of tree is usually coniferous?

Think about the trees you know are deciduous (lose leaves) and evergreens (modified leaves, stay green year round). Which type is also coniferous?

Thumbs up if deciduous trees are coniferous

Thumbs down if evergreen trees are coniferous

Going Outside: Today's Challenge

Can a deciduous tree be coniferous?

- In partners or groups of three, you will be making observations to answer this question
- You and your partner/group will observe at least 10 trees. Try to find as many different trees as you can
- For each tree you observe, you will decide if it is:
  - Deciduous (loses leaves in winter) or Evergreen (keeps modified leaves in winter)
  - Coniferous (cone) or Not Coniferous (has fruit or nuts)

Example (I recommend making a table)

Tree Number and Name (if known)	Deciduous or Evergreen	Coniferous or Not
1 Pine tree	Evergreen: needles	Coniferous: cone
2 unknown	Deciduous: leaves	Not: has nuts
3 Maple tree	Deciduous: leaves	Not: has winged seeds

Adventure 4: Biomes

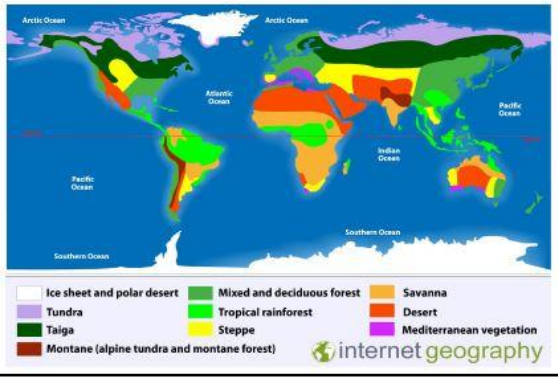
What's a biome?

- Hint: think about what is in the environment and write down at least five things that come to mind

Biome

A major area of the world classified by the plants, animals, and weather (temperature and precipitation)

Remember when we talked about phenology (the study of nature through the changing seasons)? How does this relate to the definition of biomes?



Minnesota Biomes

Four main types:

- Tallgrass Aspen Parkland
- Coniferous Forest
- Deciduous Forest
- Prairie Grassland

What do you think (looking at the names of each biome) is used to classify each biome?

Tallgrass Aspen Parkland

What plants are here?

- Aspen, Willow, Wiregrass Sedge, Lady's Slipper

What animals are here?

- Grouse, Sandhill Crane, Elk, Canadian Toad

What precipitation do we get?

- 20-22 inches (average annually)

What's the temperature like?

- 35-44 degrees F (average annually)

Coniferous Forest

What plants are here?

- Black Spruce, Cedar, Balsam Fir, Red Pine

What animals are here?

- Wood Frog, Gray Wolf, Moose, Boreal Chickadee

What precipitation do we get?

- 21-32 inches (average annually)

What's the temperature like?

- 36-41 degrees F (average annually)

Deciduous Forest

What plants are here?

- Red Oak, Basswood, Maple, Rue Anemone

What animals are here?

- Gray fox, Opossum, Skunk, Hognose Snake

What precipitation do we get?

- 23-35 inches (average annually)

What's the temperature like?

- 39-45 degrees F (average annually)

Prairie Grassland

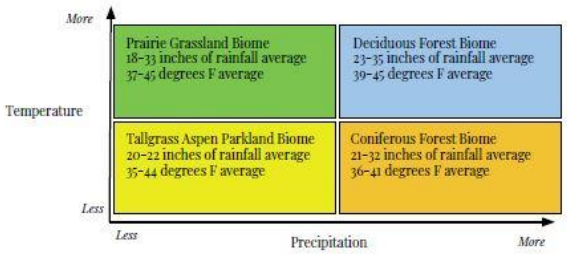
What plants are here?
- Big Bluestem, Purple Prairie Clover, Blazing Star

What animals are here?
- Great Plains Toad, Prairie Chicken, Badger, Gopher

What precipitation do we get?
- 18-33 inches (average annually)

What's the temperature like?
- 37-45 degrees F (average annually)

Climate: Precipitation and Temperature Over Time



What makes this part of Minnesota great for coniferous trees?

Long and cold winters

Lots of snow

Warm, humid summers

Defined seasons

4-6 months no frost

This area is also known as boreal forest

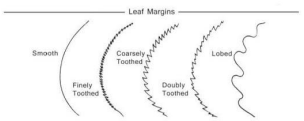
So while we are in the coniferous tree biome, trees don't know boundaries and our climate conditions are good for some deciduous trees too.

How do you know what trees are here?

Going Outside: Today's Challenge

We are going to mix art and nature while making observations of leaves.

- Use one color per tree and get a rub of a leaf/needle
- When you've collected colorings from at least five trees, you'll write down some observations comparing the leaves (these won't apply to needles):
  - Do the leaves have lobes or no lobes?
  - Are the edges of the leaves smooth, toothed, or doubly toothed



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Adventure 5: Seeing is Be-leaf-ing

Trees of Minnesota

Take a look back at your leaf art from last week. How many different shapes of leaves did you find?

Minnesota Trees

- Minnesota, according to the Department of Natural Resources, has 53 native species of trees*
  - Native means that they were originally here before settlers and were not introduced
- Those trees are divided into two groups: deciduous and coniferous
- Knowing this, what seasons do you think is easiest for identifying trees?

*(Minnesota Department of Natural Resources, n.d.)

How do we identify things?

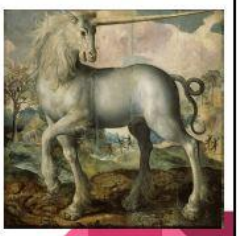
Rather than looking through a book of trees with hundreds of pictures of leaves, bark, seeds, and branches, we make things easier by using a dichotomous key. "Di" means two, so there are levels of two statement steps to guide you to the answer. Example:

1. The tree has leaves (go to page ...)
2. The tree has needles (go to page ...)

Let's practice

Practicing Dichotomous Key

The picture is the creature we're trying to identify. While I'm sure you know what it is, let's try to key it out and find out exactly what it is



1. Creature has wings (go to number 30)
2. Creature has no wings (go to number 3)
3. Creature has one horn (go to number 5)
4. Creature has no horns (go to number 9)
5. Creature has four legs, a mane, and a tail (Creature is a Unicorn)
6. Creature has four legs and a tail, but no mane (go to number 7)

Why do trees have leaves?

Leaves and needles are like solar panels for trees: they collect sunlight.

Leaves are where photosynthesis take place.

1. Leaves take in carbon dioxide and collect sunlight
2. Trees take in water that reaches the leaves
3. The energy from the sun helps turn carbon dioxide and water into glucose, a sugar plants use as food

Biology + Chemistry = Biochemistry

For anyone who's curious about what the chemistry of photosynthesis looks like:

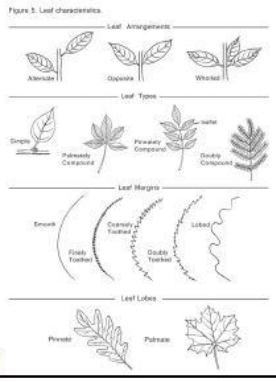
$$\underset{\text{Carbon dioxide}}{6CO_2} + \underset{\text{Water}}{6H_2O} \xrightarrow{\text{Light}} \underset{\text{Sugar}}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{6O_2}$$

6 carbon dioxide molecules + 6 water molecules convert to 1 sugar molecule (glucose) and 6 oxygen molecules using energy (light) from the sun.

Fun fact: oxygen is a waste product for the plant. It's like the carbon dioxide you breathe out or the waste you pass when you use the bathroom. If it can't be used, it's thrown away.

Deciduous Tree Identification

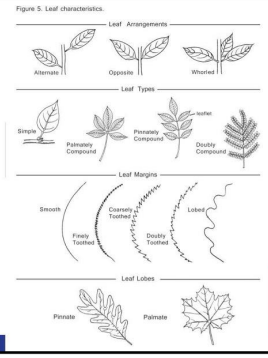
We're going to start simple. Identification of trees can be tricky, so let's just get to know what some of the leaves look like and some of the terms we use to describe leaves.



Deciduous Tree Identification

Take a look at your leaf art. Raise your hand to say yes and keep your hand down to say no as I ask the following questions:

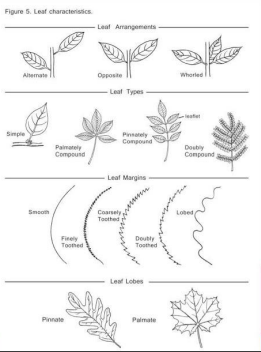
1. Who has a pinnate leaf?
2. Who has a palmate leaf?
3. Who has a lobed leaf?
4. Who has a finely toothed leaf?
5. Who has a doubly toothed leaf?
6. Anyone find a smooth leaf?



Going Outside: Today's Challenge

With a partner or in a group of three, your goal is to become more familiar with the terms for deciduous leaf characteristics

1. Observe 8 different deciduous trees for their leaves
2. Decide the leaf arrangement, type, margins, and lobes for each of the 8 trees you observe
3. If it would help you, you can sketch or do a pencil rub of the leaves you observe



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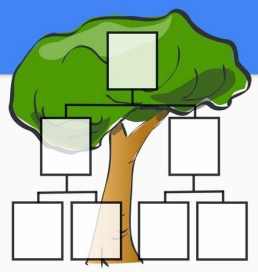
Adventure 6: Identifying Tree Families

Tree Families

Last time we looked at the different leaves that trees can have.

Today, we're going to learn how to identify and classify trees into their families. Just like you have shared characteristics with your family, trees in the same family have shared characteristics. Let's take a moment to think about and share some family traits that you have with your family.



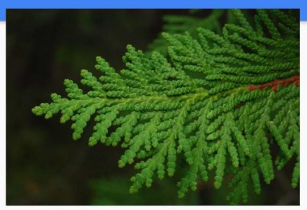
Coniferous Tree Families

The families that are coniferous tree families are:

- Cedars
- Pines
- Eastern Larch
- Balsam Fir
- Spruces

Cedars

More common in wetlands, these are the only trees with scalelike leaves



Pines vs. Eastern Larch

Pine trees have long needles in bundles of 2-5

Eastern Larch have clustered needles in bundles of 12 or more

Balsam Fir vs. Spruces

Balsams and Spruces have single leaves (needles), meaning they are not bundled like pines or Eastern Larch.

Balsam fir have flat needles

Spruce have needles with four sides (they'll feel more round)

Deciduous Tree Families

The families that are deciduous tree families are:

- Ashes/Boxelder
- Maples
- Honeylocust
- Walnut/Hickory
- Oaks
- Elms
- Birches/Ironwood
- Hackberry/Basswood
- Cottonwood/Aspens
- Balsam poplar/Cherry/Willows

Ashes/Boxelder vs. Maples

Both of these tree families have opposite branching. Fun fact: the Ojibwe word for "maple tree" is "ininaatig", with "inini" meaning "man"

Ashes/boxelders have compound leaves

Maples have simple leaves

Honeylocust vs. Walnut/Hickory

Honeylocust and Walnut/Hickory trees have alternate branching with compound leaves.

Honeylocust have both doubly and singly compound leaves

Walnut/Hickory have only singly compound leaves

Oaks

Oaks have alternate branching and simple, lobed leaves

Elms vs. Birches/Ironwood

Both have alternate branching and unlobed leaves with doubly toothed edges.

Elms have lopsided leaf bases (uneven)

Birches/Ironwoods have uniform leaf bases (even)

Hackberry/Basswood

These trees have alternate branching and simple, unlobed leaves that are singly toothed or smooth. They have lopsided leaf bases (uneven)

Cottonwood/Aspens vs. Balsam Poplar/Cherry/Willows

Both of these tree families have alternate branches with simple leafs that have singly toothed or smooth leaves and uniform leaf bases.

Cottonwood/Aspens have flat leafstalks

Balsam Poplar/Cherry/Willows have round leafstalks

Leafstalks are like the stem part connecting leaves to branches

Going Outside: Today's Challenge

With a partner or in a group of three, you will identify 8 trees by their family, using the Beginner's Guide provided. In your journal, you'll write down the tree family and how you know it belongs in that family. Feel free to do a rub of the leaf or needle to help with the description.

Bibliography

Rathke, D. M. (1995). A Beginner's Guide to Minnesota Trees. Regents of the University of Minnesota. [PDF]. https://conservancy.umn.edu/bitstream/handle/11299/49816/6593.pdf?sequence=1&isAllowed=y

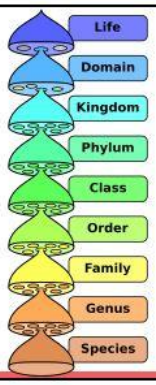
Adventure 7: Tree Species

What's a species?

Last time we learned about and observed tree families. Trees in the same families have similar characteristics, but are not exactly the same.

In science, we can classify organisms down to species. Species are living organisms that have similar characteristics and can breed to create viable (able to breed and live) offspring.

Think about it this way: how many types of felines (cats) are there (think domesticated and wild).

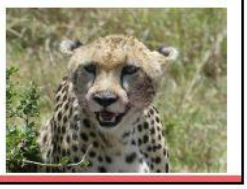


Species example

House cats are all the same species. But they are still in the same family as cheetahs, lions, and jaguars.

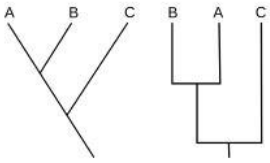
All of these animals share the same characteristics, but you wouldn't find a cheetah reproducing with Fluffy the house cat. Even if they could, the offspring would be hybrids, meaning that the offspring of Fluffy and the cheetah wouldn't be able to reproduce.

Let's talk tree species



Dichotomous Keys and Tree Species

Remember when we talked about dichotomous keys? Now we'll practice using them. I'm going to give a few examples of some of the tree species we'll most likely see outside so we can practice using the dichotomous keys. Once we've gone through them, we'll go outside and really put your skills to the test!



Example 1

Let's start: is this tree coniferous or deciduous?

I can tell you that this tree has needle bundles of 2-5.

The needles are 4-6 inches long.

Example 2

The needles are single and flat

Example 3

The branches are opposite and the leaves are simple.

The leaves have five lobes with smooth/wavy points.

Example 4

The branches are alternate.

The leaves are simple and lobed with rounded tips.

The lobes cut to similar depths.

Example 5

Branches are alternate with simple leaves.

The leaves are singly toothed but not lobed.

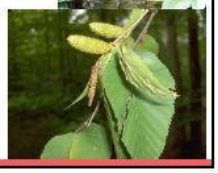
The leaf bases have nearly even sides.

The leafstalk (stem from branch to leaf) is flat.

The leaves are round/egg-shaped with small teeth.

Going Outside: Today's Challenge

We will use the dichotomous key (from the Beginner's Guide) and the checklist (which follows the dichotomous key) to observe 3 trees today. You are welcome to work with one partner. Before we go outside, let's practice using the checklist on a couple of the examples we just did and with the tree pictured here. The checklist will help confirm your observations so we don't have to write down as much information.



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Adventure 8: Getting to know...trees?

Trees are a lot like humans in many ways...

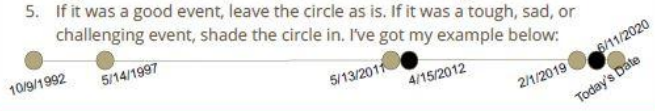
As we found last week, trees have families much like humans do. Through shared characteristics, trees are "related" to other trees and this is what puts them in their families.

We can learn a lot from trees by listening to their stories.

What's your story?

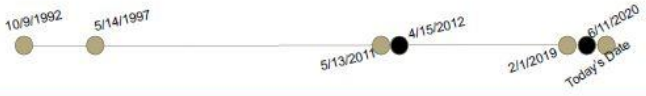
In your notebooks, I want you to make a timeline. We won't be sharing these, so don't worry about having to explain the events.

1. Draw a straight line from the left side of your paper to the right side
2. Draw a circle at the left end of the line. Put the date you were born
3. Draw a circle at the right end of the circle and put today's date and your age
4. I want you to pick and write the date of 5 major life events that occurred in your life and put them on your timeline by drawing circles
5. If it was a good event, leave the circle as is. If it was a tough, sad, or challenging event, shade the circle in. I've got my example below:



So what can we learn from our timelines?

Let's use my timeline as an example. What can you learn about me from my timeline?



Math and Tree Age

Think about it this way: let's take my age and the current year and see if we can figure out what year I was born:

I'm 27 and the year is 2020. What year was I born?

This is how we can find the age of a tree if we know what year it was cut down...but how do we figure out how old it is?

What can we learn from trees?

Obviously trees can't write down their timelines, the day they started growing (were "born"), or major events they had in their lives. So what can we learn and how?

Trees tell their life stories by their rings. When we cut down a tree, the cross section of the trunk can tell us a lot.

How do we know the age?

How do you know how old you are?

Just like with people, we can use when the trees were "born", or started growing, and the year they were cut down to figure out how old they were when they were cut down.

But how can we figure out when a tree was "born"? Take a moment to think about this.

Ring around the Tree Age?

Tree rings give us the age of the tree, which can then help us figure out when it was "born".

The light and dark rings show different seasons. Think about what a tree needs to grow. Notice that the darker rings are thinner than the lighter rings. What season does a tree grow most in? What season does the lighter ring represent then? What does the darker ring represent?

Tree Rings Summary

Lighter rings show spring/summer months and darker rings show late summer/fall and even winter (if it's a coniferous tree that keeps its needles during winter).

Rings on the outside are more recent years while rings on the inside are the early years for the tree (later in history).

Let's practice

Write the answers to the following for both trees in your notebook:

1. How old is the tree?
2. If the trees were both cut down in 2020, when were they "born"?
3. Which one is older?

Going Outside: Today's Challenge

Today we will be looking at tree rings (the cross-sections of trees are called "tree cookies"). You and a partner or partners will be aging trees. For each tree, I'll give you a letter (to identify it, like it's name) and the year it was cut down. It's up to you to write the following in your notes:

1. The letter of the tree cookie
2. The year it was cut down
3. The age (if you count light and dark rings, divide your number by two)
4. The year it started growing (or was "born")

Adventure 9: Tell me, what's your story?

What do tree cookies tell us?

Last time we looked at tree cookies and figured out their age by counting the rings of the tree and, by knowing when the tree was cut down, we could find the year it started to grow.

But what's the big problem with tree cookies?

Tree Corer (Increment Borer)

There's a better way to get the same information from the tree. We can drill a hollow tube (auger) into the tree and use the extractor tray to pull out a core of the tree so we don't have to kill the tree.

How does it work?

The increment borer has to drill into the tree parallel to the ground (straight across the tree like a tree cookie does).

We have to make sure we reach the center of the tree but that we don't go all the way through it (this rarely happens with older trees).

We have to get to the center to be able to correctly age the tree. It's our "year zero" to make sure we count the right number of rings.

Ogres are like onions...they have layers!

Think about what else in nature that can have rings, layers, or stripes that tell a story over time.

What other cores/layers can scientists use?

- Ice cores
- Sediment cores
- Rock layers

All of these can show us what gases (and how much) were present in the atmosphere (like CO2, a greenhouse gas), what organisms were present (more so in sediment cores and rock layers), and more! With all of these, the further down we drill, the further into history we go!

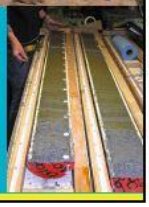
The way aging works is the layer closest to the top is the newest while the one further down is older. Think if we were to stand on this cake we would be standing just on top of the red layer. That would be the newest (youngest) layer.
Which layer is the oldest?

Ice Cores

Glaciers are formed from layers of snow being compacted and turned into ice. We can learn about when there was a lot or little bit of snow each year, if there was warmer or cooler periods of time, or if there was ash (from volcanoes).

Sediment Cores

Sediment (like sand/dirt/mud from runoff) can be found in areas of low elevation where there is little disturbance, like the bottom of a lake. We can see what seeds collected in the lake, if there was a lot of runoff (lots of rain/flooding) or not a lot of runoff (little rain/drought), and, by looking at the types of organisms in ocean sediment cores, we can determine the temperatures in the past.



Rock Layers

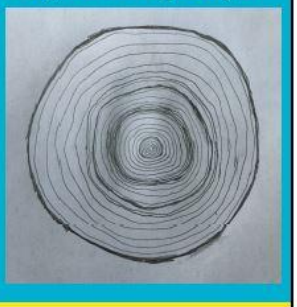
Some types of rock (sedimentary, made from compacted/hardened sediment) can be used to look at history. Just like with sediment cores we can tell if there was a lot of rain (a lot of sediment/thicker layer), or if there was times of drought (thinner layers) just like with tree ring thickness. We can learn a lot about the organisms that were alive in the past by searching in the layers for fossils.

If you were a tree, what would your rings say?

Look back at the timeline you made with the light and dark circles. We're going to turn that timeline into a tree cookie. Here's how:

1. Start with a circle in the middle of your page
2. Draw a circle around that circle for each year of life (so for me, I'd have 27 total circles)
3. Think about what thicker circles (good year) mean vs thinner circles (tough year)

I did my life story as a tree cookie to help you.



Going Outside: Today's Challenge

Today, you will each pick your favorite tree. If you and another person or people have the same favorite tree, that's fine too! We will take only one core from each favorite tree. I'll do the first core to show you how to use the increment borer and then we can see who wants to core the others. Once you have a core, you will do the following:

- Count the rings to see how old it is (either count light and dark rings and divide by two or count just light rings)
- Do the math to see what year it started growing (2020 minus it's age)
- Compare the tree's life to your life. (use the next slide to help you)

Compare your life to the tree's life

Here are some things to think about. Write down answers to at least two of these questions, but think about all of the questions:

- Who is older and by how many years?
- How many years were really good (or really tough) years for you and for the tree? What made them good (or tough) for you?
- Give one year that you and the tree shared a good (or tough) year. (Was it 2020 or an earlier year?)
- Do you think life can be difficult for a tree? Explain in a couple of sentences.
- What could you do to make a tree's life easier?

Adventure 10: What do Trees Tell us?

What have we learned from trees so far?

We've looked at the tree rings to determine how old the trees were and what year they started to grow. There's a lot more that we can learn about trees from the tree rings.

Remember, the light rings show spring/summer months and the dark rings show fall/winter months.

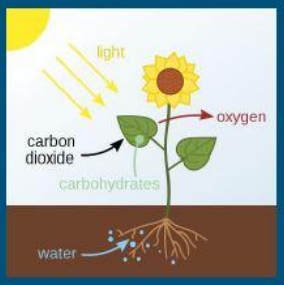
Let's think about humans: what would help us have a good or bad "growth year?" What makes a year good or bad. Think back to our timelines with the light and dark circles.

Tree rings, growth, and photosynthesis

If you notice, most of the lighter colored rings are wider than the darker rings. That's because the warmer months means more growth. But what does a tree need to grow? Think back to the biochemistry we talked about with photosynthesis.

Sunlight and Water

The change of sunlight throughout the seasons is why we see the light and dark rings. How can we tell if there has been a change in water by looking at the tree rings and what does this change in water mean?



Drought and Flood

Light colored rings that are very thick show times when water was plentiful.

Light colored rings that are very thin show times of drought.

Scars in the tree's story

Just like when people get hurt, trees can get scars after wounds have healed. What are some scars people heal from?

What do you think could cause scarring for trees?

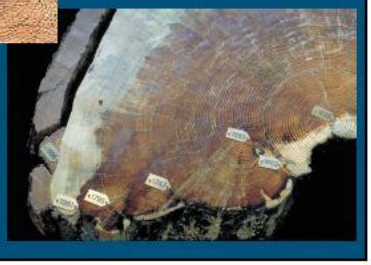
Hint: there are two main types, think about how weather could scar trees

Fire and Ice

Trees often get major scars (that we see in the tree cookie) from forest fires and from frost causing the water stored in a tree to freeze, expand, and crack a tree.

Other things we may sometimes see, thought not as easily, are scars from insects or other damage to a tree, such as lightning.

Fire Scars



Look back and reflect

Look back at the timeline you made last time. If you have any scars (physical or emotional) from any painful, sad, or scary events that you'd like to add to your timeline, feel free to add the dates and a filled in circle for the events. Remember, we are not going to share these and you don't have to write any details about what happened: just the date and a shaded circle.

Going Outside: Today's Challenge

Today we will be looking at tree cookies. These are the same cookies we looked at last time. For each tree cookie, please write down

1. The letter of the tree cookie
2. How old it was (looking back at notes from last time) for three major events:
   a. Fire Scars
   b. Drought
   c. Years where there was lots of water/growth

Adventure 11: Fire, Flood, and Local Climate

Recall: How do scientists look at the past?

Two meetings ago we learned about how ice cores, sediment cores, and rock layers can be used to examine the past conditions of the earth, such as temperatures, precipitation, gases in the atmosphere, and life on earth.

Last time we met, we looked at our tree cookies to examine signs of drought (which can lead to fires) and lots of water (or floods).

What did we learn?

We discovered that the tree cookies had fire scars. Although these trees are from Cloquet, Cloquet isn't far from Duluth and they are in the same climate. So that means if there are years of drought in Cloquet, we can safely assume there were droughts in Duluth during the same years.

Let's think about what conditions are like for:

- Floods: typically lots of precipitation over relatively short periods of time. It could even be that we had a lot of snow (precipitation) over winter and, when it melted, it caused flooding in the spring.
- Drought: typically little to no precipitation for long periods of time. It could also mean that temperatures were really high and caused everything to dry out.

A lot of our weather focuses on temperature and precipitation (rain, snow, etc.).

So how does weather relate to climate?

What is climate?

Climate is the average weather conditions over time, usually in terms of decades, which can include precipitation, temperatures, wind patterns, sunlight, humidity, pressure, and more.

Remember when we talked about biomes and why we have certain trees in this area of Minnesota? Climate can help define biomes because different species can tolerate, or live with, certain conditions.

Coniferous Tree Biome

Recall that we are in the Coniferous Tree Biome. This biome is known for being cool and moist. We have cold winters and cooler summers (compared to other parts of Minnesota and the U.S.). We usually have rain throughout the summer and lots of snow in the winter. That's what is normal for our climate and is what defines our biome.

Going Outside: Today's Challenge

Today we are going to look at data from the last 20 years for Duluth, MN and compare it to a tree cookie. Here are our goals for today:

1. Examine and make general observations of line graphs for precipitation and temperature
2. Compare maximums and minimums for precipitation and temperature for each year.
3. Decide if and when there were years of lots of rain and droughts.
4. Compare information from number 3 to our tree cookies. Does the data match up? Explain why it does or doesn't match.

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Duluth Weather Forecast Office. (n.d.) Observed Weather Reports. National Weather Service Forecast Office. https://w2.weather.gov/climate/index.php?wfo=dlh

Adventure 12: Climate Change and Pests…it's a Dangerous Life for Trees!

Thinking questions:

What do you think of when you think of climate change?

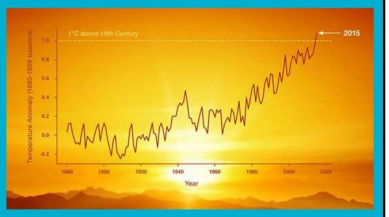
What are some organisms that harm trees?

What are some ways we can protect trees and their habitats?

How can science help trees?

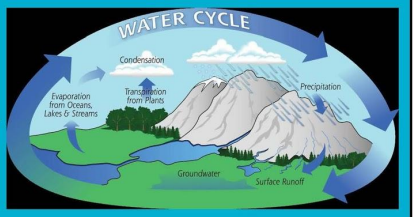
Climate Change, Temperatures, and Trees

Usually when people think of climate change, they think of increasing temperatures. Generally speaking, yes, we're seeing increases in temperatures globally. What does this mean for trees? Let's discuss!



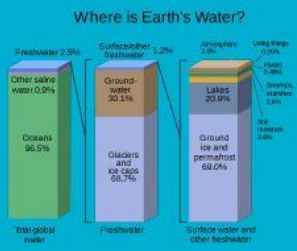
Climate Change, Precipitation, and Trees

Is climate change impacting precipitation? Think back to what we examined with our data from last time. What's happening to precipitation over time?



Increased temperatures means increased precipitation...but why?

Let's look at this diagram. Of all the water on earth, only 2.5% is freshwater. Of that, 68.7% is frozen! As temperatures increase, what will happen to the amount of liquid water? What will this mean for precipitation?



Connect ideas: how will climate change directly impact trees?

Increased temperatures means longer growing periods and more precipitation means more growth. This is all good news for trees....right?

What are your thoughts?

How much can trees tolerate?

All organisms have tolerance levels, which means they can only survive in certain conditions. That's why we have the certain trees we do in Minnesota: they can tolerate cold winters with snow and warm, moist summers. Will they be able to tolerate warmer winters with less snow and hot summers with lots of rain or flooding? What do you think?

Tree Tolerances of Moisture

Let's look at some of the common Minnesota trees and how they deal with moisture levels.

Here's a list of trees that do well with wet/moist soil. They should do ok with climate change and increasing moisture, right? But what about the rest?

Wet	• Black willow • Cottonwood • Tamarack	• Black willow • Cottonwood • Black ash • White cedar • Balsam fir	• Black willow • Cottonwood
Moist	• Norway (red) pine • White pine • Black spruce • White spruce • Paper birch • Yellow birch • Red oak	• Black walnut • Silver maple • White cedar • White spruce • Paper birch • Red oak • White oak • Balsam fir Yellow birch	• Red oak • Green ash • Silver maple • White spruce • Paper birch

Tree Tolerances of Moisture, continued

What about these trees?
What will happen to them?

Moderately Dry	• Norway (red) pine • Jack pine • Bur oak • Red oak • Yellow birch	• Green ash • Red oak • White spruce	• Green ash • Silver maple • Cottonwood
Dry	• Jack pine • Bur oak	• Green ash • Eastern red cedar	• Green ash • Eastern red cedar

Pests for Trees

Even without climate change, there are other things out to get trees. Let's look at a few:

- Gypsy Moth-defoliates trees (eats their leaves). Why is this a threat?
- Herbivores (Deer): herbivore means they eat plants. Why is this a threat?
- Emerald Ash Borer: larvae eat ash trees (and live in them). Woodpeckers go after the larvae. Why is this a threat?
- Earthworms: they eat the decomposing leaves that provide protection and nutrients for seedlings. Why is this a threat?

Pests for humans?

Let's compare ourselves to trees: what are some pests in human lives that can slow growth or even harm and endanger the life of humans?

What do we do to get rid of these pests?

How could we use these ideas to protect trees from pests?

Going Outside: Today's Challenge

We're going to focus on the tree you chose as your favorite:

1. Identify the species of your favorite tree
2. Look at what it prefers for moisture level. Based on this information, do you think your tree has a good chance of survival as the climate changes? Explain.
3. Look at the pests we talked about. Do you think your tree has to face many pests? Is it a huge concern for your tree? Why or why not?
4. Are there other concerns you have for your tree? If yes, briefly explain.
5. What do you think you could do to protect your tree?
6. Provide three words that describe how you feel about climate change and the future of the world.

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Adventure 13: Science is like Sunshine…a Ray of Hope

How are you feeling?

Let's think about the last time we met: we talked about climate change and pests that can impact a tree's survival. Sometimes, these topics can cause some negative emotions. How are you feeling? Give a word or two to describe your feelings.

Ponder the following:

"Nothing beautiful in the end comes without a measure of some pain, some frustration, some suffering."

-Archbishop Tutu

What do you think this means? How does this relate to how you're feeling right now?

Science: Turning problems into solutions

The great thing about science is that it gives us a process to observe a problem, research it, test other methods, and come up with better solutions.

So what is science doing for our trees?

For the Gypsy Moth, Earthworm, and Emerald Ash Borer, there are efforts to educate people about the damage they can do and how people can stop the spread.

http://greatlakeswowrwika.org/teamaction.html

https://www.mda.state.mn.us/plants/pestmanagement/gmunit

https://www.mda.state.mn.us/eab There's also funding for managing the Emerald Ash Borer

What is science doing for our trees? Continued…

Deer can cause a lot of damage, especially for seedlings (baby trees).

An easy fix, though costly, is fencing.

Let's think about this: if there are a lot of deer eating a lot of trees, how could we reduce the population of deer to protect trees?

So how do help make change?

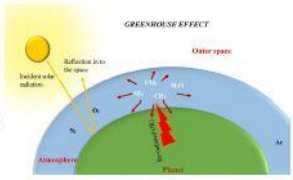
Sometimes we can feel helpless. There's so much in the world that needs to be changed to make the world a better place. How could we possibly make any change?

Let me tell you a story about a boy, his grandpa, and baby sea turtles on a beach...

How do I help fix climate change?

One big problem causing climate change is a greenhouse gas called carbon dioxide. Just like a greenhouse, it traps the sun's radiation (heat/energy) in the earth's atmosphere, and this causes warming which can also lead to climate change.

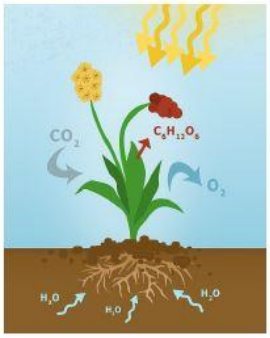
Why does carbon dioxide sound familiar?



Trees use carbon dioxide

Remember how plants take in carbon dioxide, water, and the sun's energy to make food which helps them grow? Also remember that they give off oxygen as a waste product?

So...if carbon dioxide is one cause of climate change, what can we do to help fix the problem?



Planting trees to combat deforestation

Industry, transportation, and just natural processes put carbon dioxide into the atmosphere. While trees use this carbon dioxide, it's hard to remove a lot of carbon dioxide with deforestation: this is where mass amounts of forests (like the rainforest) is cut down, mostly to make room for farming.

Going outside: today's Challenge

Today will be a little different: we're going to think about what we've learned so far and reflect...after a story time!

1. Story time: The Lorax
2. While listening to the story, write down three words for each of the following:
   a. To describe how you're feeling about climate change
   b. To describe how you feel about the future of trees
   c. To describe how you feel about what role you have in the fate of the environment
   d. **Most importantly, write on the notecard: if your tree was a person and was sad/angry/scared/uncertain about its life, what would you say to it to give your tree hope and encouragement?**

Bibliography

Great Lakes Worm Watch. (n.d.) How can I stop the spread? http://greatlakeswormwatch.org/team/action.html

Minnesota Department of Agriculture. (n.d.). Emerald Ash Borer Program. https://www.mda.state.mn.us/eab

Minnesota Department of Agriculture. (n.d.). Gypsy Moth Program. https://www.mda.state.mn.us/plants/pestmanagement/gmunit

Seuss. (1971). *The Lorax.*

Adventure 14: The Next Steps

Citizen Science

As you saw when we talked about managing tree pests, there is a lot of science being done. Sometimes, there's too much science and scientists need help! This is where Citizen Science comes in. The tree pest management is just a small fraction of all the science you can be a part of!

Citizen Science is science that anyone can do!

Local Citizen Science

http://citizenscience.dl.umn.edu/get-involved-0

https://www.dnr.state.mn.us/volunteer/opps/index.html

https://www.usanpn.org/naturesnotebook

https://www.inaturalist.org/

https://www.pca.state.mn.us/water/about-programs

Of the projects we looked at, which ones would you be interested in?

There's many more ways to get involved, but this is just a starting point!

Tell it to the Trees

We've learned a lot about trees (probably more than you ever wanted to). In the process, we've also learned a lot about each other and ourselves. I want us to reflect on our journey. If you feel comfortable, you can close your eyes or, if you want to keep them open the next slide is a forest picture. I'm going to read something that will act as our final journey and adventure.

Going outside: Today's Challenge

Today is the last day I'll be here, working on my grad school project. It's been an honor to work and learn with all of you. I hope along the way you've learned a few things and had some fun with our adventures. Today's Challenge will be completing our final (individual) interviews.

I want to share a song with you:

https://www.youtube.com/watch?v=ONfP8cRZSlI

While listening, think about what they lyrics mean to you.

Miracle - Rise Against + The Lorax

"Don't wait for a miracle...the world is passing by. The walls that will surround you are only in your mind"
"When the weight we carry breaks us, we're tempted to stay down. But every road to recovery starts at the breakdown."
"We are the miracles." (Biotuned Music, 2019)

There is a lot in the world that needs to change to make it a better place. You can be the change you want to see in the world. When you feel like giving up, don't. Because, like the Lorax said, "Unless someone like you who cares a whole awful lot, nothing is going to get better. It's not." (Seuss, 1971)

Bibliography

Biotuned Music. (2019). *Rise Against – Miracle {432Hz} Ghost Note Symphonies.* [Video]. YouTube. https://www.youtube.com/watch?v=ONfP8cRZSlI

iNaturalist. (n.d.). https://www.inaturalist.org/

Minnesota Department of Natural Resources (MNDNR). (n.d.). Volunteering opportunities. https://www.dnr.state.mn.us/volunteering/opps/index.html

Minnesota Pollution Control Agency. (n.d.). About the programs. https://www.pca.state.mn.us/water/about-programs

Nature's Notebook. (n.d.). https://www.usanpn.org/natures_notebook

University of Minnesota. (n.d.). Get Involved: Citizen Science at UMN. http://citizenscience.dl.umn.edu/get-involved-0

References

Biotuned Music. (2019). *Rise Against - Miracle {432Hz} Ghost Note Symphonies.* [Video]. YouTube. https://www.youtube.com/watch?v=ONfP8cRZSlI

Seuss. (1971). The Lorax.

APPENDIX J

TEACHING TOOL

Handout for Lesson 7

Appendix J

Handout for Lesson 7

Coniferous or Deciduous?		EXAMPLE: Yellow Birch	Tree #1 Species:	Tree #2 Species:	Tree #3 Species:
Coniferous Trees Only	Scalelike or Needlelike leaves?				
	If needlelike: bundles or single/clusters?				
	If bundled, how long?				
	If single/clustered: how many sides?				
	If 4 sided, how long?				
Deciduous Trees Only	Are branches opposite or alternate?	Alternate			
	If opposite branches, are leaves compound or simple?				
	If compound, how many leaflets?				
	If alternate branches, are leaves compound or simple?	Single			
	If leaves are simple, are they lobed or smooth/toothed?	Smooth/toothed			
	If lobed, are they pointed or round tips?				
	If simple leaves are smooth/toothed, are they doubly toothed or singly toothed/smooth edged?	Doubly toothed			
	If doubly toothed, is the base uneven or even?	Even			
	If doubly toothed leaves are even, what is the bark like?	Bronze colored			
	If singly toothed/smooth edged leaves, is the base uneven or even?				
	If singly toothed/smooth edged leaves are even, is the leafstalk flat or round?				
	If leafstalk is flat, what is the shape of the leaves?				
	If leafstalk is round, are the leaves longer and thin or are they round/oval shaped?				

APPENDIX K

TEACHING TOOL

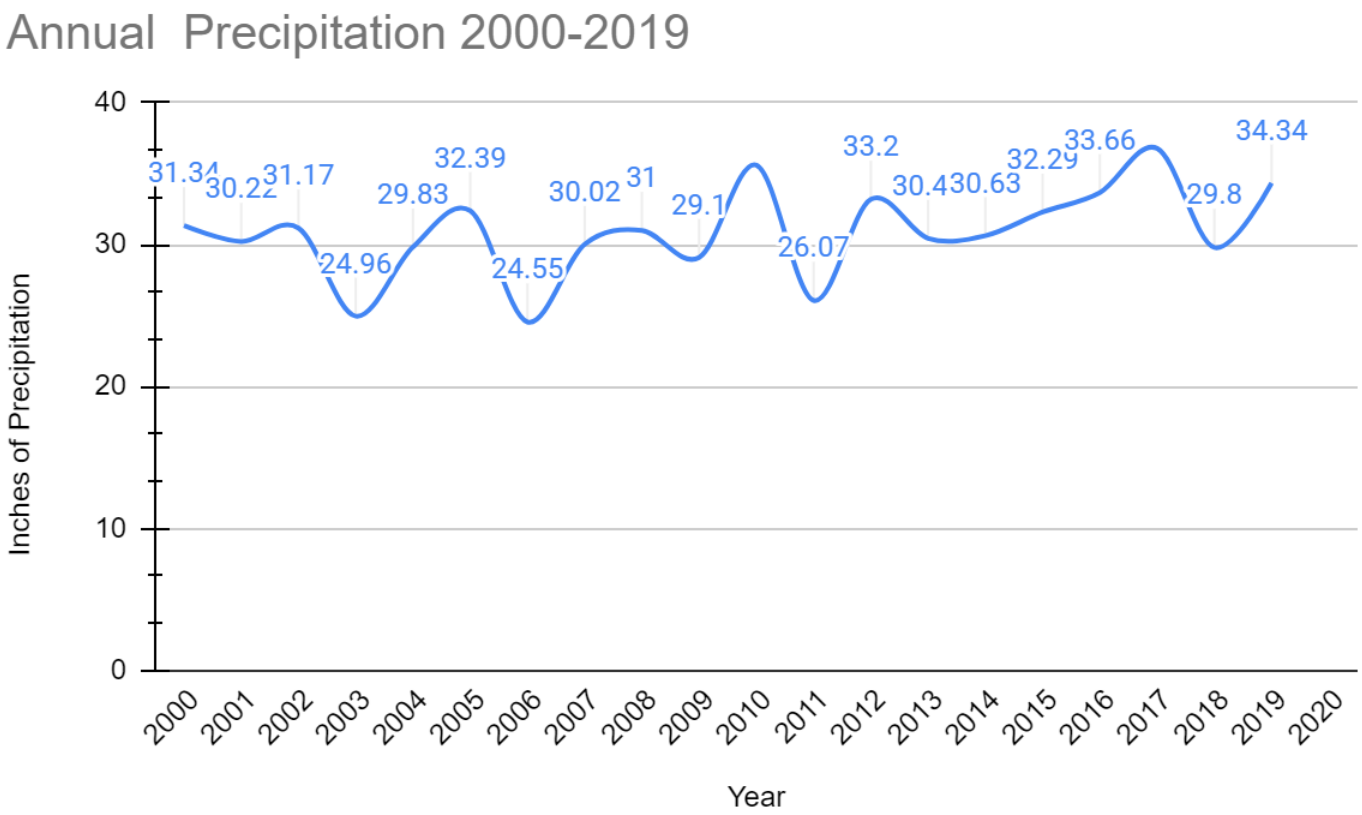
Handout for Lesson 11

Appendix K

Handout for Lesson 11

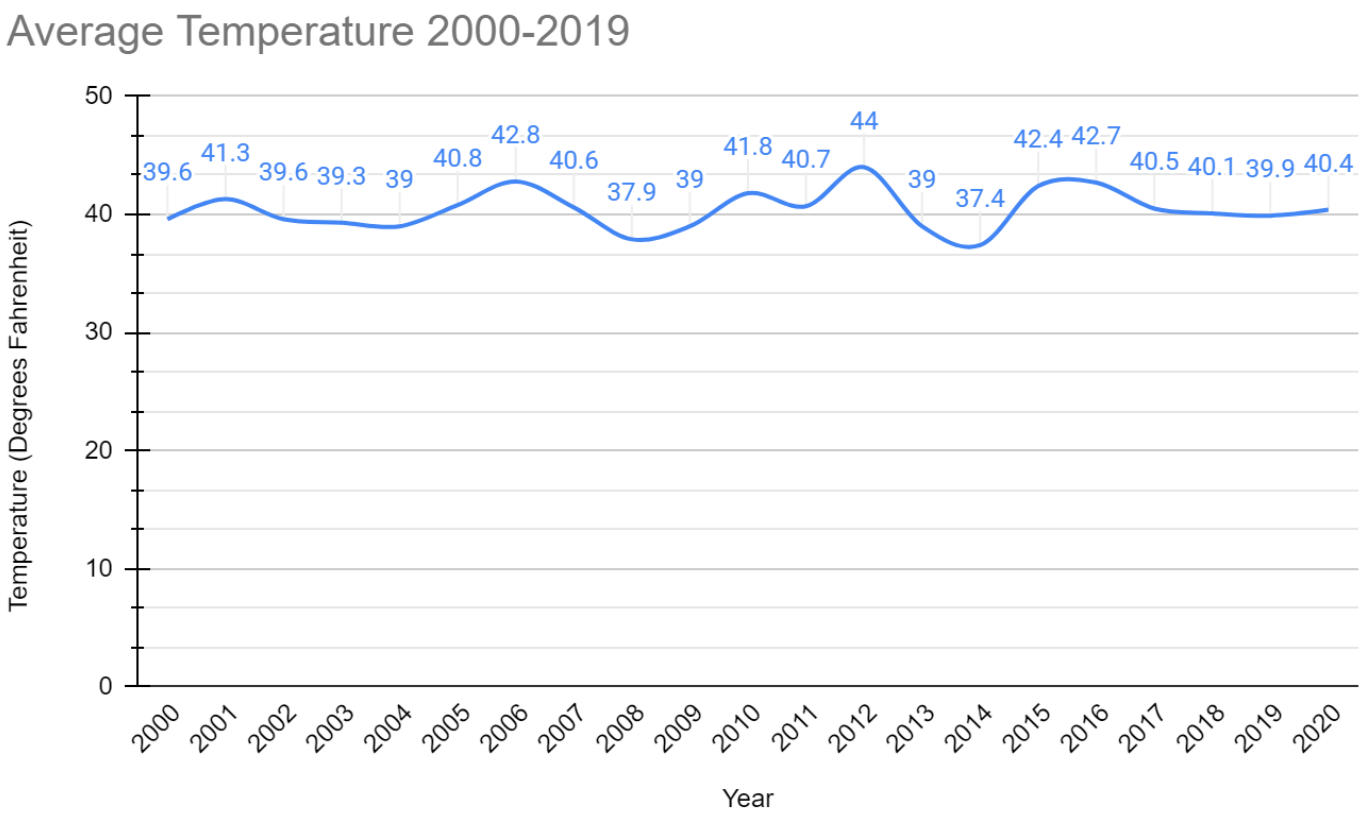
Monthly Precipitation in Inches

Minimum	Maximum	Annual	Year
0.77	5.08	31.34	2000
0.55	8.18	30.22	2001
0.34	5.75	31.17	2002
0.23	4.79	24.96	2003
0.49	4.31	29.83	2004
0.52	5.46	32.39	2005
0.48	4.72	24.55	2006
0.2	6.8	30.02	2007
0.13	5.21	31	2008
0.53	6.02	29.1	2009
0.41	6.39	35.6	2010
0.31	5.71	26.07	2011
0.37	10.03	33.2	2012
0.82	5.04	30.44	2013
0.73	4.63	30.63	2014
0.38	6.81	32.29	2015
0.83	4.96	33.66	2016
0.83	7.23	36.78	2017
0.44	4.67	29.8	2018
0.8	5.76	34.34	2019
0.18	5.25	11.47	2020


Annual Precipitation 2000-2019
Inches of Precipitation
40
30
20
10
0
31.34
30.22
31.17
24.96
29.83
32.39
24.55
30.02
31
29.1
26.07
33.2
30.4
30.63
32.29
33.66
29.8
34.34
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

Average Monthly Temperature in Fahrenheit

Minimum	Maximum	Annual	Year
4.4	64.7	39.6	2000
7.7	67	41.3	2001
17.8	69	39.6	2002
9	67.6	39.3	2003
3.9	63.4	39	2004
7.7	67.6	40.8	2005
11.8	71.9	42.8	2006
7.9	67.4	40.6	2007
7	64.4	37.9	2008
3.3	62.2	39	2009
10.6	69	41.8	2010
7.1	69.8	40.7	2011
18	71.9	44	2012
4.6	69	39	2013
1.6	66.3	37.4	2014
5.2	69.2	42.4	2015
12.8	67.5	42.7	2016
10.5	65.3	40.5	2017
10.3	69.1	40.1	2018
7.6	71.1	39.9	2019
14.4	69.9	40.4	2020


Average Temperature 2000-2019
Temperature (Degrees Fahrenheit)
50
40
30
20
10
0
39.6
41.3
39.6
39.3
39
40.8
42.8
40.6
37.9
39
41.8
40.7
44
39
37.4
42.4
42.7
40.5
40.1
39.9
40.4
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

APPENDIX L

TEACHING TOOL

Script for Lesson 14

Appendix L

Script for Lesson 14

Picture yourself walking alone on a beautiful, sunshine day in the forest. It's a cool, fall day, the type of weather where you only need a light hoodie, and even then you're warm. There's a dirt path, just big enough for you to walk on, that leads to some tall trees deep in the woods. You follow the path and the only sounds you hear are the sound of song birds. Every now and then you hear a branch snapping from a squirrel...or maybe it's a deer. You can hear it run off as you get closer to it. Overhead you can see the sun shining through the leaves as the wind gently runs through the treetops. The light makes the leaves a bright green color which contradicts the dark color of the tree bark. You keep walking down the dirt path, far into the forest to the patch of your favorite tree. A peaceful quiet welcomes you to the forest. As you sit down under your favorite tree, you take a deep breath in and let your shoulders drop as you let the breath out. You think about the terrible storms, freezing cold winters, blistering hot summers, and the endless pests that have made the tree's life challenging. But yet, the tree stays rooted, tall and strong while still being gentle enough to let its leaves dance in the wind.You are at peace among the trees and you listen closely to the wind rushing through the trees. As you listen even closer, you hear the sound of whispering through the trees. These are words you once told the trees that the trees now want you to hear: (read off notecards the participants created in Adventure 13). Sometimes you'll find the answers to your questions in the whispering wind in the treetops. Sometimes, you'll find the peace, support, and love you seek while sitting next to a tall tree in the forest. When you find yourself in times of sadness, anger, confusion, or uncertainty, tell it to the trees.

APPENDIX M

DOCUMENTATION

Roles of Approval for Study at Woodland Hills-Signed Copy

Appendix M

Approval for Study at Woodland Hills-Signed Copy

Approval for Study at Woodland Hills

In signing this document, we agree upon the following conditions and approve that Ariel Johnson, graduate student with Hamline University, may conduct a study to meet the requirements for the Master of Art in Education: Natural Sciences and Environmental Education thesis:

- Participant data will be stored in an external hard drive. All journals/handwritten artifacts will be scanned into a PDF document or uploaded as a picture to the external drive before being deleted from the researcher's data collecting technology. All pictures taken during the meeting will also be uploaded to the external drive before being deleted from the researcher's data collecting technology. This will take place immediately after each meeting. All data will have identifiable features/information blurred or replaced with the participant's number prior to being used, analyzed, or shared in a separate folder for the purpose of publication of the study. Each participant will have a number to keep from mixing up data, but only the researcher will have the document that provides the number and participant name. All data in the external drive will be deleted within six months of the study being published and the researcher having graduated.
- The Unit Manager will provide observations of participants which will also be uploaded to the external drive and will be deleted from emails/scans of the original document immediately after each meeting.
- Woodland Hills is responsible for providing the researcher with information on policies and procedures to ensure the safety of all participants.
- Woodland Hills is responsible for ensuring the safety of participants and, in the event of an emergency involving a participant, will be responsible for contacting the parents/guardians and tending to the needs of the participant.
- The researcher will provide all lessons, activities, handouts, resources, and draft of the thesis if required by Woodland Hills to discuss the involvement of the participants or to discuss the study.
- The contents of the external drive may be shared with management staff if required by Woodland Hills, with the understanding that all data will be deleted within six months of the study being published and the researcher having graduated.
- Woodland Hills can terminate the study at any time with proper notice and a description of the reason for termination of the study.
- Any additional questions, concerns, or comments can be brought to the researcher:
    - Ariel Johnson, ajohnson134@hamline.edu or (715) 817-0690

Researcher's Signature: Ariel D [signature] Date: 11/3/2020

Woodland Hills Representative Name/Title: B **(name omitted for confidentiality purposes)**

Woodland Hills Representative Signature: [signature]

APPENDIX N

DOCUMENTATION

Roles of Unit Manager and Researcher-Signed Copy

Appendix N

Roles of Unit Manager and Researcher-Signed Copy

Roles of Unit Manager and Researcher

By signing this document, we agree to the following roles and responsibilities of the Unit Manager and the Researcher for the duration of the study by the researcher, Ariel Johnson, at Woodland Hills in Duluth, MN.

Role/Responsibilities of Unit Manager

- Inform researcher of policies and procedures of Woodland Hills to ensure the safety, comfort, and inclusion of all participants
- In the case of an emergency involving a participant, follow Woodland Hills' policies and procedures to tend to the needs of the participant
- Provide supervision of participants in accordance with Woodland Hills' policies and procedures during each meeting
- Ensure that Unit Manager or other Woodland Hills staff is present for each meeting
- Communicate with the researcher on details of meeting times/locations and ensure proper equipment is prepared prior to meeting (includes but is not limited to a room for the meeting and projector with screen and hook-ups.)
- Provide updates to the researcher regarding policy or procedure changes, scheduling changes, or changes with participants
- Send consent forms to parent/guardians and collect forms to provide to researcher
- Provide written observations to answer provided questions (Observation Questions) for each meeting

Role/Responsibilities of the Researcher

- Become familiar with policies and procedures of Woodland Hills to ensure the safety, comfort, and inclusion of all participants
- In the case of emergency involving a participant, assist Woodland Hills' staff in handling the issue and maintaining safety for participants
- Communicate with Unit Manager on details of meeting times/locations and provide additional tools/resources/hand-outs, laptop, and snacks for the participants
- Provide consent forms for parents/guardians to complete
- Provide engaging and educational lessons and activities to promote personal growth for participants
- Provide, if required, all lessons, handouts, resources, and draft of thesis if needed by Woodland Hills or by the Unit Manager to discuss the study and involvement of participants
- Be respectful of all Woodland Hills staff and participants, their time, and their culture
- Follow up with Unit Manager after study has been published and after researcher has graduated to confirm complete deletion of confidential information of participants

Researcher's Signature: Ariel D [illegible] Date: 11/3/2020

Unit Manager's Signature: [illegible] Date: 11/3/2020

APPENDIX O

DOCUMENTATION

Informed Consent to Participate in Research Form-Participant (Blank)

Appendix O

Informed Consent to Participate in Research Form-Participant (Blank)

Hamline University
Institutional Review Board has approved this consent form.
IRB approval # 2020-10-114F
Approved: 10/2/2020
Expires one year from above approval date.

HAMLINE UNIVERSITY

Informed Consent to Participate in Research

You are being asked to participate in a research study. This form provides you with information about the study. The student researcher or faculty researcher (Principal Investigator) will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions.

This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research participant.

- If you have any questions about or do not understand something in this form, you should ask the research team for more information.
- You should feel free to discuss your potential participation with anyone you choose, such as family or friends, before you decide to participate. ● Do not agree to participate in this study unless the research team has answered your questions and you decide that you want to be part of this study. ● Your participation is entirely voluntary, and you can refuse to participate or withdraw at any time.

Title of Research Study: Connecting Youth to Place: Using Restorative Practices to Improve Learner Awareness of Local Climate Change

Student Researcher and email address: Ariel Johnson, ajohnson134@hamline.edu

Principal Investigator Hamline affiliation/title, phone number(s), and email address:
Ariel Johnson, student researcher, (715) 817-0690,
ajohnson134@hamline.edu

1. **What is the research topic, the purpose of the research, and the rationale for why this study is being conducted?** The research topic is studying the question "How can connecting youth to place improve learner awareness of local climate change and be used as a method for restorative practices?" The purpose is to determine if blending outdoor education and restorative practices will support the youth by providing them with an opportunity to reflect about their interactions with nature and their community, and to help them learn about the local environment. Through the activities, the hope is that the youth will feel a sense of empowerment through stewardship as they connect with the natural world in the place they interact. The circle talks will provide a guided reflection about their experiences and understanding after the activities. The rationale is that restorative practices have been used to support youth to rebuild relationships and strengthen communication skills and connecting youth to place helps to increase awareness of the environment. Therefore, the hope is that students will be empowered to become stewards of the environment to address issues regarding local climate change.

2. What will you be asked to do if you decide to participate in this research study? Participants will be asked to participate in each of the 14 meetings which will include approximately 25 minutes of lesson, 35 minutes of outdoor activities, and 30 minutes of circle reflections/End-of-Week Questionnaire. This includes providing input during discussions during lessons and circle talks, completing the surveys, questionnaires, reflection journals, and daily activities. Activities will be done both indoors and outdoors, provided the weather conditions pose no physical threat to the youth. Participants will be asked to dress appropriately so they will be comfortable being outside. Participants who struggle with writing or would prefer to record video/audio of their reflections may do so if they choose. Audio and written notes from the researcher will be taken of the final interview.

3. What will be your time commitment to the study if you participate? The time commitment for the study will be 14 meetings with each meeting being approximately an hour and a half.

4. Who is funding this study? This study is being conducted without funding. Any expenses will be the responsibility of the researcher.

5. What are the possible discomforts and risks of participating in this research study? By participating in this study, there is a small chance of feeling uncomfortable during circle talks where participants will reflect on their experiences from the activities, or when engaging in outdoor activities. Participants are encouraged to participate in these discussions and activities, but, if at any time a participant feels uncomfortable, they have the right to refrain or pass the opportunity to share their thoughts or emotions. The researcher will be sure to discuss how to be safe while outside and will work with the Unit Manager of Woodland Hills to ensure and create a safe and inclusive atmosphere for all participants. The loss of confidentiality is always a risk, but measures are being taken to avoid loss of confidentiality to protect the participants. With any outdoor activities, there is always the risk of minor injury from tripping/falling, the risk of insect bites/stings, the risk of allergic reactions to insects or plants, the risk of sunburn, the risk of being uncomfortable due to temperatures, and the possibility that participants may get caught in the rain. Please know that all efforts will be made to reduce the risks of going outside and that participants will not be expected to participate in outdoor activities during severe weather conditions or rainstorms. In addition, there may be risks that are currently unknown or unforeseeable. Please contact me at ajohnson134@hamline.edu or at (715) 817-0690, or contact Woodland Hills to discuss this if you wish. In the case that a participant experiences an emotional distress or is in need of mental health services in response to the study, you can contact the following:

- Unit Manager
  - i. The Hills Youth and Family Services
  - ii. 4321 Allendale Avenue, Duluth, MN 55803-1562
  - iii. 218.623.6452
- Duluth Counseling Center
  - i. 1420 London Road, Suite 204, Duluth, MN 55805
  - ii. 218.249.0595
- Northwoods Children's Services
  - i. Main Campus, 714 W. College Street, Duluth, MN 55811

1. (218) 724-8815

ii. West Campus, 4000 West 9th Street, Duluth, MN 55807

1. (218) 628-0237

It is recommended that participants first contact the Unit Manager who will have resources from Woodland Hills to provide assistance that is best suited for the participants given the nature of the participant's relationship with Woodland Hills. In the unlikely case of an emergency, Woodland Hills will be responsible for contacting parents/guardians and tending to the needs of the participant, including determining the appropriate health services facility to use in case of any physical injury.

6. **How will your privacy and the confidentiality of your data and research records be protected?** Participant data will be stored in an external hard drive. All journals, surveys, questionnaires, pictures, audio, and videos (if youth choose to make videos instead of writing reflections) will be stored in the external hard drive once all identifiable features have been blurred or names have been replaced with the participant's number. Each participant will have a number to keep from mixing up data, but only the researcher will have the document that provides the number and participant name. All data on the hard drive will be deleted within six months of the study being published and the researcher having graduated. The researcher is required to follow Woodland Hills's policies regarding safety and confidentiality of all youth at Woodland Hills. All policies and procedures of Woodland Hills will be followed by the researcher to ensure the protection of the rights and welfare of the participants. One requirement of this is that as a guest speaker at Woodland Hills, any documents, audio, pictures, data, or other files can be requested by Woodland Hills at any time.

7. **How many people will most likely be participating in this study, and how long is the entire study expected to last?** There are going to be 8-15 participants in the study, depending on the number assigned to the Unit Manager. The entire study will be over the course of less than two months depending on the schedules and needs of the participants and of Woodland Hills.

8. **What are the possible benefits to you and/or to others from your participation in this research study?** The benefits to you will include snacks provided at each meeting, being able to socialize with your peers, getting to experience safe, welcoming, and enjoyable outdoor activities, and learning about our local climate and plant species. Further benefits include providing a sense of empowerment through stewardship, developing communication skills, and having a sense of place in the community and the environment. The data may provide valuable information for Woodland Hills to better support their youth and may drive the need for future guest speakers, educational programs, or other external resources for the youth.
9. **If you choose to participate in this study, will it cost you anything?** No, this study requires no monetary cost.

10. **Will you receive any compensation for participating in this study?** Participants will be given snacks of their choosing (decided as a collective and by majority vote from the participants) for each session. These snacks will be store-bought by the researcher.

11. **What if you decide that you do not want to take part in this study? What other options are available to you if you decide not to participate or to withdraw?** Your participation in this study is entirely voluntary. You are free to refuse to participate in the study, and your

refusal will not impact your relationships with Hamline University or with Woodland Hills. In addition, if significant new findings develop during the course of the research that may affect your willingness to continue participation, we will provide that information to you.

12. **How can you withdraw from this research study, and who should you contact if you have any questions or concerns?** You are free to stop participating in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop your participation in this research study for any reason, you should tell me, or contact me at ajohnson134@hamline.edu or at (715)-817- 0690. You should also call or email for any questions, concerns, suggestions, or complaints about the research and your experience as a participant in the study. You may also speak to my faculty advisor, Dr Patty Born Selly at 612 501 5179 or pselly01@hamline.edu**.** In addition, if you have questions about your rights as a research participant, please contact the Institutional Review Board at Hamline University at IRB@hamline.edu.

13. **Are there any anticipated circumstances under which your participation may be terminated by the researcher(s) without your or your parent/guardian's consent?** Your participation in the study would only end if you are no longer receiving services from Woodland Hills during the time of the study.

14. **Will the researchers benefit from your participation in this study?** The researcher will not benefit from your participation in this study beyond the publication and/or presentation of the results obtained from the study.

15. **Where will this research be made available once the study is completed?** The research is public scholarship and the abstract and final product will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository and that it may be published or used in other ways, such as in conference presentations or published in research journals.

16. **Has this research study received approval from Woodland Hills where the research will be conducted?** Yes.

17. **Will your information be used in any other research studies or projects?** No - your information will not be used in or distributed for future research studies.

18. **What safety measures are in place regarding the COVID-19 Pandemic?** Due to the pandemic, all youth, the researcher, and the Unit Manager will be following the safety guidelines put in place by the Minnesota Department of Health and the Center for Disease Control to protect the health and safety of all involved. This includes, but is not limited to, wearing face masks, maintaining a social distance of six feet, washing hands regularly or using hand sanitizer, and staying home when feeling ill. If a stay-at-home order is put in place, the study may be completed virtually.

PARTICIPANT COPY

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study: *Connecting Youth to Place: Using Restorative Practices to Improve Learner Awareness of Local Climate Change*

_____
(Printed name of person obtaining consent)

_____ Date:_____
(Signature of person obtaining consent)

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this Form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

Name of Participant _____ Signature of Participant

_____ Date: _____

Photograph or Video Consent:

As a part of your participation as a volunteer in this scientific research study, you may be photographed during the course of this experiment. Any photographs of your performance (without your name or likeness revealed) may be shown to educational audiences, such as conferences. Your consent to be photographed is independent of your consent to participate in this study. If you have any questions about this consent, you can contact Ariel Johnson (ajohnson134@hamline.edu) or my faculty advisor Dr. Patty Born Selly pselly01@hamline.edu. By signing below, you hereby give permission for any photographs or videotapes made during the course of this research study to be also used for educational purposes. Your identity and face will be blurred or not shown/revealed if photographs or videos are used for any of the above purposes.

Signature of Participant _____ Date: _____

INVESTIGATOR COPY OF PARTICIPANT FORM
(Duplicate signature page for researcher's records)

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study: *Connecting Youth to Place: Using Restorative Practices to Improve Learner Awareness of Local Climate Change*

_____
(Printed name of person obtaining consent)

_____ Date:_____
(Signature of person obtaining consent)

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Signature of Participant _____ Date: _____

APPENDIX P

DOCUMENTATION

Informed Consent to Participate in Research Form-Parent/Guardian (Blank)

Appendix P

Informed Consent to Participate in Research Form-Parent/Guardian (Blank)

Hamline University
Institutional Review Board has approved this consent form.
IRB approval # 2020-10-114F
Approved: 10/2/2020
Expires one year from above approval date.

HAMLINE UNIVERSITY

Informed Consent to Participate in Research

You are being asked to participate in a research study. This form provides you with information about the study. The student researcher or faculty researcher (Principal Investigator) will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions.

This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research participant.

- If you have any questions about or do not understand something in this form, you should ask the research team for more information.
- You should feel free to discuss your potential participation with anyone you choose, such as family or friends, before you decide to participate. ● Do not agree to participate in this study unless the research team has answered your questions and you decide that you want to be part of this study. ● Your participation is entirely voluntary, and you can refuse to participate or withdraw at any time.

Title of Research Study: Connecting Youth to Place: Using Restorative Practices to Improve Learner Awareness of Local Climate Change

Student Researcher and email address: Ariel Johnson, ajohnson134@hamline.edu

Principal Investigator Hamline affiliation/title, phone number(s), and email address:
Ariel Johnson, student researcher, (715) 817-0690,
ajohnson134@hamline.edu

1. **What is the research topic, the purpose of the research, and the rationale for why this study is being conducted?** The research topic is studying the question "How can connecting youth to place improve learner awareness of local climate change and be used as a method for restorative practices?" The purpose is to determine if blending outdoor education and restorative practices will support the youth by providing them with an opportunity to reflect about their interactions with nature and their community, and to help them learn about the local environment. Through the activities, the hope is that the youth will feel a sense of empowerment through stewardship as they connect with the natural world in the place they interact. The circle talks will provide a guided reflection about their experiences and understanding after the activities. The rationale is that restorative practices have been used to support youth to rebuild relationships and strengthen communication skills and connecting youth to place helps to increase awareness of the environment. Therefore, the hope is that students will be empowered to become stewards of the environment to address issues regarding local climate change.

2. What will you be asked to do if you decide to participate in this research study? Participants will be asked to participate in each of the 14 meetings which will include approximately 25 minutes of lesson, 35 minutes of outdoor activities, and 30 minutes of circle reflections/End-of-Week Questionnaire. This includes providing input during discussions during lessons and circle talks, completing the surveys, questionnaires, reflection journals, and daily activities. Activities will be done both indoors and outdoors, provided the weather conditions pose no physical threat to the youth. Participants will be asked to dress appropriately so they will be comfortable being outside. Participants who struggle with writing or would prefer to record video/audio of their reflections may do so if they choose. Audio and written notes from the researcher will be taken of the final interview.

3. What will be your time commitment to the study if you participate? The time commitment for the study will be 14 meetings with each meeting being approximately an hour and a half.

4. Who is funding this study? This study is being conducted without funding. Any expenses will be the responsibility of the researcher.

5. What are the possible discomforts and risks of participating in this research study? By participating in this study, there is a small chance of feeling uncomfortable during circle talks where participants will reflect on their experiences from the activities, or when engaging in outdoor activities. Participants are encouraged to participate in these discussions and activities, but, if at any time a participant feels uncomfortable, they have the right to refrain or pass the opportunity to share their thoughts or emotions. The researcher will be sure to discuss how to be safe while outside and will work with the Unit Manager of Woodland Hills to ensure and create a safe and inclusive atmosphere for all participants. The loss of confidentiality is always a risk, but measures are being taken to avoid loss of confidentiality to protect the participants. With any outdoor activities, there is always the risk of minor injury from tripping/falling, the risk of insect bites/stings, the risk of allergic reactions to insects or plants, the risk of sunburn, the risk of being uncomfortable due to temperatures, and the possibility that participants may get caught in the rain. Please know that all efforts will be made to reduce the risks of going outside and that participants will not be expected to participate in outdoor activities during severe weather conditions or rainstorms. In addition, there may be risks that are currently unknown or unforeseeable. Please contact me at ajohnson134@hamline.edu or at (715) 817-0690, or contact Woodland Hills to discuss this if you wish. In the case that a participant experiences an emotional distress or is in need of mental health services in response to the study, you can contact the following:

- Unit Manager
  - i. The Hills Youth and Family Services
  - ii. 4321 Allendale Avenue, Duluth, MN 55803-1562
  - iii. 218.623.6452
- Duluth Counseling Center
  - i. 1420 London Road, Suite 204, Duluth, MN 55805
  - ii. 218.249.0595
- Northwoods Children's Services
  - i. Main Campus, 714 W. College Street, Duluth, MN 55811

1. (218) 724-8815

ii. West Campus, 4000 West 9th Street, Duluth, MN 55807

1. (218) 628-0237

It is recommended that participants first contact the Unit Manager who will have resources from Woodland Hills to provide assistance that is best suited for the participants given the nature of the participant's relationship with Woodland Hills. In the unlikely case of an emergency, Woodland Hills will be responsible for contacting parents/guardians and tending to the needs of the participant, including determining the appropriate health services facility to use in case of any physical injury.

6. How will your privacy and the confidentiality of your data and research records be protected? Participant data will be stored in an external hard drive. All journals, surveys, questionnaires, pictures, audio, and videos (if youth choose to make videos instead of writing reflections) will be stored in the external hard drive once all identifiable features have been blurred or names have been replaced with the participant's number. Each participant will have a number to keep from mixing up data, but only the researcher will have the document that provides the number and participant name. All data on the hard drive will be deleted within six months of the study being published and the researcher having graduated. The researcher is required to follow Woodland Hills's policies regarding safety and confidentiality of all youth at Woodland Hills. All policies and procedures of Woodland Hills will be followed by the researcher to ensure the protection of the rights and welfare of the participants. One requirement of this is that as a guest speaker at Woodland Hills, any documents, audio, pictures, data, or other files can be requested by Woodland Hills at any time.

7. How many people will most likely be participating in this study, and how long is the entire study expected to last? There are going to be 8-15 participants in the study, depending on the number assigned to the Unit Manager. The entire study will be over the course of less than two months depending on the schedules and needs of the participants and of Woodland Hills.

8. What are the possible benefits to you and/or to others from your participation in this research study? The benefits to you will include snacks provided at each meeting, being able to socialize with your peers, getting to experience safe, welcoming, and enjoyable outdoor activities, and learning about our local climate and plant species. Further benefits include providing a sense of empowerment through stewardship, developing communication skills, and having a sense of place in the community and the environment. The data may provide valuable information for Woodland Hills to better support their youth and may drive the need for future guest speakers, educational programs, or other external resources for the youth.

9. If you choose to participate in this study, will it cost you anything? No, this study requires no monetary cost.

10. Will you receive any compensation for participating in this study? Participants will be given snacks of their choosing (decided as a collective and by majority vote from the participants) for each session. These snacks will be store-bought by the researcher.

11. What if you decide that you do not want to take part in this study? What other options are available to you if you decide not to participate or to withdraw? Your participation in this study is entirely voluntary. You are free to refuse to participate in the study, and your

refusal will not impact your relationships with Hamline University or with Woodland Hills. In addition, if significant new findings develop during the course of the research that may affect your willingness to continue participation, we will provide that information to you.

12. **How can you withdraw from this research study, and who should you contact if you have any questions or concerns?** You are free to stop participating in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop your participation in this research study for any reason, you should tell me, or contact me at ajohnson134@hamline.edu or at (715)-817- 0690. You should also call or email for any questions, concerns, suggestions, or complaints about the research and your experience as a participant in the study. You may also speak to my faculty advisor, Dr Patty Born Selly at 612 501 5179 or pselly01@hamline.edu**.** In addition, if you have questions about your rights as a research participant, please contact the Institutional Review Board at Hamline University at IRB@hamline.edu.

13. **Are there any anticipated circumstances under which your participation may be terminated by the researcher(s) without your or your parent/guardian's consent?** Your participation in the study would only end if you are no longer receiving services from Woodland Hills during the time of the study.

14. **Will the researchers benefit from your participation in this study?** The researcher will not benefit from your participation in this study beyond the publication and/or presentation of the results obtained from the study.

15. **Where will this research be made available once the study is completed?** The research is public scholarship and the abstract and final product will be cataloged in Hamline's Bush Library Digital Commons, a searchable electronic repository and that it may be published or used in other ways, such as in conference presentations or published in research journals.

16. **Has this research study received approval from Woodland Hills where the research will be conducted?** Yes.

17. **Will your information be used in any other research studies or projects?** No - your information will not be used in or distributed for future research studies.

18. What safety measures are in place regarding the COVID-19 Pandemic? Due to the pandemic, all youth, the researcher, and the Unit Manager will be following the safety guidelines put in place by the Minnesota Department of Health and the Center for Disease Control to protect the health and safety of all involved. This includes, but is not limited to, wearing face masks, maintaining a social distance of six feet, washing hands regularly or using hand sanitizer, and staying home when feeling ill. If a stay-at-home order is put in place, the study may be completed virtually.

PARENT/GUARDIAN COPY

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study: *Connecting Youth to Place: Using Restorative Practices to Improve Learner Awareness of Local Climate Change*

_____
(Printed name of person obtaining consent)

_____ Date:_____
(Signature of person obtaining consent)

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this Form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to allow your child to participate in this study. By signing this form, you are not waiving any of your legal rights.

Name of Participant _____ Printed Name of

Parent/Guardian_____ Signature of Parent/Guardian

_____ Date: _____

Photograph or Video Consent:

As a part of your participation as a volunteer in this scientific research study, your child may be photographed during the course of this experiment. Any photographs of your child's performance (without name or likeness revealed) may be shown to educational audiences, such as conferences. Your consent to allow your child to be photographed is independent of your consent to participate in this study. If you have any questions about this consent, you can contact Ariel Johnson (ajohnson134@hamline.edu) or my faculty advisor Dr. Patty Born Selly pselly01@hamline.edu. By signing below, you hereby give permission for any photographs or videotapes made during the course of this research study to be also used for educational purposes. Your child's identity and face will be blurred or not shown/revealed if photographs or videos are used for any of the above purposes.

Signature of Parent/Guardian _____ Date: _____

INVESTIGATOR COPY OF PARENT/GUARDIAN FORM
(Duplicate signature page for researcher's records)

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Signature of Parent/Guardian _____ Date: _____

APPENDIX Q

RESULTS

Observations from the Researcher

Appendix P

Observations from the Researcher

- Session 1-total numerical significance: +5
    - Negative (4 total): instigate (x2), disruptive, rowdy
    - Neutral (9 total): questions (x2), quiet (x2), chatty, hyper, silent during circle talk, wanted to know, wanted to share
    - Positive (9 total): care, connected, consoled, observant, reflected on experiences, settled down, share story, support, thoughtful
- Session 2-total numerical significance: -1
    - Negative (5 total): frustrated/wouldn't quiet down, staying inside/depressed, staying inside/sad, tensions high, verbally aggressive
    - Neutral (8 total): change, climate, cold, environment, felt bad, mental health, outspoken, winter/worried
    - Positive (4 total):apologized, change happens, getting outside/feel better, walk outside/calm/relaxed
- Session 3-total numerical significance: +13
    - Neutral (23 total): trees (x4), new things (x2), see trees differently (x2), contributions, curious, felt depressed before session, input, interactive, learn, learned, learning, notice more, observations, previous experiences, prior interactions, recognized, thoughtful, unique
    - Positive (13 total): beautiful trees (x2), excited (x2), appreciate, calm, comfort, connected, feels better, good questions, helped, joy, reflect
- Session 4-total numerical significance: +15
    - Neutral (15 total): worldwide climate change (x2), acknowledge, comments, explain, getting warmer, hear everyone, ice melting, learning, more flooding locally, more snow locally, noticed, observations, observe, pollution is bad
    - Positive (15 total): enjoy (x3), appreciate, be outside more, can take care of world, connecting to nature, feel connected, feel responsible, good ideas, happier, included, peace, take care of nature, want to do more
- Session 5-total numerical significance: +6
    - Negative (3 total): depression, doesn't like outside, left out
    - Neutral (8 total): learn (x3), quiet (x3), notice natural world, reserved
    - Positive (9 total):excited (x2), appreciate outdoors, grown connected, happy, hope to share, opened eyes to nature, sessions helped, want to go outside
- Session 6-total numerical significance: +4
    - Neutral (7 total): focused (x2), identifying tree families, on their own, reserved, reflections, observations of trees
    - Positive (4 total): excited, insightful, good understanding, inspired
- Session 7-total numerical significance: +8
    - Neutral (7 total): identifying trees, learn, more knowledge, sharing, when sad/look outside, look at trees, trees are living things
    - Positive (8 total):excited (x3), challenge themselves, changed perspectives, changed life, trees are important, trees are unique
- Session 8-total numerical significance: +4
    - Neutral (8 total): comparing trees to people (x2), personified trees (x2), noticed, learn, outspoken, make others listen
    - Positive (4 total): happy, wanted to talk about trees, enjoyed outside, learned to listen
- Session 9- total numerical significance: +5
    - Neutral (11 total): surprised (x2), relate, asked, curious, personify trees, relate to trees, see, lot of challenging years, inquisitive, questioning
    - Positive (5 total): excited, thoughtful, trees are cool, more connected to trees, empathetic to nature
- Session 10-total numerical significance: +9
    - Neutral (10 total): comparison, realized (x2), living things face challenges (x2), questions, comparing to lives of trees (x2), reflect on experiences, reflected
    - Positive (9 total): connected with trees (x2), have good times, leadership, helped, assist in understanding, connected, leader, noticed good times
- Session 11-total numerical significance: +5
    - Negative (2 total): felt dumb, forgotten
    - Neutral (15 total): wondered (x2), trees, climate change, realized, tree cookies, tell us about trees, quieter, learned, comparing, express feelings, everyone forgets, involved, interested, help remember, don't give up
    - Positive (7 total): connected, connection, felt comfortable, reassured, support, encourage, love nature

- Session 12-total numerical significance: +6
    - Negative (1 total): worried
    - Neutral (10 total): theories, tree survival, different climate, climate change harms trees, concerned about climate and future (x2), have questions about future, concerned about trees, questioning, want to know
    - Positive (7 total): trees will survive, optimistic, want to learn (x2), concerned but optimistic, help environment, connections
- Session 13: total numerical significance: +12
    - Neutral (25 total): felt upset in response to The Lorax, felt angry in response to The Lorax, felt hateful in response to The Lorax, felt negative emotions in response to The Lorax, climate change, deforestation, pests, trees (x2), connecting to real life, planting trees (x2), talkative, seems bad, connections (x2), people, climate, interconnected, noticed, reflections (x2), concerned about the future, concerned about the environment, bigger picture
    - Positive (12 total): optimistic (x2), influential (x2), helpful (x2), positive side, can be changes to be positive, do better, empowerment, lead by example, change can happen
- Session 14: total numerical significance: +9
    - Neutral (11 total): quiet (x2), reflective, insightful, calm, insight, learned, realizations, reflections, impact, curiosity
    - Positive (9 total): make a change (x2), love outdoors, emphasized good things can happened, sessions have been helpful, lead by example, hope, can do something, peace

APPENDIX R

RESULTS

Observations from the Unit Manager

Appendix R

Observations from the Unit Manager

- Session 1-total numerical significance: +8
    - Neutral (3 total): curiosity, struggled to sit still, needed redirection
    - Positive (8 total): excitement, love to meet new people, love to learn new things, share, calmer after session, more focused after session, calm, first smooth bed time all week
- Session 2-total numerical significance: -9
    - Negative (10 total): disruption, agitation (x2), underlying social drama, argued constantly, further arguments, shouting, drama, fixated on fighting, fixated on arguing
    - Positive (1 total): inclusion of new participant
- Session 3-total numerical significance: +10
    - Neutral (2 total): goofing around, redirection
    - Positive (10 total): high energy, excitement, engaged, eager to learn, expressed learning new things, new level of focus, able to concentrate, smooth transition, heightened level of respect, heightened level of compliance
- Session 4-total numerical significance: +7
    - Neutral (4 total): understanding, less social posturing, expressed learning, relate the topic of climate change to their own lives
    - Positive (7 total): more participation, higher level of focus, active engagement, higher engagement, focused attention, calmer, more focused
- Session 5-total numerical significance: +5
    - Neutral (2 total): goofiness, goofy
    - Positive (5 total): excitement, look forward to session, excited, wanting to learn, positive
- Session 6-total numerical significance: +4
    - Neutral (4 total): struggled to pay attention, goof around, redirection, reminders to focus
    - Positive (4 total): able to focus, positive moods, calmer, more settled
- Session 7-total numerical significance: +4
    - Neutral (3 total): able to participate, less goofing around, high energy level
    - Positive (4 total): calming effect, heightened level of focus, eagerness to learn, eagerness to participate
- Session 8-total numerical significance: +6
    - Neutral (2 total): pulls from experience, goofiness
    - Positive (6 total): more invested, build off one another, connection, increase in focus, desire to learn, less disruptive after session
- Session 9-total numerical significance: +1
    - Neutral (4 total): goof around, redirection, attempted to "front" for new participant
    - Positive (1 total): do better
- Session 10-total numerical significance: +4
    - Neutral (5 total): more subdued, high energy, reserved, awkward, indifferent
    - Positive (4 total): calm, calmer, more settled, having something in nature to focus on seemed to help (ease stress)
- Session 11-total numerical significance: +4
    - Negative (1 total): expressed frustration
    - Neutral (4 total): incredulity, curiosity, active, struggling to remember
    - Positive (5 total): learning, involved, expressed surprise, positive before/during/after, calm before/during/after
- Session 12: no data, no observations taken
- Session 13-total numerical significance: +8
    - Positive (8 total): extreme excitement, full participation, focus, positive, excited, calming effect even after session, overall calmer, fronting behavior lessened
- Session 14-total numerical significance: -5
    - Negative (5 total): sadness for end of sessions (x2), frustration for end of sessions, sad for last session, agitation with return of one participant
    - Neutral (3 total): indifferent, little emotion, heightened emotions

APPENDIX S

RESULTS

Circle Talk Responses from Participants

Appendix S

Circle Talk Responses from Participants

- Session 1-focus was on creating a space, understanding, and community agreements for circle talks. No data collected
- Session 2-no circle talk conducted, no data collected
- Session 3-numerical significance value: +5
    - Neutral (3 total): depressed before, never knew, still don't like the outdoors
    - Positive (5 total): feeling better, wow, changed, look at trees differently, like trees more
- Session 4-numerical significance value: +19
    - Negative (1 total): still don't like outside
    - Neutral (2 total): didn't know (x2)
    - Positive (20 total): feel acknowledged, learned (x2), feel educated (x2), good, connect, cool, changed (x3), realize, learn (x3), need to take care of nature, fun, want to get outside, taking care of the world, make the world better
- Session 5-numerical significance value: +13
    - Negative (1 total): environment is being killed off
    - Neutral (4 total): knowledge, environment not taken care of, look at trees, climate is changing
    - Positive (14 total): changed (x2), happy, feel smarter, like the wilderness, enjoy learning, like the sessions, it's helping, want to go outside, really good, learning more, opening my eyes, watching more, realize
- Session 6-numerical significance value: +6
    - Neutral (1 total): feel different
    - Positive (6 total): feel better, noticed, want to look at leaves more, want to be outside more, changed (x2)
- Session 7-numerical significance value: +13
    - Neutral (8 total): change, knowledge, look at trees (x2), trees are living, trees are like us, something to do when sad or depressed, look at natural world
    - Positive (13 total): feel great, like learning about trees, more peer participation, love trees (x3), felt good, changed (x2), realize, changed my life (x2), changed perspective of natural world
- Session 8-numerical significance value: +12
    - Neutral (2 total): circle of life, keep learning more
    - Positive (12 total): like outside, like looking at trees, feel great, feel happy, want to talk about trees more, appreciate trees, changed (x3), realize, really like trees (x2)
- Session 9-numerical significance value: +10
    - Neutral (1 total): knowledge
    - Positive (10 total): know more, cool, changed, help, feel connected, like learning about trees
- Session 10-numerical significance value: +10
    - Neutral (8 total): different, never knew, nature can heal, trees are like humans, everyone goes through things, trees can heal, climate change (x2)
    - Positive (10 total): cool (x2), more considerate of trees, realization, realize I have scars but also good times, changed (x2), look outside a lot, want to see more about trees, think more about living things in nature
- Session 11-numerical significance value: +6
    - Neutral (4 total): refresher, learned before, look outside, trees have life
    - Positive (6 total): like trees, nature is fun, getting more knowledge, changed (x2), love nature
- Session 12-numerical significance value: +6
    - Neutral (3 total): didn't know, trees have tolerances, good that trees do
    - Positive (6 total): changed (x4), know more, excited to learn about trees
- Session 13-numerical significance value: +7
    - Neutral (4 total): trees can feel things, didn't know, climate change, save water
    - Positive (7 total): happy, feel good, be considerate of trees, changed (x3), learned a lot
- Session 14-no circle talk conducted, no data collected

APPENDIX T

RESULTS

Circle Talk Responses by Topic

Appendix T

Circle Talk Responses by Topic

Key

Connection: Connection to Place Climate: Climate Change
Learner: Learner Awareness Practice: Restorative Practices

Words/Phrases not associated with a specific topic or topics were omitted

Frequency	Word/Phrase	Topic(s)
1	climate is changing	climate
3	climate change	climate
3	look at trees	connection
3	love trees	connection
2	really like trees	connection
1	appreciate trees	connection
1	circle of life	connection
1	excited to learn about trees	connection
1	like looking at trees	connection
1	like outside	connection
1	like the wilderness	connection
1	like trees	connection
1	like trees more	connection
1	look at natural world	connection
1	look at trees differently	connection
1	look outside	connection
1	look outside a lot	connection
1	love nature	connection
1	nature is fun	connection
1	good that trees do	connection
1	save water	connection
1	still don't like outside	connection
1	still don't like the outdoors	connection
3	knowledge	connection climate
3	learn	connection climate
1	environment is being killed off	connection climate
1	environment not taken care of	connection climate
4	realize	connection climate learner
2	know more	connection climate learner
1	changed perspective	connection climate learner
1	make the world better	connection climate learner practice
1	need to take care of nature	connection climate learner practice

1	taking care of the world	connection climate learner practice
1	thinking more about living things in nature	connection climate learner practice
1	trees have tolerances	connection climate practice
2	like learning about trees	connection learner
1	be considerate of trees	connection learner
1	opening my eyes	connection learner
1	realization	connection learner
1	want to look at leaves more	connection learner
1	want to see more about trees	connection learner
1	want to talk about trees more	connection learner
25	changed	connection learner practice climate
2	changed my life	connection learner practice
1	more considerate of trees	connection learner practice
1	nature can heal	connection learner practice
2	feel great	connection practice
2	happy	connection practice
1	trees are like humans	connection practice
1	trees are like us	connection practice
1	trees are living	connection practice
1	trees can feel things	connection practice
1	trees can heal	connection practice
1	trees have life	connection practice
1	want to be outside more	connection practice
1	want to get outside	connection practice
1	want to go outside	connection practice
2	feel educated	learner
2	learned	learner
1	enjoy learning	learner
1	feel smarter	learner
1	getting more knowledge	learner
1	keep learning more	learner
1	learned a lot	learner
1	learned before	learner
1	learning more	learner
1	noticed	learner
1	refresher	learner
1	watching more	learner
1	everyone goes through things	learner practice
1	depressed before	practice
1	feel acknowledged	practice

1	feel better	practice
1	feel connected	practice
1	feel good	practice
1	feel happy	practice
1	feeling better	practice
1	felt good	practice
1	realize I have scars but also good	practice
1	something to do when sad or depressed	practice
1	connect	practice
1	help	practice
1	it's helping	practice
1	more peer participation	practice