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STUDENT ENGAGEMENT WITH NATURE WHEN USING NATURE JOURNALS
AND IPADS

By
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A capstone submitted in partial fulfillment of the requirements for the degree of Master
of Arts in Education: Natural Science and environmental education.

Hamline University

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To my family, especially my husband Nick, for your encouragement and support throughout this process. Your patience and practicality pushed me to continue working on something I enjoy and to follow through on what I started. Thank you also to Shelley and Jodie, your thoughts and guidance helped me think through this Capstone.

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CHAPTER ONE

INTRODUCTION

Technology is all around us; nature is also all around us. These are two things we have a hard time getting away from. As the world moves towards technology and slowly getting away from being outdoors, I wonder, if students can be more engaged with nature when they are using nature journals and iPads? In this Capstone I will explore student engagement in nature with the use of nature journals and technology (iPads). Over an eight week period students will be using nature journals to document what they are observing in nature, and then using the App, “Seesaw on the iPads” to record their reflection of their journal entries. My school district has moved to one on one iPads for students in hopes of providing personalized learning for each student. I want to use the technology as we move into the 21st century; it is an integral part of life today. I also want students to be able to have hands on learning and enjoyment in nature. I want this for future students because I feel I had this as a child growing up. I learned to appreciate nature and it shaped the person I am today; an advocate for the environment. I want it for my own children and my students.

As a child growing up in a small neighborhood where everyone always had someone to play with and we were always outside. As summer approached, the days got longer, the weather got nicer, my siblings and I stayed out until our Mom called us in at

night. This was my childhood; I loved playing outside. We would run through the cornfields behind our house, ride our bikes, play baseball, tag, play on the swings, you name it, we did it. It was a waste of time to stay inside when we were free to do what we wanted. Being the second oldest of 13 children, I look back on my life and I compare it to the lives of my younger brothers and sisters and I see differences in how we were raised. The older children played outside, explored, invented games, and breathed in fresh air. My parents took us to the park in the heat of the summer to swim and fish, and during the winter time, we dressed warmly and went sledding. My younger brothers and sisters found video games, computers and cable TV. My parents became overwhelmed with more children and working full time jobs that took them away from home. And it is not just my brothers and sisters, but many children who are now not exposed to nature and thus avoid the outdoors. The common complaints are that there are too many bugs, the sun is too hot, it's too much work. But when forced to work outside, play outside, just be outside, they begin to realize, hey it is not as bad as I thought.

Nature is scary! Or so some of us think, but we forget that as children we explored nature, and most of us LOVED nature! As adults we spend most of our time indoors, sitting at a computer desk, working. We are so busy in today's society that we do not have time to stop and smell the roses. And neither do many of our children. We need to give our children the opportunity to go outside and explore. Many parents run into the frustration of their child saying, "I'm bored." and "There is nothing to do outside." So it is much easier to let them come back inside to play video games, read books or play on the computer. Children do not know how to explore anymore. I would like to develop curriculum that will encourage students to explore nature using a journal and iPads.

My husband and I have our own garden. A very large garden, actually. We grow and harvest hardneck garlic varieties (among many other vegetables we grow just for ourselves) to sell to the public. Over the past eight years our operations have grown from a few varieties of hardneck garlic and about 100 heads of garlic to a dozen new varieties and 4,000 heads of garlic. As our business has gotten bigger we realized we could not do this ourselves anymore. We needed to hire help. It is not easy finding people to come out to a farm all day and work in the field. Having many siblings, I began asking them to help out. The majority of my siblings knew how to work in the field (my family was involved with the Farmer's Market in Milwaukee for almost ten years), but as they have gotten older they do not want that kind of lifestyle anymore. They did not enjoy the physical labor of gardening, they were especially scared of ticks, and they hated mosquitoes as well as sweating. So I went to my younger siblings, who did not know what working out in the field was like. Begrudgingly they agreed, after we said we would pay them and feed them. But my youngest brother Tidus, who is now fourteen, would complain the entire day. He was bored, he wanted to go in to watch TV, let's play 20 questions, and on and on it went. As the youngest he needed constant attention and would only go outside if someone would go with him. Is it because he is the youngest of thirteen or is he a product of our society?

I knew when I was in fourth grade that I wanted to be a teacher. My fourth grade teacher was throwing out old worksheets she had and I took them out of the garbage and took them home. Then I made my younger sisters my students and I would "teach" them by giving them the worksheets. I would take out my red pen and correct the worksheet. Although teaching is not quite the same as when I was growing up, it has not changed all

that much. I have been teaching for the last ten years in first and third grades. I work in an inner city, neighborhood school. This is a Pre-K through 8th grade school located in two buildings called the Lower Campus and Upper Campus. The school is an arts focused school incorporating visual arts, dance, music and drama. As budgets in schools get smaller, teaching positions have been cut. In our school, our science specialists position was cut, and teaching science was put back on the classroom teacher. In an already jam packed day, science is to be taught two to three days a week for 30 minutes. Some of my students come from educated families who encourage exploration; some of my students' parents are working day and night to provide a shelter and food for them. Some of my families are brand new to the country and do not speak any English. I decided I wanted to encourage my students to explore nature, I needed to draw them in and convince them, this is fun and you can do this on your own, wherever you are.

I began my own education in environmental education by taking a class offered free of charge to teachers from the University of Minnesota. It was called Schoolyard Ecology for Elementary School Teachers. In this class we learned about plants, insects and ecology. I was hooked! During our class, my colleague and I were baffled. Who knew science was SO engaging! We kept asking ourselves, why didn't we learn this stuff when we were in school? Maybe we did, but we never paid attention. I think back to my elementary science experience and realized, oh yeah, I did not like science because all we did was read about it out of a textbook and did worksheets. BORING! And then in middle school and high school, science was cool. We got to do some experiments and activities, but they seemed isolated and difficult to relate to. In college, I took environmental education because it was required, but my professor did not seem to like

elementary school teachers and thought we did not even know what a cow was. So, as you can imagine, another really boring science class ensued. When we finished our two week course in Schoolyard Ecology at the University of Minnesota, however, I could not wait to get back into my classroom to do all the experiments and exploration with my own students.

Then reality hit; test scores, test scores, test scores. At this time, I was in a school where the only thing that was important to the administrator was test scores. In my school district as well as many others, test scores are ranked very high on the priority list. Opening week, day one, we were told that our test scores were OK, but we need to do better. We need to do more reading and more math. The other subjects are important but not as important because we do not have to test them. Writing, Science, Social Studies and Art were left by the wayside. So began my adventure in finding time in my already packed schedule to do some outdoor science with my students.

One of the first things I did was to look at my curriculum and try to answer the question: how can I add in exploring nature through science without my principal and parents getting upset that I was not doing more reading and more math? We do not have time for science, social studies, and computer skills. That is when I decided the only way to bring science into my classroom was to combine it with other subjects. Art, writing and science go hand in hand.

So I went back to my own education and found a class on Nature Journaling. In this class I learned about simple nature drawing techniques and I learned how to journal about nature. I loved it! What a great way to get students to observe what they are seeing, write about it and draw it. I was introduced to Claire Walker, author of Nature Journaling,

which showed us how to keep a nature journal and how nature journaling can be done with any age group, wherever you are. When I take this back into the classroom, I knew this was going to be a success. Nature Journaling is a time for students to observe nature and write and draw what they observe. I want students to explore the schoolyard, to draw what they are seeing, and to begin writing what they are thinking through narratives, poetry, informational text and short stories. Since they are young children, many of my students will love the drawing part, but will still struggle with the writing part.

After talking to my advisor at Hamline University, I decided take to a class on Earth Journaling with John Caddy. He has a wonderful website on how to teach children to explore nature and write about nature. This was an online course through Hamline University. After completing the class and exploring his website I realized I love technology and my students love technology. They know and understand how to use computers and really anything digital. I did not have a single student who did not know how to turn on a computer or work an iPad. Even my students new to the country could figure out the iPads rather quickly.

Almost everyone I know loves some kind of technology. In every household you are bound to find some sort of interactive technology: laptops, smartphones or tablets. State standards are moving to integrating more technology in the schools and classrooms. Many classrooms now have SmartBoards, LCD projectors, and iPads for individual student use. Unfortunately, technology is changing so fast that schools cannot afford to keep up with the pace. However, I figured, why not use the technology our school has with nature. I began to wonder how I could bring technology and nature together. I wanted to really draw my students in after teaching them how to draw and how to explore

nature as well as how to write, I decided I would also use iPads to engage them. Maybe this technology tool will help my students struggling with the writing to finally be able to let loose their imagination and begin writing.

I created curriculum to engage my students in nature using nature journals and also using iPads as a place to record their reflection of their journal entry. Finding different ways to draw students in, to learn about nature and to write about it, can be very challenging. There are always distractions, especially at an urban school on an extremely busy, loud street when nature is just a thin strip of butterfly garden and six trees in front of the school. Hopefully, using a Nature Journal notebook and iPads will excite students about recording their observations and reflections about nature. This will hopefully lessen any fears or misunderstandings about nature and bring a lifelong engagement with the outdoors.

Technology has become a necessity in today's society. We, as a society, also have to remember that nature is a part of us. We need to find a way for technology and nature to fit together so we can enjoy them both to their full potential. In the following chapter I will explain the benefits of technology in bringing excitement into the classroom. I will also explore how students are benefiting from outdoor classrooms. Combining technology and the outdoors will help students become more appreciative of, and knowledgeable about, nature.

CHAPTER TWO

LITERATURE REVIEW

The purpose of this chapter is to show the research behind how engaged students are in nature while using iPads. Humans are animals and we are a part of nature. As you approach children and adults and ask if they are a part of nature, many say no, nature is out there (usually pointing out the window). We used to be a part of nature, living among the other animals, surviving from what we grew or could find to eat, giving back to nature by respecting what nature had to offer. Now we are largely secluded in our homes, taking our vehicles to the big grocery store and buying all of our food. We are no longer connected to nature.

Education, technology, and the outdoor classroom all go hand in hand. To understand and appreciate nature, one can use education. To be educated about nature, one must spend time in nature. To live and learn in the 21st century with technology, it must be taught and used effectively. Technology, an “inside” thing, and nature, an “outside” thing, can come together with education. Children in the 21st century are fairly tech savvy and enjoy playing with and exploring technology. But children in the 21st century are not much different than children centuries before and also enjoy being out in nature. Combining these two things in education can benefit not only children, but the teachers, parents and the future of the world.

In this chapter I will be looking at these topics to explore the connection between children, nature and technology: How does nature affect children? How can outdoor play benefit environmental education? How is the use of technology changing the classroom? How can technology help students learn and appreciate nature and science? and How can nature journals help children make a connection with nature?.

How does nature affect children?

The Merriam-Webster dictionary describes *nature* as the external world in its entirety (www.merriam-webster.com). Nature plays an important role in our lives. According to Rivkin (2014) to be human, we need to be a part of nature. A simple garden on the school grounds can provide plenty of interesting learning opportunities for students (“When the Outdoors Is Your Classroom,” 2007). Being outside with nature has many benefits, these are both mental and physical. Louv (2008) reports that scientific evidence show the benefits of nature to the physical and emotional health of people. In an age of technology, children are spending more time inside and are struggling mentally, physically and socially. According to Cleaver (2007), “Playing outside is natural exercise, which reduces obesity and diabetes. Playing on fields or in woods stimulates cooperation, creativity, and problem-solving skills more than playing on asphalt” (n.p.). Research was done in Sweden noting that children who played on asphalt had more interruptions and shorter play segments in their games than children who played in the natural outdoors (Louv, 2008). In another study, Louv (2008) reports that when children in schools had access to both green space and manufactured playgrounds, children were more creative in the green space than the manufactured playground. The

benefits of being in nature can be endless. There is so much out there and the human population has barely scratched the surface.

The benefits children get from being out in nature are beyond the classroom and the home. Louv (2008) states in his book that “...natural settings are essential for healthy child development because they stimulate all the senses and integrate informal play with formal learning” (p. 86). Cheng’s (2012) research has shown that children’s experiences in nature has a positive influence on them. These positive experiences affect children throughout their lives as Chawla, et. al (as cited by Cheng 2012) states that children will take a more active role in environmental protection if they have positive experiences outdoors, positive role models and good memories of being in the outdoors. Children are taught to enjoy nature by adults who enjoy and appreciate nature. When students are instructed about environmental education they have a greater appreciation for nature (Campen, 2012). He also states that children and young people need opportunities to have good experiences in nature. This helps students care for the natural environment, therefore making them want to learn more about the nature around them. Students who are exposed to nature are more likely to take an interest in the issues surrounding the natural environment as they get older. Adults who were exposed to nature as children are more likely to choose careers in this field. As Bogner (1998) states, people who are actively involved in nature experiences are more likely to be aware of environmental issues and will also therefore have the same kind of positive attitude towards the environment.

Being outdoors bring rich opportunities for nurturing growth in all developmental domains (Swarbrick, et. al., 2004). The self-esteem of children is greater among students

who are out in nature. Some research has shown that nature plays a role in children's health and their ability to learn (Louv, 2008). One way children benefit from nature is how to deal with stressful events in life. As cited in McArdle (2013), "Kaplan and Kaplan examine the psychological benefits of experiencing nature. They argue that it can reduce stress and mental fatigue as the physical distance from stress allows us to recover from mental overload" (p. 242).

Resilience is the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress— such as family and relationship problems, serious health problems or workplace and financial stressors. It means "bouncing back" from difficult experiences. There are many children who experience traumatic experiences, and one way to help these children deal with their experience is to be outside in nature. Russell and Farnum (as cited by McArdle, 2013) state "The naturalness and solitude that wilderness offers restore and renew our spirit, offering evidence that wilderness is in itself therapeutic" (p. 242). Nancy Wells' (Louv, 2008) study indicates that children who live in high-nature conditions have a tendency to have less psychological distress dealing with life's stressful events than children who live in low-nature conditions. According to Rivkin's *The Great Outdoors: Advocating for Natural Spaces for Young Children*, she gives examples of how participating in natural settings help children become better at resiliency. (See Appendix A)

The outdoor classroom captures a child's natural curiosity and enthusiasm (Cleaver, 2007). Children really want to be outside, being outside is described by Strife and Downey (2011) as, "[the] positive effects of nature exposure include improved cognitive functioning (including increased concentration, greater attention capacities, and

higher academic performance), better motor coordination, reduced stress levels, increased social interaction with adults and other children, and improved social skills” (p. 105).

Using nature as the classroom makes the most of children’s curiosity and enthusiasm.

There are so many benefits to being outside. Losing certain amounts of confidence and independence may come from spending too much time indoors says Cleaver (2007). She also states that nature plays a role in calming children with attention disorders. Being outdoors is so important to all people that even the American Academy of Pediatrics is offering parents a “prescription” for outdoor play (Rivkin, 2014). Louv (2008) declares that giving children the opportunity to be creative, to use their imagination and explore during play is crucial to the development of the whole child.

As shown above, nature plays an important role in child development. Children raised in conditions that foster the natural environment are better off than students who do not have that resource. Being in nature is only part of building a well rounded person. The next section will be a discussion on how children participating in outdoor play will have the potential to become environmental advocates later in life.

How can outdoor play benefit environmental education?

Many schools feel that if students are not working on reading or math they are not meeting the state standards. When the No Child Left Behind (NCLB) law passed, many things in education got pushed aside for the “basics.” The emphasis was then put on reading and math (Cleaver, 2007). When NCLB was put into place, outdoor learning became a thing of the past. Even recess was considered a waste of time (Louv, 2008). A simple 15 minute walk or outdoor play time can increase students’ ability to concentrate and be creative (Cleaver, 2007). Being outside helps students gain self-esteem by

encouraging independence through exploration (Swarbrick, et. al., 2004). When students feel good about themselves they are more likely to do better on test scores. The American Institutes for Research (2005) showed gains in social studies, science, language arts and math when students were in an outdoor classroom or were taught using some form of nature-based experiential education (Louv, 2008). Being outside in nature, though, is not just about improving test scores. According to Bogner (1998), “The ultimate goal of environmental and ecological education, other than to generate knowledge, is to develop students’ awareness and concern about the total ecosystem and its associated problems and to shape students behavior concerning the environment and conservation” (n.p.). The subject of environmental education can be rather touchy, and educators need to be aware of the age and maturity of the children before teaching them. This section will focus on how allowing children to do outdoor free play will have a positive influence on their perception of education in the environment.

In David Sobel’s book *Beyond Ecophobia: Reclaiming the Heart in Nature Education* (2013), he claims there are three different stages to teaching about the environment, and if we start when children are too young about environmental issue, such as the destruction of the rain forest, we are teaching children to distance themselves from the issues instead of connecting with them.

Sobel’s first stage, Empathy, has to do with having empathy with the natural world. Young children between the ages of four through seven learn to empathize with the natural world. A great way to accomplish this is through play.

McArdle (2013) describes the benefits of *open play* in the following quote.

Imagination is enhanced, and the ability to think symbolically and abstractly builds creativity and intelligence. Social and emotional abilities are developed as children role-play with ‘what-if’ possibilities that strengthen their understanding of the world around them and consequences to actions. They also learn empathy, cooperation, problem solving, and leadership skills through make-believe play. The creative nature of open-ended play also enhances cognitive skills, such as working memory, cognitive flexibility, and self-regulation. Self-regulation is the ability to control emotions and behaviour, resist impulses, and exert self-control and discipline. Open-ended play activities have been found to be related to ideational fluency which allows children to be able to have more divergent reasoning and a greater variety of ideas when interacting with materials and others (p. 243).

Waite (2013) states that when children are in a natural play, they are more likely to set their own agendas. When adults interfere in children free play time, children are more likely to look up to adults to resolve issues and guide them in choices. Waite (2013) also claims that outdoor play not only supports social interactions, but it also helps with emotional social behavior. Children need unstructured playtime. Louv (2008) claims that even though in this day and age more and more children are signed up for organized sports, we still have the highest epidemic of obesity. To understand what is causing this Rivkin (2014) states that humans are born to move and learn from moving. Many organized sports are adult led activities that do not necessarily support creativity, problem solving or socialization. McArdle (2013) reinforces open play by stating:

Open-ended play allows children to express themselves in play freely and in ways

that are not bound by preset limitations. Playing with open-ended materials with multiple uses and limitless possibilities, such as sticks, wet earth, plants and trees, allows for imaginative play. There are no rules to follow, no expectations and no specific problems to solve, and there is no pressure to produce a finished product when engaging freely in open-ended play. We believe the benefits of open-ended play and an open environment to be interlinked (p. 243).

Children can develop empathy through open play because it allows them to be able to discover themselves through nature. Casey (as cited by Waller 2007) argues that children need time and space outside on a regular basis in a variety of different physical environments. This allows children to find “their own resources and develop their identity and social relations, connect to the community, have contact with nature and physical activity” (p. 394).

The next stage to teaching environmental education, according to Sobel, is Exploration. During the Exploration stage, children are usually between the ages of eight through eleven and should begin to have a connection with the Earth. During this stage children are beginning to explore the landscape around them outside of their homes and into the neighborhoods and communities. During this period children need the opportunity to go out and explore. Waller (2007) recognizes that children need their own space and need privacy so they can use their creativity to play freely away from adult supervision. This allows children to use the environment for their imaginative play.

Open play varies depending on location. Louv (2008) indicates this in his book that researchers have also observed that when children played in an environment dominated by play structures rather than natural elements, they established their social

hierarchy through physical competence; after an open grassy area was planted with shrubs, the quality of play in what researchers termed “vegetative rooms” was very different. Children used more fantasy play, and their social standing became based less on physical abilities and more on language skills, creativity, and inventiveness. (p. 88)

In this stage, children should be out exploring their neighborhoods. It is hard for parents and teachers to give children this opportunity because we want to keep them safe and because giving up control is hard to do.

And finally, Sobel states the final stage of teaching environmental education is the Social Action stage. In the Social Action stage, children range in age from twelve to beyond fifteen. In this final stage of teaching environmental education, children take what they have learned through Empathy and Exploration and begin to start seeing the world and how the “self” can help the world. For this to occur, teachers and parents have to let go of the adult driven mentality and follow the lead of the child. The teaching of environmental education needs to change, according to Waller (2007), both adults and children to need to work together to learn from and with the outdoors. This gives children the confidence to act upon their interests. Wenger (as cited by Waller, 2007) states, when children act and behave with competency, they are acknowledged as competent. During this final stage is when we can start discussing the overarching environmental issues. Children are capable of understanding how to help the environment because they know how to empathize with their surroundings through open play, they can explore their environment through open play, and they know what they need to do to make a difference.

As stated before, environmental education has taken a position on the back burner. As Rivkin (2014) reports, the demands on teachers to make sure children are successful academically means the outdoor play and recess times need to be shorter or taken away completely. To meet the needs of children, we need to think of natural play as being as important as any other program they are learning in school. So how can teachers keep academics a high priority while still being able to use the outdoors? One such way is to incorporate technology.

How is the use of technology changing the classrooms?

Technology is part of our lives whether we like it or not. Many children in this day and age have been using technology for as long as they can remember. Many schools are moving towards adding technology into their curriculum to prepare for the future. Standards have changed over time to meet the demands of the changing world. Students want to use technology in the classroom and parents want to see their children using technology. Many teachers want to incorporate technology; however, there are problems meeting these demands. This third section will explore how technology is changing the way students think and work.

Prensky (as cited by Giurgiulescu 2015), defines children raised in the technology world of now as *digital natives*. Oblinger & Oblinger and Teo (as cited by Giurgiulescu 2015) describe *digital natives* as “... active experiential learners, are confident in technology, solve easily multitasking activities and communicate using icons even without the need for too many words” (p. 232). Whereas most adults born before the digital age, but are using it everyday are defined as *digital immigrants*. Digital immigrants are described as eventually succumbing to the digital world by using it daily

and fairly well, but never as fluently as digital natives (Giurgiulescu, 2015). Knowing these two definitions will help in understanding the use and reluctant use of technology in the classroom.

Many teachers fit into the category of digital immigrants. There are some teachers who are embracing technology in the classroom and some teachers who are accepting technology as a necessary in the classroom to meet new science and technology standards. Adıgüzel (as cited by Kerschner 2016), claims there are many things affecting a teachers' use of technology in the classroom, these include: lack of technology knowledge and skills, lack of technological support, large classroom sizes, and the ability to access up to date technology. Teachers are feeling overwhelmed with the new technology standards and implementation. These are just a few examples of technology issues facing teachers today. One big factor-affecting teachers incorporating technology in the classroom could be pedagogical beliefs (Ertmer, 2005). Some teachers may feel that technology is important in the classroom and are willing to implement it. To do this, they may need to change their teaching styles (Ertmer, 2005).

In a study conducted by Kerschner (2016) he writes that, "...most participant teachers believed in the benefits of using technologies as they thought that the use of technologies enriches the learning environment, increases permanency of learning, makes the content more attractive, eases learning and increases students' motivation" (p. 53). Even though this is true of some teachers, the use of technology in the classroom is still not meeting the potential challenges of technology use. Ertmer (2005) states that even though many teachers feel technology is important and are using it in the classroom, many teachers are still only using computers for remedial activities such as: research on

the internet, computer skills, free time or reward activities, word processing, and practice drilling. Teachers need to begin thinking of technology (such as tablets, computers/laptops, and smartphones) as an extension of learning. Holland (2016) reports that it is the job of the teachers to figure out how to use these devices effectively to support the learning of students.

The use of technology in the classroom can greatly benefit students and teachers.

Dede (2005) states there are three ways future students will be learning:

- Students will learn the traditional way by building relationships with others through experts, collaborations and virtual community practices
- Multiuser virtual environments (MUVES) are students who are using avatars (self-created digital characters) to connect with other avatars in a virtual world
- Ubiquitous computing, resources are available at the touch of a finger wherever you go.

To these digital natives, technology is an everyday usage. Devices such as tablets and smartphones allow digital natives to sift through information in seconds and allow them to connect to one another (Holland, 2016). Even though students in this age are digital natives, teachers need to figure out how to meet the needs of the challenges of higher level implementation of technology.

Yildirim (as cited by Kerschner 2016) states, “the use of technologies in educational settings is related to many social, economic and pedagogical benefits” (p. 44). When technology is being used in the classroom, it can improve communication and collaboration between students and teachers and in changing how teaching and learning tasks are formed (Kerschner, 2016). He also states that when teachers are using

technology to teach lessons, it allows some students to learn better; these lessons also increase their motivation and participation. Ertmer (2005) claims the ultimate goal of implementing technology is to increase student learning. If students feel comfortable using technology to learn from, then teachers need to start using technology to teach. In Kerschner's (2016) study, he states, that teachers and students have a good view of the role of technology in school environments. When technology is being used in the classroom, it can increase student motivation through different learning environments, more memorable learning, more interesting topics in a content area and makes learning more fun. (Kerschner, 2016).

Therefore, the use of technology is a great tool for teachers to use. If implemented well, it can meet the needs of almost all students. Technology is changing the way students interact and learn. Although technology is changing how students think, how is it affecting students learning science and being in nature?

How can technology help students learn and appreciate nature and science?

In 2009, the Minnesota Department of Education adopted new Science Standards. One of the new standards has to do with nature of science and technology; Strand 1- Nature of Science and Engineering, Standard 4 - The role of mathematics and technology in science and engineering. This means schools are expected to be implementing these standards in the classroom starting in 2010. Strand 1 of the Science Standards is not be stand alone curriculum, it is to be a part of all the learning and assessment in all of the science content areas (NRC, 2009). How is technology being used in schools to excite students about science? How are technology and science used with other core subjects?

This next section will look into how students are more interested in nature and science with the use of technology and answer these questions.

As stated before, technology is all around us and schools are not the only entities incorporating technology. A study performed by Boyce, Halverson and Thomas (2014) states that because technology is becoming so common, many organizations are trying to figure out how to make connections to the natural world by using technology. Added to this, Kacorski (2015) reports that we need to grab this opportunity to incorporate technology in the classroom because digital technology is all around us, we need to recognize the educational potential and bring it in the classroom and while doing this not to take away from the natural experience. In research conducted by Peffer, Bodzin, and Smith (2013), the authors state that “integrating technology into environmental education can help promote learning and understandings about local and global environmental issues that are vast, complex, difficult to personally engage with, and cannot be easily visualized or understood” (p. 16). Technology is a different kind of tool to be used in the classroom to teach about science.

Shih, J.-L., Chuang, C.-W., and Hwang, G.-J. (2010) describe mobile learning as: “Mobile learning entails the kind of learning in which learners use mobile devices with digital content inside, to learn in “anytime, anywhere” situations” (p.50). Mobile devices are technology equipment that can be moved from place to place such as: laptops, smartphones, and tablets. This is a new way of teaching science. Research by Boyce et al., (2014) claims, students who are learning in informal settings are learning in a way that is not the same as the learning taking place in a traditional classroom. The traditional classroom can be looked at as sitting in desks or tables, looking through textbooks or

watching shows on a TV. Baker (2014) reports that the ability to carry technology along with oneself and the know-how of technology, allows students the ability to be more engaged in their learning. This researcher continues by stating that when there is a focused purpose for learning, it can enhance the learning for students.

Squire; Weigel et al. (as cited by Boyce et al., 2014) claims, “The use of an electronic device, full of visual representations and text, within a natural, informal learning environment, provides students with a unique nature–electronic experience” (p. 816). Farnsworth et al. (as cited by Boye et al., 2014) reports that students are engaged in their learning and appreciation about nature through the use of electronic field guides. Research conducted by Ardoin (2006), Clayton (2003) and Sobel (2004) (as cited by Peffer & Bodzin, 2013) states, that using technology has the ability to help with the development of intellectual and emotional connections to nature and their sense of place. They also claim that a research conducted in K-12 science classrooms show students wanted to learn about earth science and environmental issues because of innovative technologies (Harnik & Ross, 2004; Smith, Edwards, & Raschke, 2006).

When students are more engaged in their learning, they may show an increase in their content knowledge. In researches conducted by Comeaux and Huber (2001), Litledyke (2008), and Proshansky, Fabian, and Kaminoff (1983) (as cited by Peffer & Bodzin, 2013) declares that, “Research suggests integrating technology use into constructivist learning methodologies in an effort to reach students’ cognitive and affective domains may increase capacity to develop environmental science literacy” (p. 18). In a study conducted by Zacharia, Lazaridou, and Avraamidou (2016), their findings indicate that having mobile technology is an essential tool for students learning about

science. Having mobile devices allow for learning on the spot, with the use of the Internet or installed Apps when offline (Zacharia, Lazaridou, and Avraamidou, 2016).

These researchers used mobile devices to help students memorize new science concepts. As Kacorski (2015) states, digital technology is a way to draw students in to their own learning in a different way. Shih et al. (2010) findings claim that learning pace and process can be adapted to the needs of the student by using mobile devices. All students can be met at their learning level and challenges (Shih et al. 2010). The use of technology when teaching science is beneficial to students. Technology is being used in other fields other than science.

This section shows how students are benefiting from using technology with science. Students are retaining more information and learning at their own pace. Students are also taking their learning into their own hands. And finally, after learning about how technology is helping students learn about nature, the next section will discuss how journaling also helps students appreciate and learn about nature.

How can nature journals help children make a connection with nature?

Nature is a wonder. All people are attracted to nature in some way. As Rivkin claims, nature is something people need. When people are cooped up in a building for a period of time, they long to be outside. There are many ways to get students outside and be a part of nature. One way to get students interested in nature is through the use of nature journals. This section will discuss how using art with journaling will get students be more connected with nature.

Journaling

Journaling is almost like keeping a diary of our day-to-day activities. The difference is that a journal keeps track of what we are seeing, hearing, touching, tasting and smelling. A journal can be reflective or interactive or both. McGough (2013) states, “A journal can communicate learning goals, develop scientific vocabulary, and create dialogue through oral and written language” (p. 63). Journaling has the possibility to benefit all students in the oral and written language. English languages learners are one example of students who can benefit from journals because they can use their own experiences to write about (McGough, 2013). McGough (2013) refers to a student who struggled with writing in class and how he was much more engaged in writing because the writing was from his own experiences making it authentic. Bereiter and Scardamalia (as cited by Bolgopal & Wallace, 2009) report that it is important that students can be self reflective of their writing when making composition changes for meaningful learning. Meaningful learning means students are taking their learning into their own hands. McGough (2013) states that when journaling, students are improving their conceptual understanding. Balgopal (2007 & 2009) reports that teachers are able to find conceptual misunderstanding of students when giving them the opportunity to write their own personal connections to what they are learning. Students may also feel better about journals because it is not graded like traditional work and may feel more confident they can create their own meanings through writing (Harada, 2002).

Hand and Prain (as cited by Bolgopal & Wallace, 2009) state “as writing experiences increase, so do conceptual-understanding and multiple-choice test scores” (p. 17). An important part of test scores has to do with *academic language*. *Academic*

language refers to the oral, written, auditory, and visual language proficiency required to learn effectively in schools and academic programs (www.edglossary.org). Students should be using academic language when talking about learning experiences. They can do this if they are taught how to and can practice orally and through written form (McGough, 2013). This researcher also states that when students are talking and writing about things they are learning in school, they are practicing academic language and thinking of new ideas as they are practicing. One way to get students engaged in journals is through art.

Art

Integrating art into literacy, science and social studies will benefit students and teachers, but this kind of integration needs to have real connections between the subjects being taught (Poldberg, Trainin & Andrzejczak, 2013). Art and science are two subjects that can benefit each other (Weigand, 1985). As Malosh (2010) states, “The study of nature through art allows the "student-artist" to experience, observe, value, analyze, synthesize and express his/her understanding of, and relationship to, nature and the environment” (p. 28).

According to the Minnesota Department of Education, art is a subject that needs to be implemented in the schools (<http://education.state.mn.us>). Art is important to students’ learning for many reasons. Poldber, et al. (2013) states visual art has the ability to help develop higher order thinking that then helps with the development of reading. Gardner (as cited by Poldberg, et al 2013) states that for young children or English language learners, drawing provides a way to show more complex ideas. These researchers also claim that students’ vocabulary will improve through art because they

will use art first then try to find words to describe their art (Poldber, et. al 2013). In addition, Malosh (2010) states, “Art activities serve as affective and effective tools to further enrich, enhance and enlighten the nature experience for students” (p. 28).

Combining art, journals and science together will enhance learning for all students.

Nature journals

A *nature journal* is defined as “the regular recording of observations, perceptions, and feelings about the natural world around you” (Leslie & Roth, 2003, p. 5). Malosh (2010) describes nature journals as guided art activities and lessons to help students make a connection to nature. In addition, John Caddy (<http://www.morning-earth.org>) states learning about nature can be about the visual arts, but it can also be about the written word. Using journals in nature will help students make observations and draw conclusions about what they are seeing through art (Malosh, 2010). According to Leslie and Roth (2003), nature journals are a person’s feelings, thoughts and reflection of nature about the world around them. Futhermore, Malosh (2010) states that being outside and making observations about things around you while using art to be creative gives students to chance to really understand and appreciate the nature experience. In addition, Malosh (2010) concludes that art activities and nature journaling promote higher-level thinking by making students analyze, synthesize, and show their comprehension of nature through art creation.

In other words, the use of journals and art can help students be more engaged in science and their overall learning. Science and art go hand in hand in learning. Through the use of journals, teachers, students and families are given an opportunity to communicate new learnings and wonderings.

Conclusion

Throughout this chapter the focus has been on the effects of the outdoors on children, how outdoor play can help students to begin understanding environmental education issues, how technology is changing the way we teach and learn in the classroom, how technology is helping us learn more about science and how nature journals with the use of visual arts also help with connecting with nature. All of these focuses show the importance of children being out in nature and learning about the environment around them. The next chapter will center on how to take students out in nature. While students are outside learning, they will use nature journals to document their learning and wonderings. Students will make their observational drawings in the nature journals and use their iPads to reflect on their drawings. I want to see if students have a greater engagement with nature with the use of their nature journals.

CHAPTER THREE

METHODS

In this chapter I created the framework of a new curriculum based on what I learned in Chapter Two. In Chapter Two the first section I discussed was how nature is important to child development, and how being outdoors affects the mental, physical and emotional state of children. The second section in Chapter Two was how being outdoors and having free play can be the spark to environmental education. In the third section of Chapter Two, I focused on how, if children are given the opportunity to have unstructured play, they will be ready to learn about issues in the environment. I also discussed how technology is changing the way students think and act. This topic is extremely important because technology is a part of today's world and we need to use it productively. Along the lines of technology is the fourth section which was how technology affects the learning and appreciation of nature. And finally, in the fifth section, I researched about nature journals. I wanted to show how using art and writing can enhance students' appreciation for nature.

Throughout my research I realized each topic built upon the other. In the rest of this chapter, I want to showcase how using the Understanding by Design method helped me create a new curriculum for teaching my students how to be more engaged with nature through the use of nature journals and iPads.

Curriculum Design

According to Wiggins and McTighe of *The Understanding by Design Guide to Creating High-Quality Units*, many teachers teach concepts to students that are superficial and non-transferable based on state and national standards, when we really should be teaching for the understanding of transferable concepts and processes while making learning authentic (2011). For students to be engaged in nature, they need to be in nature learning about it with tools to help them. I chose this method of designing curriculum because according to Wiggins and McTighe (2011), “Experiential learning that stimulates multiple senses in students, such as hands-on science activities, is not only the most engaging but also the most likely to be stored as long-term memories” (p. 6). In the Understanding by Design model, there are three stages: Desired Results, Evidence and the Learning Plan (Wiggins & McTighe, 2011). These helped me plan what my students learned and did. I will give a quick overview of what this looked like, and in Chapter Four I will go into more details about my lessons. These lessons were 30 - 45 minutes long, two to three days a week. The lessons can be completed in eight weeks or extend the whole school year.

Desired Results

Desired results are the essential questions students are always thinking about during their learning so they can eventually understand and transfer the new concepts (Wiggins & McTighe, 2011). The ultimate outcome of this curriculum is for students to be able to recognize, identify, appreciate the different plants and animals they find in nature through active engagement and be self reflective of their work. Through the use of nature journals and iPads, students can be life long learners and possible advocates of

nature. Students will understand that nature is made of up many things and is always changing. Through the use of nature journals, students will always be asking these essential questions: How do things in nature change? Why do things in nature change? What causes the changes in nature? What do I observe about nature? How do I feel when I'm in nature observing it?

Evidence

Evidence as stated by Wiggins and McTighe (2011) are performances and products that show meaning-making and transfer (p. 8). Students used BareBooks as nature journals to do most of their observational drawings. We spent the majority of our time outside doing observational drawing, but when the weather was raining or snowing, we did our observational drawings inside. We used the iPads for many things. We took pictures of things in nature and used the App, Seesaw. This App is an online learning journal and can be used for other things besides nature journaling. Students posted their nature journal entries on this App and did a voice recording of their reflection from their nature journal. All uploads from students came to me so I could see and hear what students were learning and thinking. Other ways I checked for learning were through observation and a rubric. (See Appendix F)

Learning Plan

The Learning Plan consists of activities, experiences and lessons I taught my students (Wiggins & McTighe, 2011). We spent time learning about art and observational drawing before doing actual nature journals. Nature journals are the most important part of this curriculum. McGough (2013) claims that nature journaling, “engages children in observation, drawing, thinking, and writing with a new purpose” (p. 66).

We also spent time learning how to use the Seesaw app on the iPads. Throughout all of this we worked on how to be a reflective learner. As McGough (2013) claims, “Journaling helps students to bridge oral and written language and is especially valuable for English language learners who need authentic experiences to explore and use language” (p. 64).

Setting

I implemented this curriculum with a group of first grade students. These are children between the ages of six and seven years old. Many students are native English speakers, but about half the class are English Language Learners, with a few students who are completely new to the country and speak no English at all. There were multiple languages in this class. There were a few severe Special Education students who were a part of the class, but only attended during certain times of the day, and did not participate in these lessons. There was a combination of boys and girls. These students ranged in socio-economics. This was an urban school with an arts focus Pre-K through eighth grade school. There are two buildings to this school, a K-3 lower campus and Pre-K and 4th-8th grade upper campus. The school has 63% of students on free and reduced lunch and 36% of the students are English Language Learners overall.

There was some green space for students to run around on. However, the school was under construction and the already minimal green space available got smaller during the work. Located in the front of the school was a strip of butterfly garden. This garden was planted by students some years ago. Many of the plants have matured and are well established. There was another section of butterfly garden located closer to the street. This garden was fairly new and was just planted a year ago. The plants are new and

small. There was more mulch than plants in this garden. There are minimal trees on the property with a few bushes. Within walking distance was a park the teachers like to take their students to. Although there was more green space for the students to run around in, it was still pretty limited in how many natural things can be observed. The walk to the park was a great opportunity for students to make observations about nature. As Waller (2007) states, “For young children to fully realize the benefits of outdoor play and learning, they need regular opportunities to experience wild outdoor environments as part of the school curriculum as well” (p.396).

Overall, I was hoping students would have a different view on nature after doing these journals. I think that taking students outside to view nature and using iPads as an incentive to observe and document nature got students more involved and more excited about nature. In Chapter Four I got into more detail about how I planned my lessons and reached my desired results.

CHAPTER FOUR

CURRICULUM

Introduction

This chapter will describe the curriculum created to teach how to nature journal along with the use of technology (iPads) in the classroom, both of which are being used to improve student engagement with nature. When designing this curriculum, I used Wiggins and McTighe, *The Understanding by Design Guide to Creating High-Quality Units*. As I stated in Chapter Three, the ultimate outcome of this curriculum is for students to be able to recognize, identify, appreciate the different plants and animals they find in nature through active engagement and be self reflective of their work.

This curriculum can be used in all grade levels to teach about art, science, writing and using technology. The lessons discussed in this chapter will address how to encourage student engagement with nature through the use of nature journals and iPads.

Plan

To teach this curriculum in the classroom, a teacher needs to have about 30 - 45 minutes, three days a week ranging from five to eight weeks total. The first four weeks focus on preparing students to be able to journal outside. In weeks five through eight the focus will be on spending time outside and journaling within nature. Nature journals can continue past the eight weeks depending on how much time a teacher has in his/her

schedule. The writing can consist of students just being reflective or using their imagination to write. The lessons for nature journaling can be found in the Appendix; this is just an overview of what the curriculum looks like and how it should be taught.

Lesson Overview

Week One

The Week One lesson will focus on discussing what a journal is and how it is used. It will then get into how art uses different kinds of lines to make objects on a paper. Then the focus will be on how to add details to drawings by using shading techniques and color.

Classroom experience

To begin with Nature Journaling, I brought in different journal examples I had at home. I have a daily Mom's journal, art journal, nature journal and diary. I showed my students how I have used all of these differently over the past ten years. Students were excited to see my examples and were very eager to see how they were going to be doing nature journals. When I passed out their nature journals, BareBooks, they were very enthusiastic. I had put a label with their names on the front cover of the journal in the top right hand corner. I did this because first graders have a hard time finding the front of a book when the book looks the same on the front and back. We discussed that all books have a title and the title of our book would be "Nature Journals". I demonstrated writing the title of our book on my Nature Journal. Then we talked about how covers of books usually have some kind of picture that represents what the book will be about. I drew a tree. When I let my students do their covers, many of my first graders copied exactly what I did, bubble letters for the title of the book and trees on their front covers. Some

students drew flowers, some students drew small insects, and a couple of students drew pictures of animals. All the covers were unique to each student.

When I showed my art journal, students were able to see examples of different kinds of lines. When we got to this activity in class, I encouraged students to look around the classroom for different examples of lines. We spent time in class drawing solid lines, dotted lines and dashed lines using different colors. After we drew lines, we did a museum walk. This means that students got up, pushed in their chairs and walked around the desks looking at other students' artwork. After we spent time looking at each other's work, we sat down again and talked about what we liked while we were walking around. Comments students made were, "I liked Brytania's lines because she made a pattern with her lines." "I liked Jack's lines because he used color." We did this again with curves and angles, looking at examples from the classroom and peer drawings.

When it was time to start shading, I showed my art journal and how I used shading to show three-dimensional shapes. Students were in awe. I shined a flashlight on different objects to allow students to observe shadow formation. We discussed how the part the flashlight was shining on was the brightest and that around the edges they were dark. We practiced shading in the three-dimensional shapes. This was a little harder for students. They had a hard time understanding that where light is shining is the brightest part of an object and that is white in our drawing. There are also dark parts where light does not reach; this is where the shading gradually becomes darker as the light can not reach certain parts of a three-dimensional object. This technique is to show students how three-dimensional shapes have depth. Shading with such a young group of children was difficult. We practiced it during this week, but I did not see much shading when we did

actual nature journals outside. My students who have more of an art background did add a little bit of shading but for the most part, no one did.

There was a lot to cover the first week of Nature Journaling. When I allotted 30 minutes in class to teach these lessons, I realized I really did not have 30 minutes but closer to 20 minutes when other demands were taken into consideration. So this projected one week of lessons took nearly two weeks in actuality.

Weeks Two and Three

During Weeks Two and Three of nature journaling, students will use How-To books on how to draw animals, plants, and trees. This is an extremely important time because this is where students really learn how to make observational drawings. An important part of nature journals is for students to be observing nature and representing it the way it is seen and not what the student thinks it should look like.

Classroom experience

We started off these next two weeks talking about what are observational drawings and started practicing. Observational drawing is drawing what we see, not what we think or know from our past experiences. At the beginning of the school year, when my principal gave me the go ahead to do nature journals with my students, he encouraged me to have the Visual Art teacher help me. I spoke to her about what I wanted to do and she helped me with observational drawings by teaching and encouraging it during her Art's Enrichment-Art time. We had Art's Enrichment - Art one day a week every other week for 45 minutes.

I had many different types of how-to books for students to choose from. I have my own collection of realistic how-to books, and I also checked some books out from the

school library. Before we began drawing, I told students there is a difference between drawing what we think something looks like and what it actually looks like. I did this by first drawing what we think a tree looks like and then showing students how to draw a realistic looking tree. I also found examples of tree drawings for children on YouTube. I used DoodleDrawArt YouTube channel for how to draw realistic trees for kids. After we watched the video, students watched me draw a realistic looking tree and then were given the time to draw their own trees, while thinking about what a realistic tree looks like. After we drew, students did a museum walk and looked at other students' work. Some students were able to add color to their trees. We drew a tree without leaves, but a few students added leaves to their trees anyway.

After we practiced this tree drawing, I made copies of realistic how-to drawings of animals. I told students that it looks cool to just draw the final picture of the animal, but if we do this, we are missing all the steps in between. Instead we want to use our capacity of observation to draw a picture stepwise. I talked about how we start out by drawing the first step and moving forward. That all artists use an eraser to erase mistakes and lines to help us draw. It was hard for students to follow the step-by-step drawings because they wanted to just skip to the end. Then they would get frustrated that their pictures did not look like the one in the book. I spent a lot of time emphasizing taking their time when they were practicing their observational drawings. Sometimes when we finished a drawing we would do a museum walk, or students who wanted to showcase their drawings were able to put it under the document camera to show the rest of the class.

We also started doing some verbal reflection on their drawings. Common comments from students were things like: 'it was hard' and 'it was fun'. In these two weeks, the main focus was to draw what we were seeing and commenting on what others had done. Reflections about what we were thinking and feeling during our drawings was to come later.

Week Four

In Week Four, students began the week doing the Seesaw App lessons with the iPads. These lessons can be found here: <https://help.seesaw.me/hc/en-us/articles/205565309-Seesaw-Student-Challenge-Lesson-Plan-K-2>

The next part of the lesson was to focus on using the camera on the iPad to take quality photos and practice taking pictures. During this time, students also did three-dimensional observational drawings on things brought from nature into the classroom and work on adding verbal reflection to their journals.

Classroom experience

To start off the lessons on Seesaw, I skipped around in the app and chose appropriate lessons to use. In the Seesaw lesson, they begin by discussing what a journal is; since I already did this in the first week, I did not do this again. I printed off a QR code and posted it around the room so students could log onto their Seesaw accounts. Usually if they log in one time, they do not have to do it again, but if they accidentally got logged out, the QR codes were posted around the room for them to log back on. We practiced taking pictures with the iPad camera. My rules about photos are they need to be school appropriate and if students are taking pictures of others, they needed permission from that person. I had brought in some flowers purchased from the farmers

market. I demonstrated with my iPad using the LCD projector and the computer app Reflector to show how to take nice pictures. We spent time taking pictures and importing them to the Seesaw App. We played around with adding voiceover audio to pictures also.

When I brought in the flowers, I divided them up and put students in different groups. They had to practice looking at the flowers, then draw what they were seeing into their nature journals. Even though I talked about and demonstrated how to add some darker parts to drawings to show depth, my students did not do this on their own. Their pictures were still very two-dimensional. They were very proud of their work. Throughout our time nature journaling, students would find sticks, rocks and leaves to bring into our classroom for a nature collection area. These were objects they were allowed to take and draw.

We did some verbal reflections of these drawings and comments students made usually included, “I lik[ed] it.” or “It was hard”. The written reflections were just as simple and included things such as, “It was good.” These were first graders after all and this was only the beginning of thinking about our drawings and what we were observing.

I did introduce how to use nature guides to find plants and animal names. This was pretty hard for students because they spent more time looking up what a plant was than actually drawing the plant. It was fun for students to use the Internet on their iPads to find different kinds of plants native to our region. My students would find a picture of a native plant and look to me in surprise and say, “This plant is outside in our schoolyard!”

We used the Seesaw App for more than just nature journals in my classroom. So by the time we were done doing nature journals and reflecting on them, our reflections

became much more detailed and elaborate. I think because I use Seesaw for other things besides nature journals, students felt comfortable being reflective of their journals.

Weeks Five - Eight

The final three weeks of these lessons focus on actually being outside in the schoolyard to make nature journal entries and reflect on the entries. Another way to incorporate writing is to use students' observational drawings to do creative writing or poetry.

Classroom experience

As we got ready to go outside, I spent an entire lesson discussing rules and expectations of the outside classroom. My rules of the outside classroom are:

- Student and teacher need to be able to see each other at all times
- Choose a spot and sit/stand to work
- Work the entire time
- Raise your hand if you need help or have a question
- Have fun

I also talk about how when I blow the whistle, they need to stop what they are doing and come together right away. We went outside and practiced doing these things. Students went outside, chose a spot, pretended to work, then I blew my whistle and they circled up. We did this a couple of times. This way they knew what my expectations were and understood what their job was when they went outside.

Assessment

Students were assessed using a rubric for the last three weeks of the curriculum. Students chose their favorite or best entry from each week and they were assessed using the rubric found in Appendix F. The rubric focuses on journal entries and reflections.

Classroom experience

When I began looking at the rubric and my students' work, I was pleasantly surprised. Many of my students' drawings were in the developing and proficient stage. I felt like the details they added to their observational pictures were very well done. Many of my students added a lot of detail either through color or drawing as much of the different parts as they could observe. Adding date, time and weather was something we did together every time we did a journal entry, but as we continue doing nature journals past the eight weeks, I wonder if students would remember to add these things to their journal entries.

I was also very excited to listen to their reflections. Many of my students went into detail about how they were feeling when they were drawing from, "It was fun." to "I felt cold because it was windy." Students also talked about what it was like to draw what they had chosen to draw, if it was hard or not. One of my student's reflection was, "It was hard to draw a tree, but it was easy, but it was also hard." describing her observational drawing about a tree. This is very typical of first grade students saying something is easy or hard because they do not know how else to express themselves. I was very happy to hear my new language learners speak words to their pictures. When I asked them questions during class about their drawings, I would not get a verbal or written response

at all, but when given the opportunity to speak into the iPads, they were at a more developing stage than beginner stage. This was very exciting to me!

Conclusion

These lessons were prepared thinking about where we are in this world today -- too much inside time, not enough outside time. I came from a background of being outside and enjoying nature. As an educator I wanted to create an easy and fun way for other educators to get their students outside, exploring nature and enjoying it. This curriculum should be simple enough for any teacher to follow, as I am a general education teacher with no art experience and have only taught science implemented into my writing curriculum; I felt I could do this with my first grade students and be successful.

These lessons are interdisciplinary including art, science, reading and writing. Students and teachers can be actively engaged with nature while using technology to help facilitate personal feelings and thinking. Students are more willing to express how they feel with the use of technology. They are learning and having fun at the same time.

CHAPTER FIVE

CONCLUSION

Introduction

Learning is usually thought of as something that can only be done in a classroom. As test scores have become more important, students are spending less time outside and more time inside behind a desk “learning”. The result of spending more time inside has affected students in many ways. One such way is the dislike of nature. Many educational companies know this and have created curriculum that simulates nature so students never have to leave the comfort of the indoors. These simulations can never compete with what is “nature”. Students’ learning from a picture or video cannot compare to what is real; using all the senses to explore.

Over the last seven years as I began my Master’s degree through Hamline I always knew I wanted to do something with my students that involved being outside in nature. As I took my classes and decided on incorporating nature journals, I knew I needed to also involve technology to get my students excited about being outside. I wanted my students to have an appreciation for nature and decided to write curriculum for how to do this. While I was creating the curriculum I was always thinking about how to keep students engaged with nature while they were using nature journals and iPads.

During my research I found a lot of literature supporting outdoor learning. As Louv (2008) pointed out; research has shown time and time again that nature plays a role in children's health and their ability to learn. Being outside is not just about learning the kind of plant or animal students are observing, but also about using all parts of their brains and bodies to learn. Incorporating technology and art into learning in the outdoors will only enhance learning for students.

Throughout this capstone process I have experienced a variety of revelations in my efforts to incorporate this curriculum into the first grade classroom. Some positive, some negative, but all worthwhile to my learning. There are things I want to change for the future, but many things I would keep the same. I feel this curriculum is a way for teachers to get their students outside in nature to write, draw and reflect while creating new ways of observing and thinking.

Learning

As I watched my students get ready to do nature journals, I could feel the excitement in them. Even when we stayed inside that day because of the cold, they were thrilled about doing something different. They did not realize that they were working on a science standard, or working on their writing skills or observational drawings. They were in a different kind of environment and it was fun! I wanted students to realize that learning is not a teacher always talking, talking, talking and students answering. I wanted students to realize they were always learning and being outside was just another place for them to learn.

My students were just as eager to use iPads as they were their nature journals. Something the iPads could not simulate for my students was the ability to touch the grass,

smell the flowers, watch a bumblebee crawling on a flower, feel the cool autumn winds or the warm sun. As enthusiastic as my students got about seeing a shark video on the PebbleGo website, they were just as excited about watching the monarch butterflies fly from flower to flower in our schoolyard. They were fired up about capturing this on their iPad cameras so they could draw and reflect on it later. They were taking ownership of their learning, and they were choosing what they wanted to learn more about.

We started the school year off without using the iPads to reflect. We began reflecting by saying what we were thinking when we did our nature journals. We moved into writing simple sentences, “I felt happy.” and “It was good.” on the journal entry page. This was the extent of what most first graders can do early in the school year. As we continued doing nature journals, students were able to reflect a little more but were still pretty limited in their writing. When I added the iPads and we began using the Seesaw App, the reflections became a couple of minutes of students reflecting on their drawings and how they were feeling when they were doing their nature journals. I could hear the sense of joy and amazement in their voices at what they could do and how far they had come in nature journals. Students’ sense of curiosity helped me decide how to write the lessons for this unit.

Curriculum Writing

When I had my initial meeting with my committee I thought I was going to do a research paper. After giving my proposal and discussing it with my committee we realized I had an idea for writing a new curriculum to get students more engaged in nature. From this meeting, my advisor instructed me to research a curriculum writing method I would want to use. I decided to use *The Understanding by Design Guide to Creating High-*

Quality Units by Wiggins and McTighe. After reading this book and thinking about what I have learned over the years of doing nature journals in my class I finally put all my lessons together in one place.

As I began writing the lessons for this topic I realized that the ultimate goal was for my students to not only be engaged with nature but to learn about nature and hopefully become lifelong advocates of nature. This was helpful to me when I was writing the lessons. My lesson objectives were to get my students ready to be in nature and to focus on things we would find outside.

Being a teacher, I have read many lesson plans over the past decade and have written many lesson plans. I have never written a whole unit before and this experience was very challenging. Piecing together the different parts of nature journaling was not difficult, but it took a lot of thinking and analyzing what needed to be taught first and why it was important. Then when I taught it in class, I had to change the order of the lessons and durations. Teaching the lessons also helped me focus on the learning objective of each lesson and the attainable goal. I realize now that creating curriculum sounds simple enough because I have modified other people's lessons, but I had never made up my own lessons from scratch. Using the different literature reviews I read also helped me decide how I wanted to write my lessons.

Literature Collection

When I started researching for my literature review chapter, I was overwhelmed. I was not completely sure where I was going with my research yet, but I knew I wanted my students to be outside and I also knew I wanted to incorporate technology as well as being a reflective learner. I started out with finding the benefits of being outside.

After reading many articles and books about this subject, I realized that being outside was not just learning about nature; it has a lot of benefits for better mental and physical health too. While I was reading these articles I was delighted to find movements by local people who were promoting outdoor open play. My first grade colleagues were also posting and supporting articles from around the world promoting outdoor open play. This encouraged me to want to bring my students outside to explore and play.

As I continued researching about how being outside creates a more creative learner, I fell into my next category of how being outdoors helps promote the support and advocacy of the environment. When I taught third grade I taught many lessons about caring for the environment and students were able to comprehend most of it. After reading a book called *Beyond Ecophobia: Reclaiming the Heart in Nature Education* by David Sobel (2013) and taking a class called *A Sense of Wonder - Nature Education for Early Childhood* I realized I was introducing the scary environmental issues too soon. These resources helped me figure out how I was going to teach nature journals to first graders and teach my students to enjoy nature and not worry so much about saving nature. Along with taking students outside to learn, I wanted to use something all students knew how to use, iPads.

As I stated in Chapter One about how technology is all around us; as teachers we need to embrace the fact that these students are digital natives and we need to use technology to our advantage. I needed to show how technology could be used to enhance my students' learning. When I started looking for different articles, I was not surprised I found so many articles supporting the use of technology in the classroom. Over the years I have incorporated iPads into my classroom. As noted by Ertmer (2005) many teachers

feel technology is important and are using it in the classroom. However, they have largely used "...computer-related activities in which teachers most often engaged their students (for purposes of) expressing themselves in writing, improving their computer skills, doing research using the Internet, using computers as a free-time or reward activity, and doing practice drills"(p. 26). I feel this is true. I catch myself sometimes doing just these things. Using the Seesaw App was one way of helping me encourage my students to take charge of their learning. We ended up using the Seesaw App for more than just recording our reflections. There were times students did observational drawings right on the Seesaw App and then added a verbal reflection after they did their drawing.

Having a learning journal is another way for students to take charge of their learning. I have always loved journaling in my own life, but when I came across nature journals, I was delighted! When I started researching about the benefits of journaling, I confirmed what I already knew: journaling about oneself's own experiences is one of the best ways to learn. When my students journal they could use words and/or pictures to show what they were learning.

Art plays a vital role in learning about nature. Through the articles I read, I found that art is important because it teaches students how to see nature and appreciate it. Nature journals use art to help students learn about nature. My students were always excited about doing the art activities to get ready to do nature journals. The articles supported what I did in the classroom with nature journals. Students were engaged with nature when we went to our outdoor classroom. They got to choose what they wanted to observe and they were reflective on their observational drawings. This way of learning encouraged writing, observational drawings, oral language and science on a different

level. According to one of the articles I read by Malosh (2010), art activities and nature journaling promote higher-level thinking by making students analyze, synthesize, and show their comprehension of nature through art creation. I have to agree.

Challenges

There were some challenges I faced while implementing this curriculum into my classroom. The biggest challenge I faced was time. And I do not mean just how much time in the day but also the change of season. I wanted to start this right away at the beginning of the school year but ran into the issue of getting rituals and routines established for my classroom as well as not getting iPads for my students until closer to October. As the weather got cooler I had to find other ways to bring nature to my students. I also did not have enough time in the day to teach my students nature journals. I scheduled 30 minutes to teach nature journals, but really had closer to 20 minutes. This was just not enough time to go outside with all of our materials, sit and do an observational drawing, then be able to reflect on our drawings. In the lessons I wrote, I allotted 30-45 minutes per lesson and I believe this will allow for more time to be in nature and to be reflective.

Another challenge I felt was the age of the students. First graders, at the beginning of the year, are essentially still kindergartners. School is still pretty new and being reflective is something that really needs to be taught and practiced. As the school year progressed, I felt my first graders were only ready to be reflective of their learning around January. They were beginning to think about their learning and were able to explain their thinking. In first grade, students are just starting to read, so using the iPads as a reference to find the names of plants or animals was very difficult. This took up a lot of time and

guidance from an adult to try to find specific names of plants they were drawing. It was easier for me to already have the names of the plants and guide them to use these names in their journals. This, of course, affected how much science they were actually learning because they could not find the answers for themselves. I did use plant and animal guide books also, but like the iPad, it took a lot of time and lots of help for students to be able to find the plant they were drawing. Even though this was the case, students were still excited about just observing and drawing things from the schoolyard. I feel using nature journals for learning is possible in the primary grades, but the students may need more teacher guidance.

Future Plans

I have been using nature journals in my classroom for many years, but it has never really looked the same. Now I feel like I have a plan that can implement nature journals into the classroom effectively. I want to do nature journals again, but I think I would wait until the spring. I do not think it matters what age group I am teaching, I would still wait until the spring. The reason for this is because at the beginning of the school year it is so important to teach rituals and routines, and by spring students are ready to be learners outside because they know the expectations of the classroom. Deciding to teach nature journals in the spring is important because while the weather is still cold from the winter, the first few weeks of nature journals can be taught inside. This is another way to get students ready to go outside to journal when the weather gets nicer.

Conclusion

I learned a lot throughout this process. One thing I learned is that students are just

as eager to use iPads as they are to use a paper and pencil journal. My students showed me time and time again that they were excited to nature journal. They listened and worked hard in class so that we could go outside to journal. They also enjoyed using the iPads to reflect on their work. I was amazed at how students were really thinking about their drawing and were able to record themselves reflecting on what they drew. I was hoping my new language students or my students who spoke another language fluently would record their reflections in their native language, but they did not.

When I approached my principal about teaching nature journals in class to complete my Master's program, he was in full support. He encouraged me to do what I needed to do and to use the resources we had in school to help me. I enlisted the help of our visual arts teacher. She also taught my students how to do observational drawings in her class so that when they came back to my classroom they already had some background knowledge. Working with our art teacher, my students were getting the same language from me as they were with her. They also got extra time to practice drawing and to talk about their drawings.

Overall, I enjoyed this process. I learned a lot about how just being outside benefits all peoples' mental and physical health. I learned that as exciting as technology is for children, so is having their own personal journal they get to take home, as well as just being outside to do what they wanted. I hope that this summer my students continue to nature journal in their journals and continue nature journaling for as long as they can. I want my students to have a love and appreciation for nature and become advocates for the environment as they grow up. I wrote this curriculum with the teacher in mind. I want

to encourage any teacher to pick this up and implement it into their classroom. This is another way to have fun and learn with and about students.

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**Appendix A - Features of Natural Environments That Support Children's
Resilience and Strength**

Features of Natural Environments That Supports Children's Resilience and Strengths

Feature	Results
Natural surroundings and views of nature	<ul style="list-style-type: none"> - Better concentration - Better ability to inhibit impulses and delay gratification - Better coping with upsetting events
Special places in nature	<ul style="list-style-type: none"> - Opportunities to assimilate and transform experiences in places that are responsively alive - Opportunities to feel connected to the larger universe of living things - Memories that form a reservoir of calm to draw upon - Familiarity with nature as a favorite place that can be recreated in new places
Nature play	<ul style="list-style-type: none"> - Better concentration, ability to stay on task - Better motor coordination and agility - More cooperative, creative social play
Animal companions	<ul style="list-style-type: none"> - A feeling of acceptance by a responsive, nonjudgemental creature
Animal care	<ul style="list-style-type: none"> - Better self-control - Better social skills
Gardening	<ul style="list-style-type: none"> - Greater self-understanding - Greater self-esteem - Better interpersonal skills and ability to work in groups - Increased sense of connection and responsibility to the environment

Source: As cited by Rivkin (2014) -- Adapted from L. Chawla, "The Importance of Access to Nature for Young Children," *Early Childhood Matters* (June 2012): 50.
http://vps.earlychildhoodmagazine.org/wp-content/uploads/2012/07/ECM118_11_The-importance-of-access-to-nature_Louise-Chawla.pdf

Appendix B – Week One Lesson Plans

Week One - What is a journal? lines, and shading technique

Day 1: What is a journal?

Objective: students will be able to identify and understand what a journal is and how to use it

Materials needed:

- Variety of journals (diaries, science journals, electronic journals, etc.)
- Chart paper
- Marker
- Blank Journals (to distribute to students) - I used blank hard cover journals found on this website - <http://www.barebooks.com/> (I ask students to bring in \$3 to cover the cost of the journals), or you can make journals by stapling sheets of papers folded together, I also put a small “x” on the front of all the books so students know what is the front of the book and what is the back of the book
- Crayons, markers or colored pencils
- Poster of what a Journal page should look like every time you write in the journal
- Small post-it notes

Lesson:

1. Begin the lesson by showing the different kinds of journals you brought in. Ask students what are journals and why do people use them. On the chart paper, write down student responses.
2. Let students know they will begin keeping a journal using blank books. They will document what they see, hear and feel (emotionally and physically) when they are outside in nature.
3. Post the *What a Journal Page Looks Like* poster for students to be able to see and discuss that each journal page should have these things: date, time, and location. Journals show things that occur over a period of time in sequential order, students need to understand the importance of using the next available page in their journals for the next entry. The post-its will help with this. As students finish their journal entry, they can move the post-it to the next page so they know what page they are on. At the beginning of journaling, check each student’s page to make sure they are moving the post-it correctly. This should be done for the next couple of weeks to make sure students know what to do.
4. Tell students they will be getting their own journals and the first thing they are going to do is decorate the cover like a real book. They need to make sure to add the title,

“Nature Journal” and their names to show who the author/illustrator is. They can use colored pencils, crayons or markers or a combination of these things. Pass out journals and let students decorate their covers.

5. Once students are done with their covers, have a museum walk. This means, students leave their books on their desks, put their hands behind their backs, and walk around the room to look at other student’s work. They are not to touch anyone else’s work but just look with their eyes. Come back together and discuss what are some things you saw that you liked.

Day 2: Lines, curves and angles

Objective: students will be able to draw different kinds of lines

Materials:

- Nature journals
- Different kinds of writing utensils (thick and thin markers, crayons, art pencils)
- Colored pencils
- Chart paper
- Handout on lines
- Handout on curves and angles

Lesson:

1. Today students will be working on drawing lines. Talk about how lines make up different objects. They will practice making different kinds of lines in their journals today.
2. First thing they are doing to do is go to the page with the post-it on it. Before writing anything, the teacher should check to make sure all students on the first page. Then remind students of the *What a Journal Page Looks Like* poster and add the date, time and location.
3. As students are working on their journals, the teacher will make the drawings on the chart paper. Pass out the lines handout. The teacher draws diagonal lines using different drawing utensils. Have students practice drawing different kinds of diagonals. Continue working on the rest of the hand out.
4. Once everyone has completed the handout, give all students a single piece of tape. Turn the journal so it is horizontal, tape the top of handout into the journal page close to the binding, then fold the hand out in half so it can be tucked into the book. And move the post-it to the next available page.
5. As a class, discuss what they were thinking about as they were drawing their lines, what lines did they observe in the classroom to inspire the lines they drew?
6. Repeat with the curves and angles handout.

Day 3: Shading

Objective: students will understand how shading can add dimension to a picture

Materials:

- Shading handout
- Pencils and erasers
- Chart paper with different size shapes
- Ball or any three dimensional object
- Flashlight

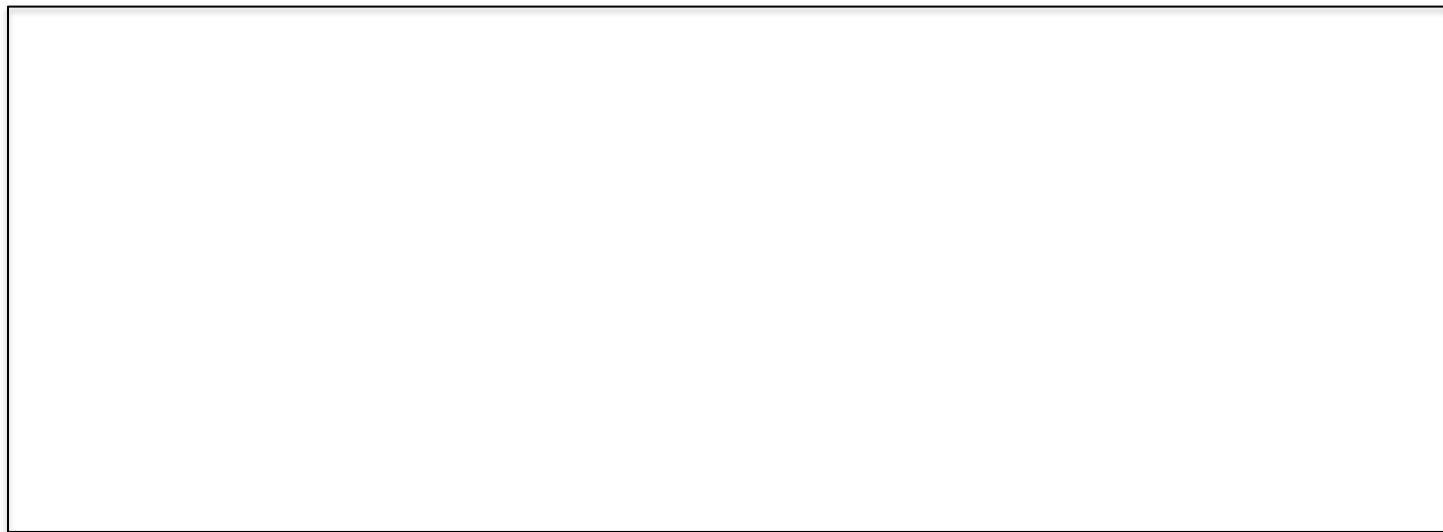
Lesson:

1. Today students will be working on shading. Hand out the shading sheet. Discuss with students how adding shading can make two-dimensional object look three-dimensional. Shading is used to show where light is hitting an object and shows depth.
2. Turn off the lights, shine the flashlight on the ball. Ask students what they notice (where the light is shining it looks white or brighter, as they look around the object, it looks darker).
3. Discuss how when we are drawing, we can add light and dark to make a flat picture look more real.
4. Shading can be done in a couple of different ways, hatching and crosshatching. Hatching is when the artist makes straight lines all going in one direction. Crosshatching is making straight lines in multiple directions. Demonstrate this on the chart paper.
5. Have students practice both methods.
6. Once everyone has completed the handout, give all students a single piece of tape. Turn the journal so it is horizontal, tape the top of handout into the journal page close to the binding, then fold the hand out in half so it can be tucked into the book. And move the post-it to the next available page.

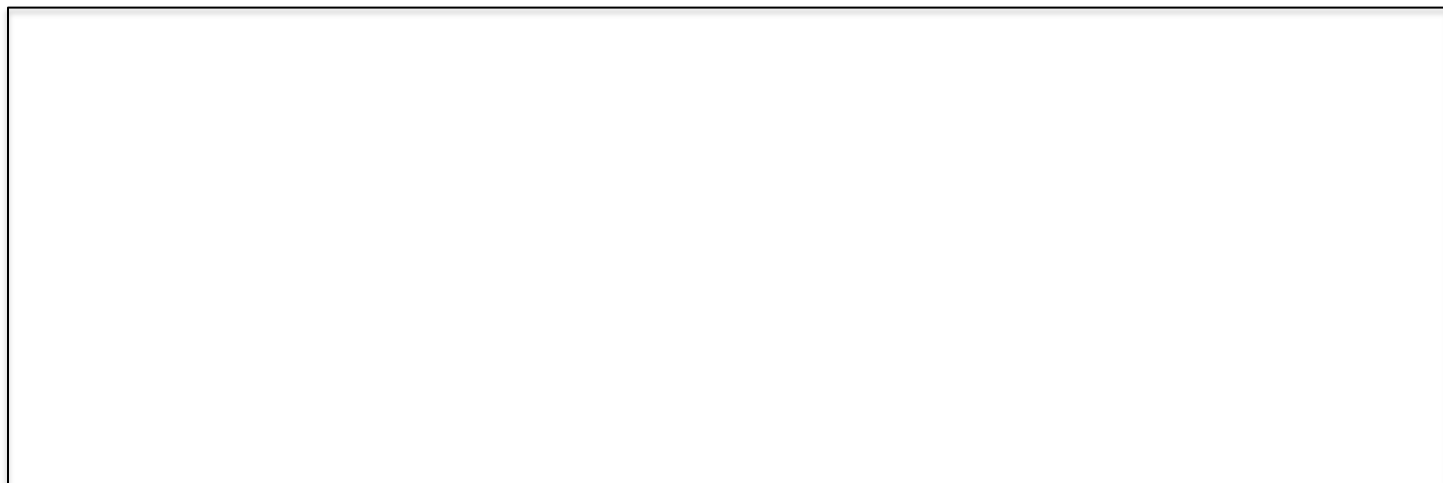
Name _____

Making lines

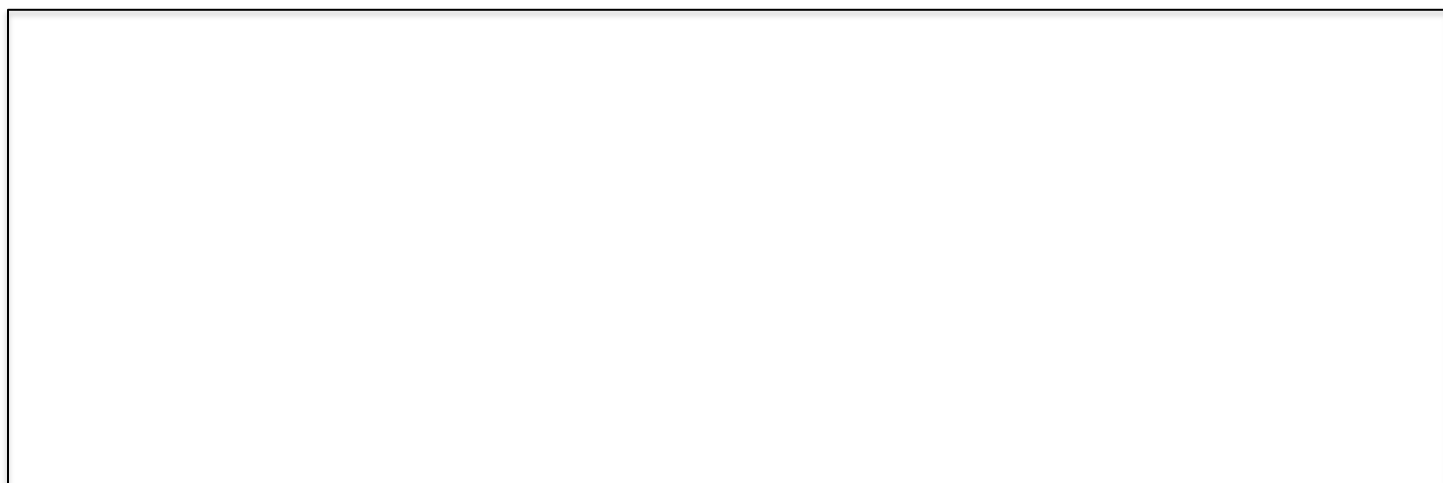
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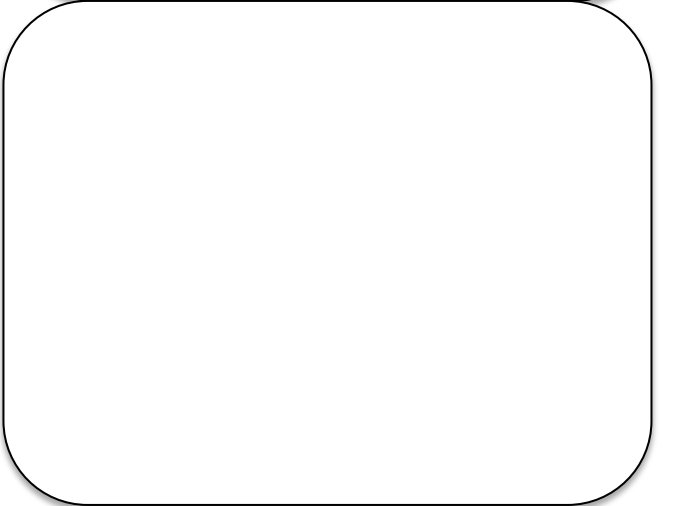
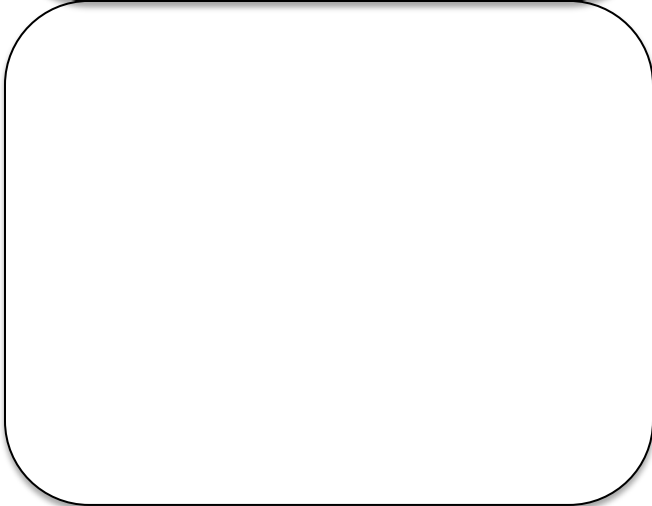
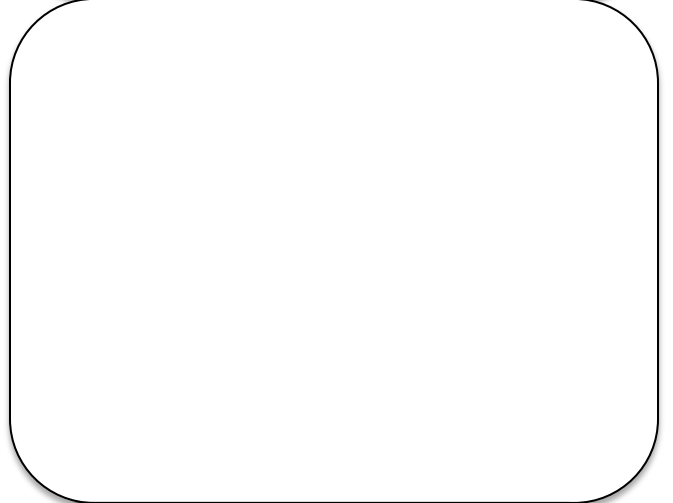
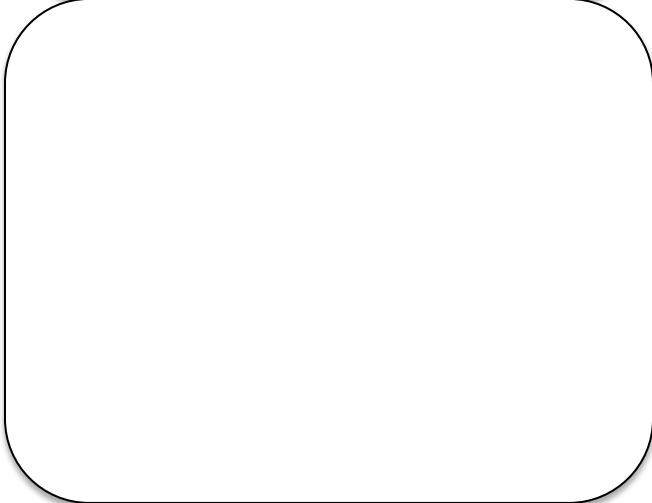
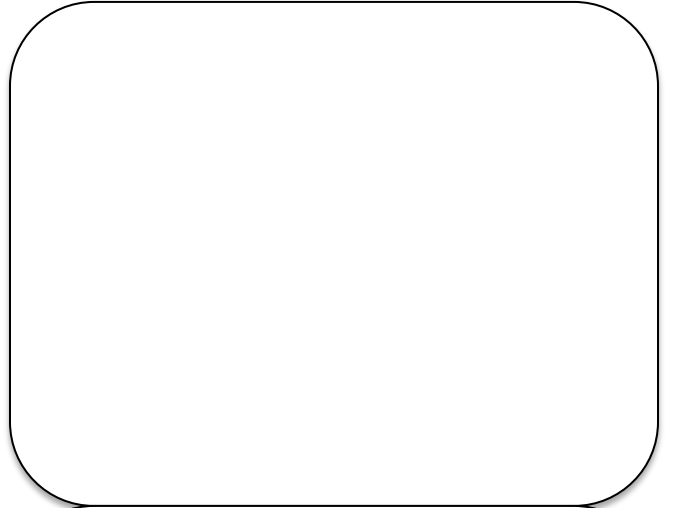
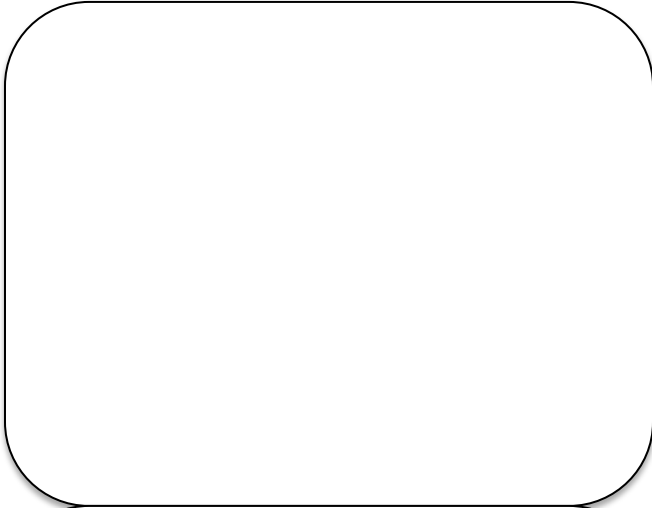
Vertical lines



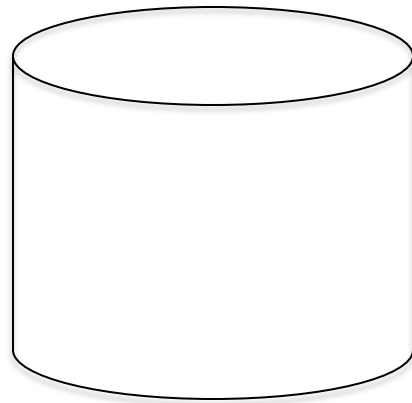
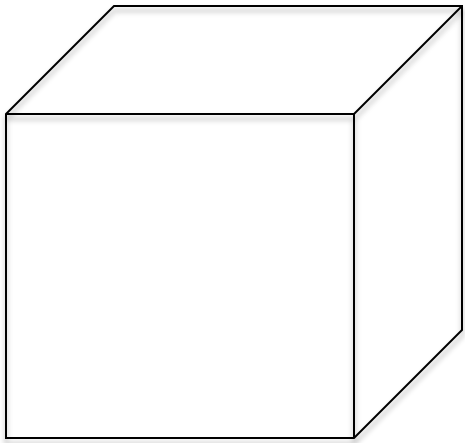
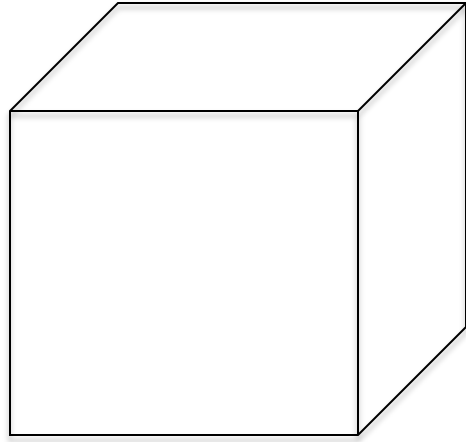
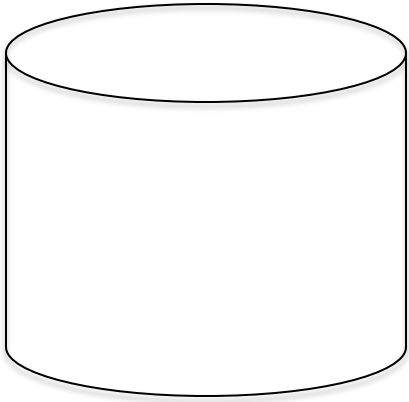
Horizontal lines



Curves and Angles



Shading



Appendix C – Week Two and Three Lesson Plans

Weeks Two and Three - How to do observational drawings in the classroom

These lessons can be taught and practiced over the next couple of weeks. This will give students the opportunity to be doing observational drawing. This will help students be more observant when they are ready to go outside to do nature journals and have more accurate journal entries.

Objective: students will practice drawing what they are seeing and not what they think something looks like

Materials:

- A variety of How To drawing books on realistic animals, plants and trees
- A copy of one page from the How To book for all students
- Pencil and erasers

Lesson:

1. Introduce How To books to students. Start with animal books, as students are very excited to draw realistic animals. Then move into trees and plants (this is what students will see more of when they are nature journaling outside)
2. Make a copy of one page and pass out to students.
3. Discuss how there are steps to How To books and students should follow the steps. The emphasis should be that they need to start at the beginning of the How To drawing and work their way to the end. This will help them focus on drawing pieces at a time and be successful at completing the drawing. Discuss with students how the things they are drawing are made up of shapes and to focus on the shapes then add details.
4. They need to go to the next available page in their journals to do their drawings.
5. Continue practicing with other drawings, adding color to the drawings to make them appear more realistic.
6. At the end of the lesson, remember to move the post it to the next available page.
7. Come together as a class and reflect on what you like about your drawings, what was hard, what you were thinking?

Appendix D – Week Four Lesson Plans

Week Four - iPad, verbal reflections, three-dimensional observational drawings and nature guides and Internet

This weeks lessons focus on the iPad and three-dimensional drawings. Use the Seesaw link to find the lessons on how to use the Seesaw App and how to introduce it to students. The educator should go through the Seesaw App lessons first to understand how to use Seesaw.

Day 1: How to use the iPad camera

Objective: students will be able to center objects in the middle of their camera and capture an image

Materials:

- iPad or tablet
- Variety of things from nature (flowers, sticks, pinecones, rocks, sea shells, etc.)

Lesson:

1. Introduce the camera function on the iPad. Discuss how taking photos with the camera is another way to capture nature.
2. Things to consider when taking pictures:
 - Hold iPad steady
 - Touch the screen to focus on your object
 - Make sure object is on the screen before taking a photo
 - To zoom in, either move the iPad closer to the object or pinch out with your thumb and forefinger (Note: sometimes this makes the object appear blurry)
3. Set out the different things from nature throughout the classroom. Practice going around the room to take pictures of these things and objects around the classroom.
4. Have students choose their favorite picture to show to the class and why it is their favorite picture.

Day 2: Seesaw App

<https://help.seesaw.me/hc/en-us/articles/205565309-Seesaw-Student-Challenge-Lesson-Plan-K-2>

Days 3: Three Dimensional Drawings and nature guides (books and Internet)

Objective: Students will be able to observe an object from nature and make a realistic drawing of what they see

Materials:

- Variety of things from nature (flowers, sticks, pinecones, rocks, sea shells, etc.)
- nature journals
- Pencils, erasers, colored pencils
- Nature guides
- iPad

Lesson:

1. Demonstrate to students how to make a three-dimensional drawing. Choose an object from nature. Take about 15 seconds to observe the object. Look at the different shapes that make up the object.
2. Start with the shapes you observe and begin drawing those in your nature journal.
3. Once the overall shape is drawn, begin adding details.
4. Use color pencils to add details.
5. Students should spend at least 7-10 minutes on an object, really focusing on the details. As students finish, they can find another nature object to draw.
6. Using the nature guide books and/or Internet try to find what you were drawing, write down what it is you drew.
 - www.discoverlife.org
 - www.enature.com/home
7. Use the Seesaw App to take a picture of your nature journal entry. Record your reflection. Choose your favorite drawing to share. Think about what you like about it, do not like, and why you feel this way. Once your picture is taken, record your reflection.

Appendix E – Weeks Five - Eight Lesson Plans

Week Five - Eight - Outdoor Classroom rules and expectations, nature journal and reflection

Weeks five through eight will focus on going outside to add nature journal entries. Spend the first day of Week five establishing rituals and routines for the outdoor classroom. Go outside, weather permitting. If it is not nice enough to go outside, students can use photos they have already taken of nature or things around the room.

Day 1: Establishing the Outdoor Classroom

Objective: Students will be able to establish a list of expectations for the outdoor classroom

Materials:

- Chart Paper
- Marker

Lesson:

1. Make a Y chart writing in Looks like, Sounds like, Feels like for the Outdoor Classroom
2. Ask students what they think being in the Outdoor Classroom should look like?
3. Ask students what they think being in the Outdoor Classroom should sound like?
4. Ask students what they think being in the Outdoor Classroom should feel like?
5. From this chart, begin a new chart with what the expectations of the Outdoor Classroom should be?
6. The class needs to agree and understand on the Outdoor Classroom expectations before going outside.
 - Expectations may include: stay in sight of the teachers, stay in one spot the entire time they are working, work the entire time, when journal entry is completed - begin a new one, be safe, etc.

Day 2: First trip outside

Objective: Students will be able to follow the Outdoor Classroom expectations and complete a nature drawing

Materials:

- nature journals
- Pencils, erasers, colored pencils, nature guides (all in bins)
- Reflection Poster

Lesson:

1. Before going outside, review the Outdoor Classroom expectations
2. Gather materials to go outside.
3. Have students choose a spot to work, spread out bins.
4. Have students begin working, walk around to check on how students are doing.
5. After about 10 minutes gather students in a circle. Discuss what they liked and did not like about their journal entries.
6. Go back inside and take out iPads. Take a picture of the journal entry and record a verbal reflection. Display the Reflections Poster (can add other reflection questions or change any of these questions to reflect what your learning objective is)
 - What you did that you liked.
 - What you did that you did not like and would change.
 - What do you think about nature journaling?
 - What do you like about being outside when journaling?
7. As students become more comfortable doing their reflections, they can begin doing more creative writing with observational drawings. They can write poetry about their drawings, create stories or focus on one drawing to do more research and learn about it.

For the next few weeks, continue doing nature journals outside as much as possible. Making sure to come in to record nature journal reflections on the iPads.

Appendix F - Rubric

Rubric

	Beginning	Developing	Proficient
Journal Entries	- A simple drawing	- Date, Time - A drawing with details -May contain color	- Date, Time, Location - A drawing with lots of details - Has color to show details - May contain labels to show what drawings are
Reflections	- No reflection	- 2 to 3 word utterance - focus on only one part of a reflection (like, didn't like, change, feelings, etc.)	- at least 8 word utterance - focusing on multiple parts of the reflection including: like, didn't like and want to change, feelings during the drawing, etc