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Environmental Education In Informal Learning Spaces

Integration, Design, and Access

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B.S. Elementary Education
Washington State University

Graduate Portfolio

In Partial Fulfillment of the
Requirements for the Degree of

Master of Science in Environmental Studies

Environmental Education Emphasis

University of Montana
Missoula, MT

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Introduction

My love and appreciation for the natural world began as a child, many of which I still do today; hiking with my family, watching (and trying to catch) the minnows in a stream, making mud pies and flower stew, helping on the farm – watching the compost steam in the winter–, collecting rocks, watching the trees and clouds shift with the wind, following a trail of ants, counting the different birds we heard, and tending to and learning about my plants in our greenhouse. I was fortunate enough to be brought up by parents that instilled the importance of a relationship with nature from a young age and encouraged me throughout the entirety of my relationship with nature. From childhood to adulthood my parents have encouraged and supported every opportunity I choose to pursue that stimulates my curiosity of the natural world and my passion to create a better world for generations to come. These experiences played an integral part in who I am today. As a result of the love I fostered as a little girl and the endless support I've been given, I felt inspired to pursue a master's degree in Environmental Studies.

During my time as a teacher, I struggled to get students outside to experience the natural world around them and connect with one another. Due to the COVID-19 pandemic, my classroom was online, making it easier to get students outside for assignments or brain breaks as most could venture into their backyard or out to a patio. During this time, specific COVID protocols in the district required math and English language arts to be the focus and strongly suggested they be taught from the curriculum book. This enhanced my personal beliefs of disagreement regarding learning in the classroom, from the book, for the test. While teaching, I stuck to the book but often found myself questioning how much the Common Core Standards truly developed the skills students would need to contribute to society productively and beneficially.

Following my time as an education and throughout graduate school I worked as an adventure camp counselor for the City of Missoula. I facilitate recreational activities for school-aged children such as camping, hiking, geocaching, rafting, and bird watching to name a few. Within this environment, despite having no curriculum, experiential learning taught participants valuable skills like resiliency, courage,

relationships, and teamwork, and of course provided countless opportunities to explore the natural world. Facilitating learning in partnership with nature was more so what I envisioned when I wanted to become an educator but something was still missing. As a trained educator, I recognize the importance of materials taught in schools which motivated me to pursue an Environmental Education Certificate along with my degree.

Throughout my graduate school journey, I did what I could to incorporate elements of environmental education into my job as a recreational facilitator but it was difficult without altering the framework of the program. During this time I also interned at the PEAS farm in the Fall of 2022 as a Farm Educator guiding students to learn about an urban farm. The informal learning environment of the PEAS Farm provided experiential learning opportunities for students that corresponded with what they were learning in class. As a Farm Educator, I facilitated student learning in partnership with the environment of an urban farm and the classroom teacher. Although this experience was enjoyable and informative for me as an educator, it too lacked the range of continuous environmental education among learners; only providing a snapshot of specific environmental education for young elementary students.

Together these experiences have helped me hone my passion for being a facilitator of learning, as well as guiding me toward the realm of informal learning in partnership with environmental education.

I believe learning occurs everywhere and anywhere, all the time. In contrast to formal learning spaces, particularly that of the classroom with traditional standardized curricula and lessons, informal learning spaces provide various opportunities for learners to develop socially, cognitively, and spiritually. In this portfolio, I will focus on using learning spaces to facilitate environmental education and promote environmental literacy. I will discuss the incorporation of the framework of environmental education into an experiential and informal learning environment; the creation of a curriculum that fuses formal and informal learning, providing upper elementary students opportunities to participate in hands-on experiential learning opportunities of environmental education; and the direct and indirect benefits nature-based experiences can provide when implemented into a therapeutic group home.

Embedded in each component is an environmental education framework that has been adapted for the diverse setting and requirements of the respective organization associated with each component. Below is an overview of the environmental education framework that will be integrated into the three components.

The three components examine three diverse informal learning environments and determine how each can be used to promote environmental literacy. Following the framework overview is a brief summary of the three components within the portfolio.

Environmental Education Framework

Environmental literacy, is the end goal of environmental education, which is the understanding, ability, and motivation to make responsible and informed decisions regarding the relationship between humans and their natural and artificial environment (Meredith et al., 2000). This goal is achieved by developing the four attributes of environmental education: awareness/connection to place; knowledge; problem-solving skills; and taking action/service. These elements are typically taught in said sequence, in specific programs the elements progress often from kindergarten through 12th grade (Meredith et al., 2000). In other programs, adaptation would be required but all ages/grades can participate in and achieve all elements.

Starting at first grade or younger, or with individuals that lack awareness of nature awareness is created by the acknowledgment of, connection to, and engagement with their immediate surroundings through hands-on, place-based experiences (Kudryavtsev et al., 2012). Once a connection to and awareness of the natural environment has been made, knowledge is acquired regarding their environment and beyond, and an understanding is developed of the relationship between humans and the environment (Meredith et al., 2000). Aligned with the cognitive maturity of the child or individual is the development of problem-solving skills. Skills such as identification, exploration, implementation, and evaluation are deployed to investigate problems and solutions, bolstering critical thinking about environmental problems (Kudryavtsev et al., 2012). The final element of environmental education is taking action/service in which experiences, knowledge, and problem-solving skills are

combined into a community service-learning project. Within a specific program, this element, often associated with older children, and students in upper high school, individuals identify a problem or challenge and then plan and implement the plan to solve or mitigate the problem that was identified (Meredith et al., 2000). In other types of programs, all aged individuals can participate in this element, however, the planning component might be minimal or removed and the action piece is direct and produce an immediate and visible result. Within this element, regardless of age, individuals are modeled for and or model how to take action toward environmental change.

Although the progression of these elements can be associated with an age or grade, it is not required so long as each element is adapted for the constraints of the program it will be implemented in and for the needs of the individuals. Adaptation of an environmental education framework may result in various challenges relevant to each program. Perceived challenges may be associated with the adaptation itself, i.e. the depth at an element is achieved varying cognitive levels and duration variations within an informal setting.

The element essential to an environmental education framework is first the development of awareness/connection to place as this establishes sensitivity and appreciation of the environment, essentially, developing individuals' reasons to care about the environment and build from the following elements of the framework.

A basic outline along with approximate grades and ages often associated with each is below. It is important to keep in mind that the outline below is constructed to fit within a specific type of program and will be adapted accordingly for each component.

- **Awareness / Connection to Place**
 - Kindergarten and beyond (age 5 and up)
 - Place-based experiences and developing an awareness
- **Knowledge**
 - 2nd - 5th (ages 7-10)
 - Relationship between humans, the environment, and environmental problems
- **Problem-Solving Skills**
 - 5th - 8th (ages 10-14)
 - Critically thinking about environmental problems and solutions
- **Taking Action / Service**
 - 8th - 12th and beyond (ages 14-18+)
 - The culmination of other components into service-learning

For the purpose of this portfolio the age groupings will be disregarded, instead the skills and characteristics of each element will be the focus and the framework will be adapted based on the restraints and goals on the following three components and their respective program.

Below each component is briefly summarized.

Component 1: *Environmental Education Framework Integration: Missoula Parks and Recreation Summer Camp*

The first component will examine the opportunities within an informal learning space to incorporate an environmental education framework. I will utilize my knowledge gained throughout my time in the EVST program, particularly from coursework grounded in environmental education, and the experiences from working with Missoula Parks & Recreation to develop an outline of the camp's structure with the integration of an environmental education framework. An outdoor recreation program structured with an environmental education framework can add to the engaging hands-on, place-based experiences children have while participating in the program. The integration will utilize these characteristics to develop various elements of environmental education and foster environmental literacy.

The knowledge gained from completing the Environmental Education Certificate and my experiences working within an Outdoor Recreation Program will allow me to incorporate an environmental education foundation into the organization of programs, specifically the Outdoor Adventure Programs through Missoula Parks & Recreation. For the past two years, I have worked at Missoula Parks & Recreation where I have wanted and tried to integrate foundational elements of environmental education. I will use this component of my portfolio to show program directors that environmental education can be embedded in the program and how to do so without altering the core characteristics or taking away the opportunities and experiences of the participants.

Component 2: *Curriculum Design, Fifth-Grade: Garden City Harvest*

The PEAS Farm provides many students with the unique opportunity to explore and learn about urban farming through hands-on experiences. While interning there it

was apparent that these beneficial experiences were only being taken advantage of by young elementary classes. Although still advantageous for the learning of those experiencing the farm, I did not see a student above the third grade while working there. After discussing this with the Farm to School program director, I was informed that it was often because older grades had more required and tested standards that take priority. I did not like this reasoning. I can say, with almost certainty, most, if not all, children rather learn outside, from experiences, experiments, investigation, and exploration of their environment. With this in mind, I knew I wanted to find a way to encourage upper elementary educators, particularly fifth grade, to more frequently venture outside of the classroom while still addressing the standard requirements. To do this, I combined my knowledge and experiences from being an educator, what I learned in my coursework in EVST, and my time working at the farm to extend informal learning opportunities for students at the farm to enhance student learning and foster their journey towards environmental literacy.

Component 3: Therapeutic Group Home Patients, Nature-Based Experiences, and The Promotion of Environmental Literacy

During the Spring 2022 semester, while enrolled in the EDU 588 Action Research course, I planned, developed, and implemented a study that investigated the effects nature-based experiences had when implemented in a therapeutic group home. I used these findings to inform the director of a group home whether or not nature-based experiences deserved the allocation of resources devoted to their planning and execution. The study was designed to examine the associated benefits of outdoor experiences and the ability to provide a space for at-risk teen males to develop their social and psychological skills. My findings along with the evidence presented from a literature review convinced the director to acknowledge the potential therapeutic benefits and support the implementation of additional outdoor experiences.

With the time I've spent partaking in nature-based activities along with what I have and continued to gain about environmental education and environmental literacy I felt there was more the implantation of outdoor experiences could offer the adolescents

of the group home. In addition to the direct outcomes of implantation, i.e. therapeutic benefits, I examined potential indirect benefits, mainly how the implementation can extend environmental education to a diverse group and promote environmental literacy within them.

As the group home was therapeutic based, I want the experiences implemented to align with the techniques of a wilderness therapy program while also incorporating the ideals of environmental education. This component will present my study and initial findings along with a discussion of the role implementation of nature-based experiences play in extending access to environmental education and promoting environmental literacy among at-risk adolescents in non-traditional living situations.

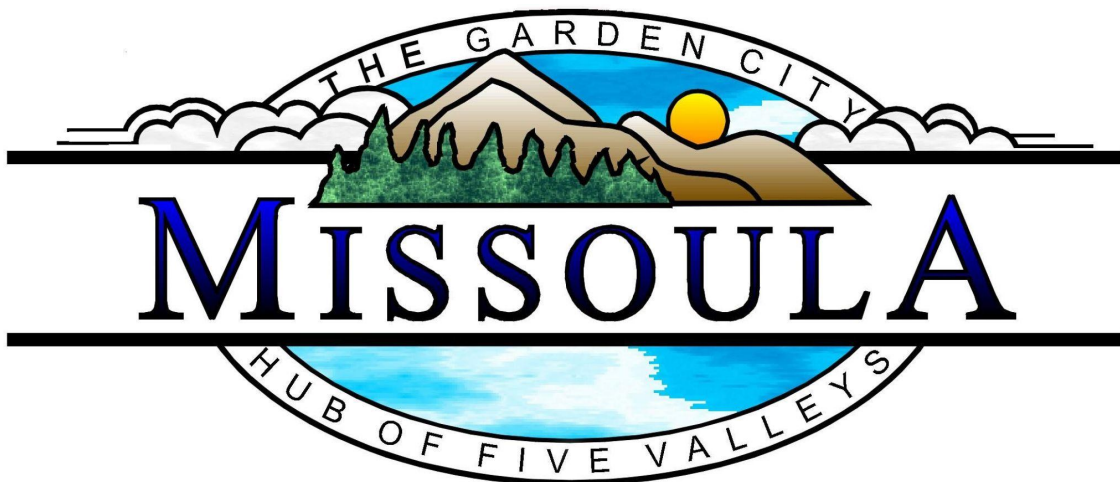
Together these components provided an avenue for me to continue pursuing my personal, academic, and professional goals in ways that were outside the scope of my past course and fieldwork. The information compiled in this portfolio accounts for my knowledge and experiences acquired during my time in the EVST program, providing only the stepping stones for my future endeavors.

Many sleepless nights were put into the preparation and formation of this portfolio and I am proud to present it to whomever is interested and hope it is well received.

Component 1

Environmental Education Framework Integration:

Missoula Parks and Recreation Summer Camp



Overview

Missoula Parks & Recreation Summer Camp Program

P Positive	A Attitude	R Responsibility and Respect	K Kindness	S Safety
<p>Welcome Our team is dedicated to the relationship our outdoor spaces and play have in the development in a child’s life. At Parks and Recreation, kids can explore the natural world, learn lifelong skills, build resiliency through adventure, and develop relationships with caring staff. These ideals are more important than ever and are at the heart of all our programs. We strive to be the place where your child can find success, struggle, try something new, find a friend, laugh, and adventure.</p> <p>Challenge By Choice The freedom to back off from participation – but not an invitation to opt out! We facilitate participants to stay within their growth zone and to expand their possibilities in a welcoming safe atmosphere.</p> <p>Experiential Education We learn by doing. Leaders facilitate experiences in an atmosphere of safety and fun where everyone has an opportunity to explore the natural world around them.</p> <p>Inclusive Recreation We strive to create opportunities where we can all recreate together as a community.</p> <p>Supervised Outdoor Free Play Staff provide specific opportunities for youth to play alongside their peers in the outdoors. Using this supervised unstructured time to use their imaginations and explore the natural world.</p> <p>Strengths-based Approach We appreciate participants for exactly who they are and work to find their strengths. Staff may set the structure, but the participants are active in the process and are valued for their individual skills and talents.</p> <p>Teamwork Our programs promote sportsmanship, healthy competition, and playing with heart.</p> <p>Community When we play together, we build our community. Exploring neighborhood parks, trails, and open spaces helps develop strong community-minded citizens.</p>			<p>Camp Formats/Location Most camps run Monday - Friday with the expectation of various adventure-level camps which run on a shortened week schedule.</p> <p>Day camps</p> <ul style="list-style-type: none"> - Daily registration - Ages 4-12 <p>Week camps</p> <ul style="list-style-type: none"> - Neighborhood parks - Ages 5-12 <p>Adventure</p> <ul style="list-style-type: none"> - Five days, no overnight - Ages 5-12 <p>Adventure 1 (ages 5-12)</p> <ul style="list-style-type: none"> - Two days, one overnight - Ages 5-12 <p>Adventure 2</p> <ul style="list-style-type: none"> - Four days, two overnights - Ages 8 and up <p>Adventure 3</p> <ul style="list-style-type: none"> - Four or five days, three overnights - Ages 8 and up <p>Adventure 4</p> <ul style="list-style-type: none"> - Five days, four overnights - Ages 8 and up <p>NOTE: Some Adventure camps have varying age ranges and are specific to younger (5-8) or older (9-13) groups but typically range from ages 5-12.</p>	
<p>Reference: City of Missoula Summer Camps 2023 https://www.ci.missoula.mt.us/3017/Summer-Camps</p>				

Integration of Environmental Education

Within recreational-based summer camps there is a unique opportunity to bring environmental education outside of the formal learning setting. Such as those planned by a classroom educator are often guided by the educational timeline of standards, curricula, and tests. Summer camps like Missoula Parks & Recreation, along with similar camps, provide an informal learning environment for youth to explore and interact with their natural environment through various structured and unstructured activities. With camp program facilitators in place of certified educators and a range of ages, abilities, and cognitive levels in one group, a variety of adaptations, methodologies, and experiences will be required to integrate an environmental education framework into the summer camp foundation.

The characteristics of the program and the experiences of the campers were encouraged to remain constant in the foundation of the camp to make the framework outline straightforward and more appealing to those in charge and who I will need to convince of its implementation. Keeping the basic characteristics and experiences of the camp is essential to creating a strong foundation within a range of ages and cognitive levels for environmental education to progress and build off that foundation to foster the progression toward environmental literacy.

Characteristics of the summer camp environment allow campers to experience challenges, teamwork, community, experiential learning, and exploration that foster the development of relationships, curiosity for the natural world, and social and outdoor skills among the youth. With time and age factors in mind, the integration of an environmental education framework will sequentially progress, however, the process and depth of each will be adapted to suit the constraints of the program. Instead of altering the characteristics and foundation of the camp, this integration would add to them in such a way that guides their experiences toward increasing and improving their environmental appreciation and responsible behaviors. By providing an environmental education framework to direct these experiences, participants will begin or continue to be exposed to various ways humans interact with their environment. In addition, they will begin to develop ecological knowledge and knowledge of the interactions between

humans and the environment. Due to the age of most and time restraints, they will be modeled for and briefly participate in identifying problems from experiences within their environment and their potential solutions. Finally, participating in and being modeled for a range of activities and experiences provides participants an example of ways individuals or communities can make a difference and encourage a healthy environment we can continue to recreate in and one they can enjoy.

With this integration, campers will not only gain joy from the activities and nature they experience, but they also are able to develop connections and skills that drive curiosity for their environment, and the perceptions and attitudes to appreciate, create, protect, and sustain a healthy natural world.

Due to the informal nature of the learning environment of the summer camp, the range of ages, abilities, and cognitive levels, and the camp counselors in place of certified educators, the components of environmental education will be achieved to varying degrees and measures of success than in a formal setting. In addition, the four components can progress over each camp's duration rather than by age or grade, however, the cognitive level of groups will dictate the depth to which a component is infused.

Within the summer camp setting, various challenges in implementing environmental education may arise. Challenges associated with the depth of each element able to be explored are directly related to the short week duration of a camp, age ranges, abilities, cognitive level of the participants, rate of progressions, and camp counselors in place of certified educators. Although this component will outline integrating an environmental education framework into the current camp structure and individual camps, another option could be creating a camp specifically for environmental education, facilitated by certified and or appropriate personnel. This, however, is an option but is not depicted within this portfolio.

Below I will discuss how each element of environmental education can be adapted and integrated in such a way that aligns with the foundations and informal nature of the summer camp.

Awareness / Connection to Place

Place-based experiences and sense of place within the natural environment

Developing youths' awareness of the natural environment and creating a connection to place is the foundational building block in environmental education. The process of building awareness should be first and therefore often begin at an early age to develop an appreciation and sensitivity for nature and the natural environment. Through hands-on experiences, youth are able to create meaningful connections with their natural environment, developing a sense of place. For younger age groups, about five to seven and up, or others that lack a connection to place, this encompasses activities that promote interacting with, becoming aware, and creating a bond with their natural surroundings, this could include: structured or unstructured play/exploration, crafts in nature with natural materials, observing nature, etc. As the age of the youth increases, developing awareness and connection to place should be continued with hands-on experiences in or with their natural environment but will decline in the degree of emphasis as other elements of environmental education are integrated. As participants increase in age, about seven and up, the awareness developed should slowly begin transitioning to incorporate developing an awareness of human interactions and impacts on the environment. The focus of this should be introducing and bringing awareness to the interactions and impacts rather than attempting to fully understand them, this will come with the following element. This could include activities such as: visiting community gardens, local farms, recycling centers, wildlife refuges, etc. Although there is a variation of activities among age groups, each age group will benefit from each activity. With that being said, older participants that have already developed a baseline awareness of their natural environment can and should begin being encouraged to develop an awareness of the challenges and interactions associated with their environment. If a group consists of older participants, activities and experiences should correlate with the cognitive needs of the group. While activities that develop a baseline awareness/connection to place can and should be incorporated, other activities that also encourage the awareness of interactions and impacts should be included. This could mean the program facilitator or a partnering organization leader encourages older

participants to focus on human interactions when observing or discussing their environment, especially if that participant is in a group of younger children. This progression of awareness, i.e. awareness, connection to place, and appreciation of the natural environment to awareness and acknowledgment of human interactions and environmental challenges, lays the groundwork for the next component, knowledge.

Possible Activities to Develop Awareness/Connection to Place

Activities should be centered on hands-on experiences with their natural environment.

This could include but is not limited to the following:

- Structured and unstructured play in natural areas
- Camping/hiking/backpacking/rafting/fishing/fire building/etc.
- Paint/dye with naturally made colors
- Nature scavenger hunt
- Nature collage
- Storytelling of natural objects
- Sense of place – written/illustrated/discussed
- Observe birds + make bird feeder
- Exploring aquatic/terrestrial habitat – playing in/observing
- Visit local farm/community garden
- Visit recycling center/landfill
- Visit and explore MPG Ranch/wildlife refuge/recreational areas/etc.

Knowledge

Humans, the environment, and environmental issues

The second element of environmental education, knowledge, builds on the experiences, awareness, and appreciation gained from the previous element. Providing participants with the knowledge to help them understand their natural environment, human-environment interactions, and environmental challenges. Within one camp week, the knowledge provided needs to align and relate to the connections, activities, and experiences participants had when building awareness of their natural environment as well as be appropriate to the cognitive level of the campers. By doing this, the youth will be able to connect their concrete experiences with abstract knowledge, allowing them to better achieve an understanding of the information shared. Regardless of age, the participants should gather or be provided information that will assist them in

understanding their environment, challenges, and interactions associated with the concrete experiences from that week's camp activities. Younger participants, about six to eight years old, may benefit more if the knowledge is relatively concrete or not too abstract or in-depth as this might be difficult for them to grasp. Then the knowledge provided and level of understanding can progress with the campers' age and cognitive level. Still using their concrete experiences and understanding of their environment to understand and make meaning of human-environment interactions and environmental challenges.

Knowledge can be delivered in various formats, camps can partner with outside organizations, visit the organization's site/project, or bring the organization to the camp participants in an outdoor, convenient, and relevant location for learning to occur. Program facilitators (camp counselors) can also provide participants with knowledge through explanation/instruction, modeling, read-aloud, and/or storytelling.

As the Missoula Parks & Recreation Summer Camp program is not rooted in environmental education, program facilitators are not required to have or be trained in relevant environmental knowledge. For this reason, relevant background knowledge will need to be provided to program facilitators to ensure accurate information is conveyed to the participants. However, the informal learning environment which characterizes the summer camp entails learning be done by engaging in various activities. Therefore, program facilitators providing participants with information should not be the focus, instead, the facilitation of activities that offer opportunities for participants to gather information and make their own meaning. Experiences and activities must accompany any new information presented to camp participants. Meaning, for the knowledge component of environmental education to be successful in the setting of this program, must be integrated through other elements, specifically the awareness/connection to place or any other activity and experience, and delivered or discovered organically alongside relevant activities. Therefore, the program facilitators can share the knowledge they know as well as facilitate activities where a more knowledgeable person provides the information or allows campers to discover knowledge.

Possible Activities to Develop Knowledge

Activities should be centered on the sharing and gaining of knowledge through teaching, modeling, and discussing. This could include but is not limited to the following:

- Build on activities from the awareness component

- Team up with outside organizations

 - Missoula Butterfly House and Insectarium

 - Friends of the Clearwater

 - Animal Wonder

 - Montana Natural History Museum

 - Recycling Works / Republic Services / Pacific Recycling

 - Waste Less Works / Home ReSource

 - Montana Forest Service / Montana Fish and Wildlife

 - Garden City Harvest

 - Compost Collection Service

 - MPG Ranch

 - Environmental/conservation/restoration organizations in Missoula

- Model / discuss / practice activities and choices that benefit the environment

 - BEAR Aware

 - Leave No Trace

 - Purify drinking water

 - Crafts, activities, projects, and ways to reduce/reuse/recycle

 - How/what to compost

 - Biking/walking around town

- Native plants/how to identify them/when they grow/their importance

- Native wildlife/how to identify tracks and scat

- Local produce grown/locally grown

- Effects of pollutants have on natural environments – noise/light/air/trash

Problem-Solving Skills

Critically thinking about environmental problems and solutions

Regardless of age, participants should and can be asked to enhance and apply their critical thinking skills, at whatever level they are at, to relevant environmental problems. As camps are five days or less and need to be planned ahead of time, problem-solving and critical thinking can be integrated with two ways that will fit within these constraints.

The first is activating participants' critical thinking during discussions throughout daily activities such as play, hiking, swimming, lunch, transportation, etc. This would

encourage participants to critically think about their daily activities inside and outside the program, associated environmental problems, and the process of developing solutions. The second is, following experiences that developed participants' awareness and knowledge, take a portion of a day to focus on critical thinking, identifying (or reviewing/discussing) problems relevant to their experiences (or focusing on one experience and the problems associated) and brainstorming solutions that are achievable by the group.

Due to age variation, timeline, and informal environment of the program, an in-depth process of identifying problems and developing solutions would be difficult to achieve. Rather, the structure of the program provides multiple opportunities for problems to be discovered and the development of solutions to be facilitated and or modeled. As all age groups should be encouraged to critically think about environmental problems and solutions, the program facilitator and or the lead of the partnering organization will need to provide greater facilitation for younger groups. However, as participants increase in age less facilitation will be needed, and follow-up questions may be asked, leading to greater discussion of the problem and the possible solutions. Problem-solving skills can be done in conjunction with other activities, during downtime, or as its own activity during the day.

Although this does not merit the same time and attention that would be achieved in an environmental education-based program, longer timeframe, or within a formal learning environment, participants are exposed or continued to be exposed to relevant environmental problems and the process of developing potential solutions. In addition, these exposures and modeling allow participants to see themselves as capable of and the process behind developing a solution. The following component, taking actions/service builds on this idea and exposes participants to seeing themselves as part of the solutions and making a difference.

Taking Action / Service

The culmination of other components

Taking action, the final element of environmental education, allows participants to understand what actions and to partake in those actions that keep the environment healthy. As this is the final element of environmental education, participants should build on the connection, knowledge, skills, and motivations developed throughout the week by providing opportunities for participants to understand how their actions can make a difference. By providing opportunities to partake in and demonstrate actions that improve and sustain the health of the environment, participants become active members of their community. In addition, participants can see themselves, along with their peers, and community members as part of the solution, empowering and motivating them to continue taking action at home, at school, or in the community.

For such action or service to fit within the time constraints and the variation of age and cognitive level, the final component of environmental education should take a generalized and hands-on approach to direct service. Direct service projects will allow participants to actively partake in the solution, regardless of age, the outcome and benefit of their participation should be apparent. Projects and activities should be associated with the experiences and weekly camp theme, in a hands-on way that requires campers to be present as active participants. This will allow participants to contribute positively to the environment they've experienced throughout the week, wrapping up the week of recreation, exploration, and appreciation.

One key feature of direct service projects is that they must correspond with and be a culmination of each element prior. In environmental education elements build on one another allowing participants to make meaningful connections between each component. Therefore, the theme of the week will influence the awareness and connections made, the knowledge gained, the focus on critical thinking, and the direct service action. Although improving the environment will be the focus of the service action, said action must allow participants to connect their experiences, knowledge, and skills to real-world situations and issues. As the experiences of participants differ depending on variables such as, the age of the group, camp location, and weekly theme and activities, the corresponding service projects will also differ and vary to align with the experiences and learning of various weekly camp groups.

Possible Activities to Develop Taking Action/Service

Direct action service projects should correspond with previous components, experiences, and knowledge attained throughout the week. This could include but is not limited to the following:

- Cleaning up a river bank, park, campground, trail, local fishing pond, etc.
- Pulling noxious weeds
- Planting native plants
- Providing trash bags along the river
- Build and distribute bird houses
- Partner with the forest service, assist maintaining trails, cleaning informational posts, etc.
- Initiate recycling or composting, can be done within one group, collaboratively, or initiated by one but includes other groups

Program Week Outline Of Environmental Education Components

Camps that are four days are often adventure camps for older participants with awareness, connections, and appreciation already developed, therefore human interactions, knowledge, and problem-solving can be the focus with service action at the end to connect their experiences of the week. On the other hand, shorter camp weeks, i.e. two or three days, are often for younger participants. Therefore, the focus of shorter camps should be the developing of awareness, connection to place, and knowledge, only discussing human/environment interactions and problem-solving when and if obliquely and engaging in a service action project if time permits. As previously mentioned, the focus of shortened camps, which are typically made up of predominantly young participants (five to seven or eight), should be a connection to place and building an awareness and appreciation for the environment.

As most camps are either full or half days Monday through Friday the week outline example below will follow a full-day Monday through Friday camp schedule. The schedule overview only provides a sequence of elements throughout the week. Once an element is introduced, it should be included and visited each day following. For example, once 'knowledge' is introduced on Tuesday, it should be re-visited throughout the week, it may only be the focus on Tuesday when it was introduced but should continue to be discussed. The table below depicts the sequence of elements throughout the week, the **bolded** items indicate the focus of that day.

Schedule Overview

Monday	Tuesday	Wednesday	Thursday	Friday
<ul style="list-style-type: none"> ● Awareness/connection to place 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge ● Problem-solving skills 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge ● Problem-solving skills 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge ● Problem-solving skills ● Taking action/service

Immediately below is a detailed description of what each day might consist of when following the outline above. Below the description is a chart that briefly depicts the focus element(s) of each day and associated activities. This chart aligns with the outline above and the camp theme below.

Example Camp Theme: Hiking

Example Below Corresponds With Weekly Framework Outlined Above

Monday:

First day of camp. Expectations are set, and campers get acquainted with their facilitators, peers, and the daily schedule.

Participants will start small and work their way up to activities at the end of the week, the first day might consist of small, easy hikes or walks through wooded areas in addition to various games, playground time, or crafts. They will take a small hike today and combine it with lunch and playtime in said area.

During their hike, participants should be instructed to collect natural materials that have fallen to the ground or are dead to make art with later. Facilitators should remind participants to be aware of all the different things they can see, their color, texture, size, shape, etc., and the different materials they can use. If possible the craft should be done along or at the end of the hike.

It could also be fun to see if the participants can name any plants along the hike or the materials they are using.

Tuesday:

Participants will likely start their second day with a game or playing at the park followed by a hike with exploration, play, and snack or lunch throughout.

A game could be participants practicing camouflaging with their surroundings to play a version of hide N seek. A craft could be participants picking an area that they believe will help them hide or something animals may use to camouflage, using what they found to play or draw. These activities, along with the hike and time in nature will continue participants to develop awareness and connection to place.

During the hike the facilitator should begin providing knowledge to participants about their surroundings, this might be an identification scavenger hunt. Small groups of participants can be given bird, flower, shrub, and/or tree identification sheets or each facilitator will have said sheet working with participants to identify what they see.

Small groups can be utilized for older participants, approximately nine and up, while participants working with facilitators will likely work best for younger kids, approximately eight or nine and younger. This activity will activate their awareness and encourage them to begin learning the names of things around them.

This can also be extended to have campers identify the location flowers are growing or what trees they often find together to encourage the knowledge of campers to make connections among the relationships within nature.

During and following their hike, participants should also be given unstructured free time to play and explore their environment to continue developing connections to place.

Wednesday:

In a five-day schedule, Wednesday is a down day for camp participants to rest.

Most of the day participants will likely spend much of the day unstructured free time exploring a wooded park or green space or playing games as a group and crafting. Therefore, they will continue developing an awareness and connection to place.

Facilitators or in partnership with an entity like the Forest Service or Missoula Urban Forestry can use this time, to emphasize the campers' impacts will playing in the

wooded area near a trail or behind the park, discussing different plants in the area and/or how humans are impacting the area and working to improve it.

For example, at Greenough Park in Missoula certain areas are blocked off due to the planting of saplings or the extensively marked trail at the start of the Water Works hike in Missoula. This can be shared and discussed or when/if experiences correlate with similar areas, as they often do, discussing while the group is present, helping connections be made when teaching them about human interactions and start them thinking critically about other ways humans interact with the environment.

The program facilitator or partnering organization lead can use this as an opportunity to encourage participants to identify other areas human impacts are noticed or types of problems caused by human interaction and what steps can be taken to avoid the problem or fix the problem. Depending on age more or less facilitation will be required.

Following this discussion would be a short walk or game with additional time to explore a wooded area, the facilitator should use this time to remind participants to be aware of their interactions with the natural environment and encourage positive interactions.

Thursday:

Participants will likely spend the morning playing a game at a park or in a wooded area then typically having lunch before the hike, near the entrance.

Using this time, regardless of the age of the group, the facilitator can stimulate critical thinking about humans' impacts on the environment and problem-solving skills by discussing and questioning participants about how their activity, playing, hiking, eating, etc., affects the environment. In addition to encouraging participants to think of ways an activity or action impacts the environment, encourage participants to think about how can said activity or action be adjusted to lessen or omit the impact on the environment or what they can do to reduce or alleviate the impact.

These questions and discussions should happen throughout the day, during play, lunch, hiking, or even during transportation, whenever the facilitator can connect them to the concrete experience of the participants.

If applicable, likely with older age groups but can be done for all groups regardless of age, towards the end of the day the facilitator can begin introducing the activity/service action project the participants will be part of the following day. The facilitator can review with participants the week's experiences, awareness, connections, and knowledge, and assist participants with connecting them to their problem-solving critical thinking skills. The facilitator can help the group work towards identifying ways they can use what they've learned and experienced throughout the week to take action.

Friday:

The final day is often what the group of campers has been working towards, i.e. a longer or slightly more intense hike.

Before heading to the hike, the facilitators should review with the group the experiences, connections, and knowledge gained from the week. Ask participants to employ or facilitate the use of problem-solving and critical thinking skills to brainstorm ways we as a group can positively impact the environment.

Depending on the groups' age, greater or lesser facilitation will be needed. Participants should discuss various actions they can participate in that would positively impact the health of the environment. Following the discussion the facilitators can share what service action project the group will partake in along or after their hike.

During the hike, participants will continue developing an awareness and connection to place and the facilitator should continue exposing the group to knowledge about their environment. Younger-aged groups can continue identifying what they see on the new hike. Older aged groups can do the same, however, they would also benefit from identifying, investigating, and or learning about the signs of and ways humans interact with and impact the environment they are in.

Regardless of age, these group service action projects can be partnering with entities like Forest Service or Missoula Urban Forestry to plant wildflowers, native shrubs, or trees in areas barren or negatively impacted areas by humans along the trail if groups are not hiking to said location.

Following the service action, participants will finish their hike and head back to the park to relax before pick up. During this time the facilitators can facilitate a

discussion with participants regarding what they learned this week and during the service project, the importance or impact the service project had on themselves and or on the environment, how different elements made them feel, etc.

As the end of the day and the week of camp wrap up, the discussion can continue, participants can have unstructured free time, a game can be played, or participants can relax (for adventure camps, relaxing is typically what participants choose to do after a long week).

Week Outline

	Monday	Tuesday	Wednesday	Thursday	Friday
Focus element(s)	<ul style="list-style-type: none"> ● Awareness/connection to place 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge 	<ul style="list-style-type: none"> ● Awareness/connection to place ● Knowledge ● Problem-solving skills 	<ul style="list-style-type: none"> ● Knowledge ● Problem-solving skills 	<ul style="list-style-type: none"> ● Taking action/service
Activities	<ul style="list-style-type: none"> ● Hike ● Exploratory play ● Nature-based craft 	<ul style="list-style-type: none"> ● Hike ● Exploratory play ● Structured nature-based game ● Identification hunt 	<ul style="list-style-type: none"> ● Exploratory play ● Game or craft ● Area discussion ● Discussion ● Walk or exploratory play 	<ul style="list-style-type: none"> ● Free play ● Discussion ● Hike ● Discussion 	<ul style="list-style-type: none"> ● Review week ● Revisits problem-solving discussion ● Hike ● Service action

Goal of Integration

Integration of environmental education into recreational-based summer camp utilizes the setting and experiences the children are exposed to as a participant. As the backdrop to each camp, Missoula Parks and Recreation fosters participants' interest and curiosity about the natural world by centering campers' experiences around outdoor

recreation and other nature-based activities. Campers are provided with opportunities to engage with place, explore and play in the natural world, cope with challenges, and build community. Some of which are key characteristics an environmentally literate individual possesses.

Enhancing and developing these characteristics with an environmental education framework will allow the experiences and connections made to progress to knowledge and motivations and eventually develop into environmentally responsible behaviors. As the camps are short-term and structured as recreational rather than educational, the delivery of environmental education will differ from that done in a classroom or educational-based camp. However, this may be of benefit, as the experiences and recreation are first and foremost, therefore, providing campers with unique and diverse opportunities to develop connections, awareness, and enjoyment from nature, the first element of environmental education. Following this, additional activities and experiences are had, continuing their connections and enjoyment with the natural world as they now begin to gain a general knowledge of the environment and their interactions with the environment. At the end of the week, after creating connections with, finding enjoyment from, and gaining knowledge of the natural world the campers will take action in some way that helps the environment they spent the last week experiencing.

By incorporating environmental education into the summer camp setting, campers are given ample opportunities to enhance the awareness and knowledge necessary for the motivation that promotes change and sustains a healthy environment. Campers can enjoy, relax, and experience nature while learning the values and actions that foster a sustainable and healthy environment that will captivate future generations the same way it has captivated them.

Component 2

Curriculum Design, Fifth-Grade:
Garden City Harvest



Overview

Garden City Harvest

Mission

We plant seeds and grow together to create a healthy Missoula on our over 20 neighborhood farms, school gardens, and community gardens.

Vision

We envision a connected community where everyone values and has access to healthy, local food.

Core Guiding Principles

Respect – We respect ourselves, others, and our ecosystem. Respect cultivates trust and a safe space for program participants and our staff.

Compassion – Our work is grounded in compassion. We are empathetic and kind.

Collaboration – We work cooperatively rather than competitively at all levels, building relationships and partnerships that are mutually beneficial. We communicate frequently and openly with community members, neighbors, partners, and with each other.

Trust – From our open farms and gardens to our open hearts and minds, we trust in our community members. Community and togetherness are only possible when lined with trust.

Stewardship – We are caretakers of the land. In everything that we do, we consider the impact on our environment. We respect and honor the ground that grows our food, the water that keeps it alive, the air that we breathe while farming, gardening, and living.

Sustainability – We are committed to investing in this organization and its people by promoting a positive work-life balance, providing suitable wages and benefits, and long-term employment opportunities for all staff members.

Reference: Garden City Harvest. <https://www.gardencityharvest.org/school-gardens>

Curriculum Overview

Model

The primary goal of this curriculum is to provide lessons for fifth-grade educators that enhance the teaching of required standards through hands-on experiences, urban farming, and sustainability. In alignment with the ideals of Garden City Harvest and the Farm to School program, this curriculum was designed with lessons to be taught in conjunction with associated projects but can also be used to develop and implement similar projects within the school environment if not already present. The curriculum is interdisciplinary as its focus theme is cultivation, which is achieved by emphasizing sustainability, farming, gardening, and the farm-to-table process. Within lessons, curriculum-based subjects are incorporated such as science, social studies, English language arts, and math, and could be extended to better include other subjects like technology or art. The curriculum was designed to be either adoptive or adaptive, allowing the educator to teach it cohesively or choose to teach lessons that best align with their particular goals and student needs. This curriculum is meant to encourage the participation of fifth-grade students with Garden City Harvest projects like the PEAS Farm in such a way that applies to grade standards.

Scope & Sequence

Below educators will find a table outlining the curriculum framework. As previously mentioned the curriculum is both adaptive and adoptive, allowing the educator to choose when to teach a lesson. Within each unit, educators will find multiple lessons to choose from each with various durations, materials, and standards. Lessons within one unit can be taught to help students develop and build upon their knowledge, however, this is not necessary and is left to the discretion of the educator. All lesson outlines include goals, objectives written in “Students will be able to...” (SWBAT) form, aligned standards, materials, duration, and discussion questions identified up front and throughout. The goal is to facilitate the awareness, knowledge, and skills of cultivation as a whole so students can recognize alternatives and sustainable action.

Assessment

All lessons provide educators with at least one idea of a summative assessment to choose from to evaluate students' ability to meet objectives at the end of the lesson, these options range from implementation and debates to posters and stories. Educators should implement various formative assessments throughout lessons to check for understanding, adapt teaching techniques, or revisit certain concepts and skills, this may include, discussions, whole or individual check-ins, journaling, and student observation. Ideas of formative assessments are also included with each lesson. Regardless of the order or timeline lessons are given, educators should try to revisit previously taught objectives (if applicable to the current lesson) to reestablish competencies and allow connections to be made across the curriculum.

Note

The curriculum is developed to be used in Montana, specifically in and around the city of Missoula, however, it can be adjusted to be used else where. Durations listed for each lesson are estimation and more time be required. This will be specific to class needs and depth the educator wished to achieve with each lesson. Preparation time and materials may be required for specific lessons, this will be identified at the start of the lesson outline.

Conceptual Framework

Unit	My Environment	Farm/Garden Residents	Farming	Compost	Starting Your Own
Focus	Establish a sense of place through the evaluation of our perspective.	Develop an understanding of the various non-human residents in a farm or garden and the role they play.	Learn about different farm settings, what goes into each form of farming, and the various impacts.	Learn how and the importance of recycling nutrients and how it can benefit the earth and a garden or farm.	Acquire the necessary skills to grow your own food or start a garden.
Outlined goals	<p>Connect with nature by identifying their values and emotions associated with a place.</p> <p>Assess their perspective and discuss how it affects their experience and understanding of a place.</p>	<p>Identify and investigate the residents of a garden.</p> <p>Understand the important roles of pollinators.</p>	<p>Collaboratively investigate and evaluate various types of farms.</p> <p>Discuss the movement of food and the associated advantages and disadvantages.</p> <p>Collaborate to inform others of alternative methods.</p>	<p>Investigate compost to learn about its components and the ecosystem within.</p> <p>Collaboratively inform others of compost.</p> <p>Create their own compost pile.</p>	<p>Understand how to plan a garden.</p> <p>Cook a meal or prepare a snack using produce they grew or harvested or produce that was locally sourced.</p>
Lessons	<p>1. Sense of Place</p> <p>2. What Am I Looking at?</p>	<p>1. Insect Investigation</p> <p>2. The Power of Pollinating Pollinators</p>	<p>1. Big & Small Farms</p> <p>2. The Journey of Our Food</p> <p>3. Why Urban Farming?</p>	<p>1. Nature's Recycling</p> <p>2. Breaking it Down</p> <p>3. Let it Rot</p>	<p>1. Growing a Garden</p> <p>2. Garden Mapping</p> <p>3. Feeding Yourself</p>

Unit 1: My Environment

Lesson 1: Sense of Place

Goal: Provide students an opportunity to use each of their senses to observe their surroundings and become aware of their mental and physical responses.

Objectives:

- SWBAT make and use their observations and emotions to write journal entries of a memorable place in nature, a spot they find comfort from in the natural area, and a closely observed natural thing in the area they chose.
- SWBAT use different perspectives to observe and write journal entries about their surroundings helping them become aware of the scale and differing perspectives.

Standards:

English Language Arts

- 5.W.3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- 5.W.10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

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- 2.3 C. Places—Learners describe the meaning of “place” both close to home and around the world.

Duration:

- 45-60 minutes

Materials:

Journal – Natural area – Google Maps or Google Satellite Images (optional)

Vocabulary:

Perspective

Discussion Questions:

- How is perspective going to change what we notice? Why?

Outline:

- Invoking a sense of place can be done in many ways. Below are two different ways, one is done more generally and the other is done in relation to the “What Am I Looking At?” lesson. The educator can choose to create a student's sense of place one or both ways outlined below.
 - For both options, students should sit quietly and observe their surroundings
- **Option 1**
- Students will spend approximately 10 minutes journaling about a natural place they feel connected to or have a memorable experience with.
- Encourage students to describe the place using each of their senses, including their thoughts and emotions.
- Students will then go outside and find a spot to journal in. This time students will take about 10 minutes to journal about the place they are currently in, using their senses as well as the thoughts and emotions that come about while journaling.
- Students will stay in their spot but pick one thing in the area to closely observe and journal about, i.e., a plant, a bug, a closer look at the grass or dirt, or one particular leaf, etc. Students will take 5-10 minutes to journal about the thing in their area they are closely observing. Encourage students to try using all of their senses as well as the thoughts and emotions that come about while observing.
- Before going inside, instruct students to grab 2-5 items from the area they were journaling in.
- Once inside the educator can ask for student volunteers to share one or both journaling.
- Ask students to discuss the differences they encountered while journaling the two different places, i.e. a memory and present experiences.
- Students will use the items from their area to create a collage to go along with their journal entry.
- **Educator can choose to end the lesson here or choose to extend the lesson into additional writing standards**

- Students can use their journal entry to create a short poem about the place they just journaled about. The poem will go along with their collage.
- **Option 2**
- Using all their senses, including emotions and thoughts, students will journal from various perspectives and focuses, making note of different observations made at each journaling perspective
- Students will spend 5-10 minutes journaling from focused to more broadened perspectives.
 - Immediate bubble, i.e. their desk
 - Proximate area, i.e., whole classroom or table group
 - Their environment, i.e. their school/outside their classroom, hallway, playground, etc.
 - Google satellite images, i.e. school grounds from this perspective (as close as possible) or county or city.
- Finally students will spend 5-10 minutes journaling about what the various perspectives showed them, how their observations or thoughts and feelings changed with different perspectives, how distance affected their journaling, etc.
- Ask for student volunteers to share any part of their journaling or observation made.
- Students will then draw an image that corresponds with each journal entry. Be sure to have students identify their location in each picture. As the perspective gets broader, their location should also resize with their perspective.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in class journaling activity

Lesson 2: What am I looking at?

Goal: Help students understand that different perspectives can affect what we notice about something, what we see, feel, smell, hear, think, or how we interact with it.

Objectives:

- SWBAT make and uses varying perspectives to observe a natural area, to journal what they see from each perspective.
- SWBAT create a short story from their journaled observations to personify a bug or plant they observed.

Standards:

English Language Arts

- 5.W. 3. Write narratives to develop real or imagined experiences or events using effective techniques, descriptive details, and clear event sequences.
- 5.W.10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

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- 2.3 C. Places—Learners describe the meaning of “place” both close to home and around the world.

Duration:

- 45-60 minutes
- Plus time/days for short story

Materials:

Journal – Local farm or natural area – Google Maps or Google Satellite Images
(optional)

Vocabulary:

Perspective

Discussion Questions:

- How might different perspectives change what we notice? Why?
- What do you see, taste, smell, touch, hear, think, and feel?
- How did our perspectives affect what we noticed?

Outline:

- **NOTE:** This lesson requires a field trip to a local farm, however, it can also be adapted to be done in a school garden, nearby open space, forested, or grassy area.
- Students will look at a satellite or drone image of a local urban farm, zoom in as close as possible without cutting parts of the farm, and spend 5-10 minutes journaling, using words and drawings, about what they see, taste, smell, touch, and hear.
- Students will then head to the urban farm, and take the first 5-10 minutes they are there to journal (using words and drawings) about what they see, taste, smell, touch, and hear.
- Students can be given a tour or allowed to explore the farm. They will then individually find a specific area of the farm they want to observe, this area should be planted or freshly harvested i.e. looking only at the corn but looking at all the corn, from top to soil, and take 5-10 minutes to journal (using words and drawings) about what they see, taste, smell, touch, and hear.
- Students will then take a closer look at what they are observing, i.e. one singular corn stock, and take 5-10 minutes to journal (using words and drawings) about what they see, taste, smell, touch, and hear.
- Students will then look even closer, i.e. one part of the stem or the stock fibers, and take 5-10 minutes to journal (using words and drawings) about what they see, taste, smell, touch, and hear.
- Students will take their final observation by looking as closely as possible at the soil their chosen plant is growing in. They will take 5-10 minutes to journal (using words and drawings) about what they see, taste, smell, touch, and hear.
 - **NOTE:** The educator should have students journal 4-6 times, be sure one is the farthest view away, one when first observing the location in person, and one focused on a specific thing in the area, and the final is as close as students can look (if available students can use magnifying glasses for this observation).

- Students can discuss and share what they discovered or noticed with each closer observation, the educator can also have students journal what they discovered.
- **Educators can end the lesson here or choose to extend the lesson into writing standards.**
 - Students will use their journaling to write a short story about a small bug, or multiple bugs or they can personify a plant they observed (let students be creative), watching a giant (the observing student), closer and closer to them. The bug(s) or plant can be located on the plant or soil, the student can decide, and the students will describe the little bugs' experiences of coming into contact with the giant student through dialogue, setting, thoughts, feelings, etc. Each observation the student journaled should be roughly a paragraph in the story.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in class journaling activity
- Summative
 - Short story based on student observations when journaling
 - This can be from the bug or plants perspective or from the student's perspective looking down on a tiny home

Unit 2: Farm and Garden Residents

Lesson 1: Insect Investigation

Goal: Introduce students to non-human residents in a garden or at a farm and help them understand the role these residents play in the garden.

Objectives:

- SWBAT explore the school garden or nearby urban farm for bugs, records their observations using words and illustrations, then use these observations to predict the role of various bugs.
- SWBAT identify bugs by researching observed bugs and determine the species and role in the garden.
- SWBAT develop a model to show the movement of matter in the garden ecosystem using their observations, research, and other resources.
- SWBAT use observations and research to write a short monologue about the day in the life of one of the bugs that live in the school garden.

Standards:

Science

- 5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

English Language Arts

- W.5.3 Write narrative to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences
- W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
- W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic

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- 2.1 B – Earth’s living systems—Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that

living organisms, including humans, affect the environment in which they live, and how their environment affects them.

Duration:

- Approximately 30-45 minutes to explore the garden and discuss observations
- 20-30 minutes to complete the diagram
- 30-45 to begin writing monologue brainstorm/draft
 - Additional time to complete and present monologue

Materials:

Notebook – Pencil – Access to internet or library – Small gardening shovels and/or magnifying glass (if available, not necessary)

Vocabulary:

Pest – Beneficial bugs – Environment – Ecosystem – Decomposers – Pollinators – Matter – Nutrients – Interaction

Discussion Questions:

- Where might we find bugs in the garden or farm? Why might you find them there?
- Why are there bugs in the garden or farm?
- What from your observations may help you predict what the role of the bug was?

Outline:

- Before leaving the classroom, define pests, beneficial bugs, and environment, and ensure definitions are available to all students for the lesson (take notes, print outs, use poster)
- Bring students outside to the school garden or at the start of a field trip to an urban farm, allow students 5-10 minutes to closely observe a section of plants. Instruct students to look from top to bottom, in the leaves, around the soil.
 - **NOTE:** students can gently pick up dead leaves, move soil with a hand, and look into the top of plants without harming them.

- The following 15 minutes give or take should be spent recording bugs that are observed, have students observe and record color, location, action, size, body parts, etc. using words and pictures.
 - **NOTE:** Encourage students to spread throughout the garden to ensure more diverse findings and students can record one or multiple observations.
- Bring students back together (this can still be done in the garden and individually or in pairs) and have students use their prior knowledge and observations to predict the bug's role in the garden. Students can share their observations and predictions.
- The following step can be done outside with printouts or inside using a projector. Have educators display images of various bugs found in the garden, students verbally share their observations, and the class identifies them amongst images presented.
- Once identified, educators will present its name, role, pest or protector, who it eats, who eats it, etc.
 - **NOTE:** This information can be provided and made available by the educator or students can be required to discover this on their own via research. If researching, additional time will be required for students to work.
- The following steps will need to be done in a classroom setting, this can be inside or in an outdoor classroom. As a class define the remaining vocabulary words
- Have students select one bug they observed to draw a diagram of its role, i.e. the matter moves in the garden.
 - **NOTE:** Students may complete the diagram depicting the movement of matter in an ecosystem as a class guided by the educator or individually.
- **Educators can end the lesson here or choose to extend the lesson into writing standards.**

- Students will use the same bug, movement of matter diagram, observations, and research to create a monologue. Students will *become* their chosen bug, and write a short monologue narrative of the bug's day in the garden (written in the first person). Describe/discuss its color, location, activities, role, meals, movement of matter, etc. all as if they were the bug itself.
- Encourage students to brainstorm their monologues before starting a draft. The pace of brainstorming to writing is up to the discretion of the teacher.
 - **NOTE:** Students will likely need additional days to complete the writing portion of this lesson. Teachers may need to give additional writing lessons, i.e. descriptive language, perspective writing, etc. this will be unique to each class.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
- Summative
 - Students will draw a diagram that shows the movement of matter in an ecosystem and explain its parts.
 - This should include plants, animals, decomposers, and the environment
 - Students written monologue
 - Description and a story of the bug they chose to become
 - Color, body type, location, activities, role in the garden, meals, i.e. a day in the life of this bug in the garden, etc.

Lesson 2: The Power of Pollinating Pollinators

Goal: Understand that many plants depend on pollinators, many pollinators depend on plants, and pollination plays an important role in gardens and farms.

Objectives:

- SWBAT collaboratively identify five main parts of a flower using a diagram following their exploration and dissection of flowers.
- SWBAT create a diagram to show and describe the process of pollination using their knowledge.
- SWBAT uses take the information provided and apply their knowledge of fractions and decimals to determine how much nectar is needed to make one pound of honey.

Standards:

Science

- 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
- 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Math

- 5.NF.3. Interpret a fraction as a division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving the division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem
- 5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- 5.MD.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.

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- 2.1 B. Earth’s living systems—Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the biosphere.

Duration:

- Approximately 45 minutes
- Additional 30 minutes for math portion

Materials:

Notebook – Pencil

Preparation:

Collect native wildflowers (if not available store bought flowers will work), slice them down the center to expose the inside of the flower, be sure there is enough for one flower per 3-5 students.

Vocabulary:

Pollen – Pollinator – Pollination – Nectar – Pedal – Stigma – Stamen – Sepal – Stem

Discussion Questions:

- What is pollination? Why does it happen?
- Who pollinates? Do we need pollinators and pollination? How or why is pollination good?

Outline:

- **NOTE:** Lesson preparation required.
- Display a diagram of a flower, have students take out a notebook, and pass spliced flowers to each student group. Allow students to observe and try to identify parts of the flower using a displayed diagram.
- Ask students to define and explain what pollination is and why it happens, educators will follow up to clarify or correct. Do this by identifying pollen, stigma, and stamen on flowers. Ask the class to follow along, draw the diagram in science notebook, labeling, and define flower parts as class progresses.

- **NOTE:** Educator + students will continue drawing and labeling diagrams, pedal, and stem, referencing flowers.
- Encourage class discussion on how and why pollination happens and who or what does it. The educator follows up by clarifying animals that pollinate and explaining how the wind is also a pollinator.
 - **NOTE:** Emphasize the role pollen and pollination have in reproducing a plant
- Begin another class discussion, posing “We all have our favorite foods, do you think this is the same for pollinators? Do birds like the same nectar as a bee? How might a bird find its favorite nectar?” Allow for discussion before moving to the next activity.
- Provide students with a factsheet on local pollinating plants and their characteristics, this can be found on places like the state park website, and nearby national park database, and if unable to locate local plants, characteristics of common pollinating plants will work.
- Provide each group with a factsheet on local pollinators or various types of bees and what they are attracted to. Explain to students that bees pollinate many different flowers but each bee has a favorite native or local flower.
- In their groups' students will use the factsheets to develop a scientifically based prediction of which pollinator(s) are likely to be attracted to the wildflower(s).
- Provide students with 5-10 minutes of group discussion time before asking groups to share their predictions and explanation. Allow space for discussion between predictions.
- As individuals, in small groups, or as a whole class, students will draw a diagram depicting the movement of pollen, i.e. between plants and animals.
- And/or a diagram depicting the process of honey, i.e. flowers growing, nectar attracting, bees pollinating, producing honey, the use of honey in the winter, and the use of honey via humans, etc.
 - **NOTE:** This will require additional research or to be done as a class paired with a discussion.

➤ **Educators can end the lesson here or choose to extend the lesson into math standards.**

- Following student predictions and discussions revisit the importance of pollination. Ask why is pollination important? Allow for additional discussion or clarification to be made.
- What are some ways pollinators benefit us humans? I.E. pretty flowers, agriculture, honey.
 - **NOTE:** partner with local farm to use local honey or purchase locally sourced honey at the store
- Present the jar of honey (ideally an easy fraction of 16oz) ask students to estimate how many pounds of nectar it took to make an 8oz jar of honey. How many bees do they think it took? After students complete math problems, each student can try some honey, about 1 teaspoon each
- Provide students with the following formulas
 - $16 \text{ oz} = 1 \text{ lb}$
 - $1 \text{ lb honey} = 5 \text{ lb nectar}$
 - $550 \text{ bees} = 1 \text{ lb honey}$
- Students will need to find the following
 - How many bees = 5lb nectar **550 bees**
 - What fraction of 16 oz (1lb) is the 8oz jar of honey? **8oz is 1/2 of 16oz**
 - How many bees = this 8oz jar of honey? **$550 \text{ bees} / 2 = 225 \text{ bees}$**

➤ **Extension**

- $1 \text{ bee} = 1/10 \text{ teaspoon of honey}$
- $96 \text{ teaspoons} = 16 \text{ oz}$
- If each student gets to taste about a teaspoon of honey, approximately how many bees collected honey per taste? **About 10 bees**
- How many bees does it take to make 1 teaspoon of honey? **About 10 bees**

- Using this information, what is another way to determine approximately how many bees it took to make an 8oz jar of honey? $1/10$ of honey = 1 bee
 $1/10 \text{ honey} * 10 \text{ bees} = 1 \text{ teaspoon}$ $96 \text{ teaspoon} / 2 = 48 \text{ teaspoon}$
 $48 \text{ teaspoon} * 10 \text{ bees} = \text{About } 480 \text{ bees for } 48 \text{ teaspoons or } 8\text{oz of honey}$
- Why do you think this calculation is greater than your original calculation of how many bees it took to make 8 oz of honey? **The first calculation did not take into account the honey bees need to eat**
 - **NOTE:** Educators may need to give additional math lessons i.e. fractions, decimals, conversions, etc. this will be unique to each class

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
 - Observe students are engaged and participating in flower dissection
- Summative
 - Students can describe various ways of pollination
 - Bee, bird, bats, wind, etc.
 - Students can identify 5 parts of a flower
 - Students use information gathered and provided to predict which flower will attract which pollinator and use scientific information to justify their predictions
 - Accurately calculate the number of bees needed to make an amount of honey

Davis, J. (n.d.). *How long does it take honey bees to make honey?*. BeeKeeper Facts.

<https://beekeeperfacts.com/how-long-does-it-take-honeybees-to-make-honey/>

Flowers seeking pollinators. (n.d.) California Academy of Science. Retrieved February 2023 from

<https://www.calacademy.org/educators/lesson-plans/flowers-seeking-pollinators>

Unit 3: Farming

Lesson 1: Big & Small Farms

Goal: Teach students about the variations of farms and help them understand the difference and advantages and disadvantages of industrial, small/backyard, and urban farming.

Objectives:

- SWBAT define and describe a farm and the various characteristics that make up a farm using their background knowledge.
- SWBAT define, identify, and classify different types of farms using knowledge gained and participate in class or small group discussion.
- SWBAT conduct research and use the knowledge gained from class discussions to prepare paper, presentation, or illustration on the characteristics of their chosen farm type.
- SWBAT use the knowledge gained, from class discussions or research, to compare and contrast the characteristics, uses, and challenges addressed or created with various types of farming to examine the advantages and disadvantages of each farm.

Standards:

English Language Arts

- W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic

Science

- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

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- 3.1 B. Sorting out the consequences of issues—Learners apply their knowledge of ecological and human processes and systems to describe the short- and long-term consequences of selected environmental issues on sustainability.

- 3.1 D. Working with flexibility, creativity, and openness—Learners demonstrate active listening, tolerance, adaptability, and openness as they work with others to gather a range of perspectives and information.

Duration:

- 45-minute class block
- Plus 45-60 minutes minimum to complete a lesson extension option
 - Additional time is required for various extension options
- Additional time required for chosen assessment method

Materials:

Paper – Coloring utensils – Internet access – Whiteboard or poster – Access to local farm or PEAS Farm (optional but not necessary)

Vocabulary:

Farm(ing) – Crops – Produce – Industrial farm – Urban farm – Hydroponic farm – Rooftop farm – Homestead

Discussion Questions:

- What is a farm? What's on a farm? What does a farm do?
- Are there different types of farms? What makes them different?
- How does location affect a farm?
- What challenges and advantages are associated with the location of a farm?
- What challenges have humans addressed with each type of farm?

- Is a farm different from a garden? What about a small farm and a large garden? Are they the same or different? How are they the same and different?

Outline:

- Provide students with a piece of paper and 10 minutes to draw their idea of a farm, what is grown there, what buildings or tools are present.
- After time to draw their farm, ask students the following, and make a list on the board of the students' responses.
 - What is a farm?
 - What is on a farm?

- Where are farms at?
- What do farms do?
- Ask students to think to themselves or discuss in small table groups. Are there different types of farms? How are they different?
 - Explain there are different types of farms, big and small, urban, industrial, and backyard. Farms can also have different uses or specialities, i.e. some grow corn, apples, vegetables, raise animals, etc.
- **Fun side extension or time filler**
- Show students an image of MyPlate.gov. Grains, vegetables, fruits, protein, and dairy are present on the plate. Ask students the following:
 - **NOTE:** The goal of asking the following questions is engaging students by filling up their plate, based on MyPlate.gov, with the farms they created. As students raise their hands mark off each sections, trying to mark each off
 - Whose farm had grains? Wheat, oats, rice, etc.
 - Whose farm had vegetables? Carrots, lettuce, broccoli, etc.
 - Whose farm had fruits? Apples, grapes, tomatoes, etc.
 - Whose farm had protein? Soybeans, peas, livestock, etc
 - Whose farm had dairy producing livestock? Cows, goats, etc.
 - **NOTE:** If students have worked on fractions and conversions ask students to determine the fraction of each based on the percentage of each section.
 - Grains 30%
 - Vegetables 30%
 - Fruits 20%
 - Protein 20%
- Following that exercise gives students a definition of a farm. Emphasize “a piece of land”, in the definition – there is no size identified.
 - Definition

- A piece of land that is used to grow crops and or raise animals for produce.
 - Following this the educator can engage student discussion in the crops and animals present on a farm
- Ask students what they think an industrial farm is, an urban farm, and a small/backyard farm. Have students help define/describe the types of farms.
- Define and describe industrial farms, urban farms, and small/backyard farms. The educator should have students write these definitions down and or should be visible for the class to see throughout the lesson.
- Show students images of all types of farms. With each image students should determine if they think it is a farm or not and what type of farm they would classify it as, i.e. industrial, urban, small/backyard, then justify their answer. Encourage students to focus on “any piece of land that grows crops and or animals”. This can be done in small groups and or as a class. Below are examples of land being used to grow crops and or animals for produce.
 - Large industrial farms, small local farms, urban farms, rooftop gardens (growing produce or housing bees to produce honey), show a small family farm raising a few cows, a large scale flower field, pumpkin patch, christmas tree farm, etc.
 - Get students thinking and show them small backyard “gardens” that are grow flowers and fruits, a small backyard “gardens” that grows flowers, fruits, and chickens, a school garden (especially if what is grown is mostly produce), a community garden, a large backyard greenhouse, industrial hydroponic farming, or a small scale or urban hydroponic garden, etc.
 - Discuss the different types of farms shown, discuss/describe location, size, characteristics, etc.
 - Following initial discussion, revisit the images of industrial, urban, and small/backyard farms, facilitate student discussion. Compare and contrast the three types of farms, discuss if or should they all be considered a farm and when/why one farm would be preferred over the others.

- Following this exercise ask students how their idea of farms and farming has changed from the beginning of class to now. How does your image of a farm differ from what we were just shown?
- Ask students to work in small groups to develop a solution to the following problem.
 - World population increases. Food needs increase. Space availability decreases
 - Three types of farms each with advantages and disadvantages
 - Industrial farms produce large quantities of food but take up a lot of space and require food to be transported to all places
 - Urban farms produce less quantities of food, still take up a good portion of land but food doesn't have to be transported as far
 - Small backyard farms which only produce food for the owner
 - Brainstorm other ways humans can address this challenge.
 - Allow time for students to collaborate. Have students share their ideas and discuss them. Then introduce urban rooftop and hydroponic farming.
 - Discuss potential advantages and disadvantages of these modern farms
- **Educators can end the lesson here for a short and simple introduction of the types of farms or can choose to extend the lesson to further discuss different types of farming.**
 - **NOTE:** Based on time, access, and or level of students, the educator can choose one or combination of multiple options below.
- **Option 1:**
 - The educator can show the class 2-5 short videos of different types of farms. Two of the videos should discuss an industrial farm and an urban farm, others can include hydroponic farming, small family farm (homestead), urban rooftop farming, etc.
 - Educators can encourage students to take note to discuss all videos at the end or discuss one video at a time. Educators should take notes visible to all students of class discussion. The discussion should focus on the

advantages and disadvantages of each farm type, challenges humans addressed with each farm type, and challenges created by each farm type.

- Extension question: Can/should humans adapt or implement the farming types differently to better address any of these challenges?
- **Option 2:**
 - Students can work individually or in small groups. Each group/individual will choose a different type of farm to research. Students can find articles and or videos to help them present their chosen farm type to their peers. Students should look into location, size, produce, use, advantages, disadvantages, etc.
- **Option 3:**
 - The educator can set up a virtual or in person field trip to a farm, if living in or around Missoula, MT the class would be able to work with PEAS Farm to tour an urban farm. The virtual or physical tour should be accompanied by a video or virtual tour of another type of farm. Students compare and contrast the two types of farms and discuss the advantages and disadvantages.

Assessment Examples:

- Class discussions and participation
- Short research paper or long response/exit-slip on one type of farm.
 - Introducing it, describing its characteristics like location and size, discuss the reasoning behind this type of farm, what challenges it helps address, and other advantages and disadvantages.
- Short Powerpoint presentation on one type of farm.
 - Introducing it, describing its characteristics like location and size, discuss the reasoning behind this type of farm, what challenges it helps address, and other advantages and disadvantages.
- Illustration or 3-D model of one type of farm + short written or oral description

- One specific farm with its defining characteristics, i.e. location, size, farming method, etc.
- Describe its advantages and disadvantages and the reasoning behind this type of farm or the challenges it addresses and or creates.

Lesson 2: The Journey of Our Food

Goal: Make students aware of the various places our food comes from, how far it might travel, and the benefits of consuming local food.

Objectives:

- SWBAT discuss the ingredients of a meal, identify where it came from, and how it was transported to the student to bring awareness to where food comes from.
- SWBAT discuss as a class the pros and cons of transporting food to create a diagram that represents what was discussed as a class.
- SWBAT research and collect the pros and cons of local, regional, national, or international sourced products to create an argument to persuade the consumer to buy their product.
- SWBAT use their knowledge and information presented to make an informed decision as a consumer regarding where their produce originated.

Standards:

English Language Arts

- 5.RI.9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- 5.SL.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- 5.SL.8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
- 5.SL.4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

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- 3.2 B. Evaluating the need for action—Learners evaluate whether action is needed in specific situations, using environmental, cultural/social, and economic criteria. They decide whether they should be involved in that action.

- 4 C. Accepting personal responsibility—Learners describe the broad environmental, social, and economic consequences of their personal and group actions and as appropriate, accept responsibility for their actions.

Duration:

- 20-30 minutes for initial lesson
- Plus 60 minutes (or more) for consumer debate portion

Materials:

Ingredients/components of a meal – Internet access – Posterboard – Map for each student (electronic is ideal but not necessary) – 5 different colored writing utensils

Preparation:

Ask students to write down the components or ingredients in a meal they ate and bring it to class the following day. Students can also do this with their lunch although this might result in less variation.

Vocabulary:

Local – Regional – National – International – Consumer – Emissions – Supply chain

Discussion Questions:

- Could these ingredients come from closer?
- Why does it matter how far our food travels?
- Why do we transport food? What are the advantages and disadvantages of transporting food?
- Why or if we need each type of farm? What are some advantages or challenges of each type of farm?
- Does the distribution area affect what is or isn't available? Does it affect when certain items are or aren't available?

Outline:

- **NOTE:** Lesson preparation required.
- Ask the class about their favorite meal, and to identify 5-10 ingredients of that meal. Students will write these ingredients, use their peers and/or the internet to research where these ingredients likely came from, and calculate approximately how far each ingredient had to travel.

- The educator can provide each student with a map to mark the location of these ingredients or use a class map to identify the furthest or shortest distances ingredients had to travel
- Allow 10-15 minutes for students to work before having students share where and how far their food came from. Encourage class discussion of how far the food traveled. Why does it matter? How would eating locally change your favorite meal? How is transporting or not transporting good or bad to us or the environment? Why do we transport food?
 - **NOTE:** The educator should facilitate and clarify throughout the discussion. Discussing things like emissions, cost, and availability of transportation food.
- Educators can discuss the stages within the food transportation supply chain. Allow time for discussion, ask students if they can come up with steps of the supply chain. Help students with this, create a possible supply chain as a class.
- Have the class focus on the reasons we transport food and the pros and cons of transporting food.
 - As a class create a list of why/how we transport food
 - **NOTE:** Discuss population (cities vs. rural), climates, seasons, method, etc.
 - As a class create a chart or diagram of the pros and cons of transporting food
 - **NOTE:** Discuss availability/variety, the cost for the consumer, emissions, packaging, waste, local economy/farmers, etc.
- **Optional activity to help students understand how different types of farms provide food to different areas depending on their size and purpose.**
 - As a class determine the approximate area each of the following types of farms distributes food to
 - Backyard farm, homestead, or family garden
 - Local or urban farm
 - Regional farm

- National farm
 - Industrial farm
- Use a map (a virtual one with the capability to zoom in and out, will make the exercise easier) or piece of paper to simply show the different distribution areas.
- Using one color, draw a house that acts as the central location (this can also be the school). This is where the backyard farm, homestead, or family garden's radius will cover. Draw a circle using the same color to identify its distribution area.
- In another color mark the location of a local or urban farm and draw its distribution area. It should include the location of the house.
- Using another color mark the location of a regional farm and draw its distribution area.
- Using a different color mark the location of a national farm and draw its distribution area.
- In a different color mark the location of an international farm and draw its distribution area.
 - **NOTE:** Each distribution area should include the previous, building outward.
- Discuss why and if we need each type of farm? What are some advantages or challenges of each type of farm? Does the distribution area affect what is or isn't available? Does it affect when certain items are or aren't available?

➤ **Educators can end the lesson here or choose to extend the lesson into research and speech standards**

- Divide the class into six even groups, assign three groups local and the remaining groups either, regional, national, or international. Introduce the following activity to students.
- The educator will be a consumer at the grocery store trying to buy something. The three local groups will each be paired with another group

to debate against, trying to persuade the consumer. Local and regional groups will try to persuade consumers one way or another to buy beef. Local and national groups will try to persuade the consumer to buy corn. The local and international groups will persuade the consumer to buy onions. Each group will have to try to convince the consumer to buy either local or transported food.

- Provide each group approximately 30 minutes to research and create a list of the pros and cons of picking their option over the other.
 - **NOTE:** Groups should be prepared with how the food is transported; how transporting or not transporting affects emission and climate change, the price for consumers and local jobs, availability and options; preserving/freshness of local vs transported food, etc.
- Consumers can choose or not choose which option to go with based on information presented by each group. Choosing a group is up to the discretion of the education.
- Following the three debates the educator should engage the class in a whole group discussion to further discuss the pros and cons of transporting or not transporting food. How different situations might lead a consumer to choose one over the other? What options offer the greatest range of benefits? How might this differ from person to person?

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
- Summative
 - Participating in consumer debate
 - Discussing various effects of transporting food, positive and negative

Our food's journey. (2020). FoodSpan.

https://www.foodspan.org/_pdf/lesson-plan/unit2/lesson7-foods-journey-lessonplan.pdf

Lesson 3: Why Urban Farms?

Goal: Build student understanding of alternatives through developing knowledge and understanding of urban farms.

Objectives:

- SWBAT participant in a class discussion to compare and contrast urban and industrial farms to create a Venn diagram of the two farm types.
- SWBAT work in small groups and apply their knowledge to collaboratively and creatively inform consumers of the benefits of urban farms and buying local.

Standards:

English Language Arts

- RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- W.5.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
- SL.5.1 . Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacherled) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

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- 3.1 B. Sorting out the consequences of issues—Learners apply their knowledge of ecological and human processes and systems to describe the short- and long-term consequences of selected environmental issues on sustainability.
- 3.1 D. Working with flexibility, creativity, and openness—Learners demonstrate active listening, tolerance, adaptability, and openness as they work with others to gather a range of perspectives and information.

Duration:

- Approximately 60 minutes
- Plus time/days for small research project portion

Materials:

Notebook – Pencil – Green marker – Red marker – Access to the internet or books for research

Vocabulary:

Buying Local – Urban Farm – Industrial Farm – Emissions – Produced – Consumed - Consumer – Supply Chain

Discussion Questions:

- What do you think of when you hear the word farm?
- What is an urban farm like?
- What is an industrial farm like?
- What are some advantages and disadvantages of urban farms? What about industrial farms?

Outline:

- **NOTE:** This lesson can be done outside if weather and location permits, or pre- or post- field trip to local urban farms. If done not in the classroom slight changes will need to be made.
- Engage students in class discussion by asking what they think of when they hear the word farm? Make a list of the ideas and characteristics shared.
- Define and briefly explain what an urban farm is and an industrial farm. Present various images of urban and industrial farming to students, have them quietly make lists in their notebooks about what they notice in each picture, ask if they can distinguish the types of farms. Remind students to write their thoughts and ideas in their notebook. Allow a couple of minutes for questions or thoughts at the end of this exercise.
- Split students up into small groups (2-4 students) and assign each group to either urban or industrial farms (ideally an even number of groups will be assigned to each farm). Students will create a list of characteristics of their assigned farm by researching to gather information. Encourage students to think about more than

just size and location, i.e. what is produced, quantities produced, what goes into producing different amounts of food, why location even matters, can or does each type of farm impact consumers in any way, etc. Allow approximately 20 minutes to do this.

- **NOTE:** If already done “The Journey of Our Food” lesson encourage students to think back to the lesson and why location is important and the impacts (positive and negative) impacts of transporting food
- Bring students back together to share their findings. The educator should record what is said on posters to display for students and/or have students copy it into journals. Allow 5-10 minutes for discussion.
- Combine one group of each farm type (one urban farm group should be paired with one industrial farm group). Students will collaboratively work to compare and contrast the two types of farming by creating a two-step Venn Diagram.
 - Step 1: Allow approximately 15 minutes of work time, students should research additional information. Students will make a Venn Diagram to compare and contrast the characteristics of the two farms. Encourage students to think of size, location, type or amount of resources consumed, type and amount of food produced, impacts on emissions, effects on economy/consumer, the journey of food from farm to table, etc.
 - Step 2: Within their groups, students will discuss the similarities and differences of each farm and circle the various attributes they think are positive or negative. Inform students they will need some sort of explanation to justify their choice. Positive attributes will be circled in green and negative will be red. Allow an additional 5-10 minutes for students to complete this step.
- Once groups have completed their Venn Diagrams, the educator will bring the class back into a discussion, have students share the similarities and differences they came up with first, and create a Venn Diagram encompassing each group.

- Then have students assign positive or negative associations with each attribute. Encourage students to justify their choice, respectfully agree/disagree with peers, and discuss amongst each other.
 - Educators will then redefine urban and industrial farming, discuss technique differences and environmental impacts, advantages/disadvantages of their locations, etc. Reference class Venn Diagram, further explains, correct, or clarify attributes associated with positive and negative. Educators can also choose to show short videos on urban and industrial farming if necessary.
 - **NOTE:** Educators discussion and videos should focus on the differences of urban and industrial farming and emphasize the benefits of urban farming
- **Educators can end the lesson here or choose to extend the lesson into writing standards.**
- Students will use group and class diagram and additional research to define and explain what urban and industrial farming is, identify one or the other and inform the audience why/how it is more or less beneficial than the other (students can choose either as long as they support their claims with facts, reasonings, and information to meet the standard). Ideally, students' essays or posters will focus on the benefits of urban farming after informing the audience of urban and industrial farming.
 - **NOTE:** Educators can have students write an essay OR create and present a poster board in place of an essay.
 - **NOTE:** Additional time/days will be needed to complete small research assignments and presentations. Educators may need to instruct additional research or informational writing lessons, this will be unique to each class.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion

- Participation and observation of consumer debate
- Summative
 - State an opinion, goods from local/urban farms or industrialized farms, students should use information and facts presented in writing, short descriptions, graphs, images, etc. to present their opinion. The educator can require or let students choose between an essay or poster and a presentation to present their opinion and supporting facts to persuade consumers of their opinion.

Unit 4: Composting

Lesson 1: Nature's Recycling

Goal: Helping students understand how biodegradable materials can be recycled to reduce waste by introducing them to compost.

Objectives:

- SWBAT identify and categorize materials that are biodegradable and non-biodegradable given various waste products to determine what can be composted.
- SWBAT use their knowledge and additional research to create a poster explaining what compost is and its benefits then present the information to younger grades.

Standards:

English Language Arts

- 5.W.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- 5.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly
- 5.SL.4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Science

- 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

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- 1 A. Questioning—Learners develop, refine, and explain questions that help them conduct environmental investigations and learn about the environment
- 1 B. Designing investigations—Learners design environmental investigations to answer specific questions—often their own questions.

- 1 C. Collecting information—Learners locate and collect quantitative and qualitative information about the environment and environmental topics, using a range of methods and sources. They explain why they used selected information collection methods.
- 3.2 C. Planning and taking action—Learners use their research results to develop action strategies and design solutions at levels consistent with their maturity and preparation. As appropriate, they implement their plans.

Duration:

- 30-45 minutes
 - Additional 20-30 minutes if the experiment is included
- Plus work days for compost project portion
- Additional days for extension lessons (identified at the end of this lesson)

Materials:

Poster Board – Biodegradable materials – Recyclable materials (papers and plastics) –
Dirt – Trash from lunchroom

Preparation:

Ask students to bring in a few items that would be thrown away, both old food and garbage. Items can also be collected from garbages around the school.

Vocabulary:

Biodegradable – Non-biodegradable – Substance – Physical change – Chemical change – Recycle – Compost

Discussion Questions:

- Why are recyclable items not considered biodegradable?
- How does compost help the environment?
- How can compost help you, a gardener, a farmer, the land?
- Is composting worth it or should we just throw everything out to save time?

Outline:

- **NOTE:** Lesson preparation required.
- Begin by asking students to name things that get thrown away either at home, at school, in a restaurant, at a park, etc. The educator will record the list on the

board and encourage students to do the same. Once a decent list has been made the educator will write the total number of items listed and then circle everything biodegradable.

- Ask students what the circled items all have in common. Allow time to think, this can be individually or 2-3 minutes of group discussion. Ask for volunteers to share how or why they think these items are related.
- Inform students these items are biodegradable, ask if anyone knows what it means, then define and describe biodegradable. Write the total number of biodegradable items.
- Ask students what recycling means, define it for them. Allow for discussion within table groups before open class discussion. Have students identify the recyclable items (underline or lightly cross out) and discuss why these items are not circled, and why they are not considered biodegradable. Write the total number of recyclable items.
 - **NOTE:** Educators should write definitions on poster boards for students to reference, and encourage students to write definitions into notebooks.
 - **NOTE:** Glass is recyclable in other places but not in Montana. How this is categorized is up to the educator, however its categorization should be accompanied with a discussion regarding its ability to be recycled and the decision to recycle it or not.
- Ask students to use the definition of biodegradable and recycle to determine if the circled items (biodegradable materials) can be recycled? Allow time to think and discuss.
 - **NOTE:** If the educator wants to make the lesson more hands-on an experiment to demonstrate the biodegradability of biodegradable material vs recycled materials can be set up. Use soil, a slice of fruit, a small piece of leafy green, and two small pieces of recyclable material, i.e., paper and plastic. Place soil in an open container, place each material on soil, cover them with additional

soil, lightly water the soil daily, and place it by the window. After five to seven days, students uncover the materials and record their findings.

- Educators can do a side experiment or have half the class do each. For this place, put some of the soil in an open container, then place the piece of plastic, then the paper and organic material, lightly sprinkle it with dirt, place a final piece of plastic, and cover it all with dirt.
- Water, location, and duration should be the same for both demonstrations. Students will investigate biodegradable materials, recycled materials, and the differences between compost and landfill.
- By participating in this investigation students will also meet NGSS 5-ESS3-1 and NAAEE 1 F. Working with models and simulations—Learners use models to analyze information that support their environmental investigations. They explain the purposes and limitations of these models.
- Explain that composting is natural recycling. Define compost(ing). Explain the process of composting, use a cycle diagram or show students a short video on the steps of composting.
- Write the number of items left after recycling and composting.
- Ask students to note how much waste material is left after removing recyclables and biodegradables.
 - **NOTE:** For quick extension, students can determine what percent or fraction of waste material actually belongs in the waste. What percent or fraction of materials get wasted when simply thrown out? What percent of natural recyclable material do we waste?
- Engage students in small and then whole group discussion, approximately 10-15 minutes. Based on what we've just learned, how might compost help the

environment? How might compost help you, a gardener, a farmer? What are your thoughts on compost, should we do it more?

- Divide students into small groups (2-3 students), give each group actual materials that are to be thrown out or images, and give about 7-15 per group. Ask groups to categorize materials into biodegradable and non-biodegradable (students can also identify recyclable materials). Allow 5 or so minutes for this.
 - **NOTE:** Students could also collect various classroom trash bins around the school and investigate their contents. This could be more engaging for students and allow for an extension via identifying a problem and proscribing possible solutions for trash bin owners. This will take additional time, lessons, and faculty collaboration.
- Ask groups to share which material they had the most difficulty categorizing, where they chose to categorize it, why, and what their peers think of its category.
- **Educators can end the lesson here or choose to extend the lesson into reading and speaking/listening standards.**
 - **NOTE:** Various extensions are included due to different programs and procedures among schools/classrooms. Each extension encourages students to use/gather existing and new knowledge and to inform others of their findings.
 - **Option 1:**
 - If a composting program in the lunch room is already in place, students can gather information, make, and present a poster board to younger grades to educate them on what is biodegradable and what goes into the compost and what does not.
 - A similar option would include creating posters to encourage composting during lunch and educate students on what to compost.
 - **Option 2:**
 - If a composting program is not in place, in small groups students can do additional research, create posters, powerpoints, essays, or

speeches, and present them to office faculty to advocate for a composting program.

- **Option 3:**
 - With or without a composting program the class can get dirty investigating the lunchroom trash bins after lunch, separating biodegradable, recyclable, and non-biodegradable materials. Calculate how much of the trash bin's contents were wasted due to not being composted or recycled, and calculate an average of wasted compostable and recyclable material per week. Compile class information and create a poster. Brainstorm who to present this information to, what needs to be done to improve what was discovered, and what can we do.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
 - Observe all students engaged and participating in small group activity and project
 - Sharing and recording observations made with biodegradable experiment
- Summative
 - Students create and present posters either educating other grades how and why to compost or findings made when investigating trash and possible solutions.

Extension:

- As an extension of the activity above or as its own activity the following lesson meets additional CCS, NAAEE and NGSS. Students will critically think about recycling as a whole.
 - **English Language Arts**

- 5.W.7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 5.SL.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly
- 5.SL.4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
- **North American Association for Environmental Education**
 - 1 G. Drawing conclusions and developing explanations—Learners synthesize their environmental observations and findings into coherent explanations.
 - 3.1 A. Identifying and investigating issues—Learners use primary and secondary sources of information and apply research and analytical skills to investigate environmental issues, beginning in their own community and region.
 - 3.2 C. Planning and taking action—Learners use their research results to develop action strategies and design solutions at levels consistent with their maturity and preparation. As appropriate, they implement their plans.
- Facilitate class discussion on recyclable materials, biodegradable materials can be included, cardboard, paper, plastics, and glass.
- Have students collect data on the amount of recyclable materials that were thrown away (educators can determine if they want to count recyclable materials that were recycled) while at home or in the school. Students can do this for 2 days to a week or more.

- Following the data collection students will get in small groups to combine their data, while doing this ask students to discuss some of the following:
 - What does the data show? What does this data mean?
 - What does the data make them think or how does it make them feel?
 - Why might the data be this way? What is influencing it?
 - In regards to the environment, why is this data significant?
 - In regards to our regulations and our society, why is this data significant?
- After plenty of time to discuss, bring the class together for a group discussion, and ask students to share their thoughts.
- Facilitate discussion to help students was the data to identify a problem. Then have students think about the causes and influences of the problem(s) identified.
- Once these have been identified as a class or in small groups, students begin brainstorming solutions or ways to lessen the problem(s). Following this the educator can either of the following:
 - **Option 1:**
 - In small groups students can focus on a problem and use their knowledge and research to develop a solution. Identifying the causes of the problem, explanation of the solution and why and how it would help mitigate the problem, how the solution would be implemented, challenges of the solution, etc.
 - Groups can create a small presentation to inform their peers of their findings.
 - **Option 2:**
 - As a class one problem should be chosen, using this as the focus the class should name the causes and influences of the problem and brainstorm a solution to said problem.
 - This can be done as a class or in small groups, if done in small groups each should focus on the same problem and then come back together as a group to identify one solution to the rest of the activity.

- After determining the solution the class should develop it by conducting research. They should determine what caused the data to be this way, i.e. why people not might recycle, explain/outline the process of implementing the problem, how and why it will help mitigate the problem identified, challenges that might arise, social influences or impacts, environmental impacts, why the solution would be beneficial, why it matters, impacts not recycling, impacts recycling, etc.
- The class can end the exercise here or collectively create and share a presentation advocating for the solution to be implemented. This can be shared with the general public, school district board, local government officials, or other applicable policymakers and members of society, a presentation could also be recorded and posted to social media to reach a larger group.
- For example, solutions students might want to implement could be: glass recycling program, city recycling service and bins, compost pick up, school, district, or city compost pile, school recycling program, separate trash bin at school or around town, etc.
- The presentations from the small groups or as a whole to another party would act as the assessment for this extension activity.

A teachers guide to compost. (n.d.). Central Vermont Solid Waste Management District.

https://www.cvswmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswmd1.pdf

Lesson 2: Breaking it Down

Goal: Learn about decomposers and investigate the components of compost.

Objectives:

- SWBAT identify at least two biodegradable materials and decomposers present in compost by dissecting an active pile of compost.
- SWBAT use their knowledge and observations to create a diagram of the ecosystem found inside a compost pile to show the movement of matter among at least three components.
- SWBAT explain the process of a compost pile and identify characteristics, uses, and benefits.

Standards:

Science

- 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

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- 2.1 B – Earth's living systems—Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment in which they live, and how their environment affects them.
- 2.1 B – Earth's living systems—Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the biosphere.

Duration:

- 60 minutes
- Plus 30-45 minutes for math portion

Materials:

Active compost pile – Gloves – Mat, cardboard, or thick paper to explore compost on – Magnifying glass (not necessary, but fun to have) – Fork, toothpicks, or utensil/tool to dig through compost with (students can also just use fingers)

Preparation:

Collect and bring in active compost for students to dissect.

Vocabulary:

Decomposers – Ecosystem – Biodegradable – Organic matter – Compost – Substance – Physical change – Chemical change – Active

Discussion Questions:

- What are key components of a compost pile?
- What does a compost pile start as and what does it finish as?
- Why can we no longer make out the biodegradable materials that went into the pile?
- What change is happening and why?

Outline:

- **NOTE:** Lesson preparation required.
 - **NOTE:** This lesson can be done at or in partnership with a local urban farm, utilizing their compost pile. This can also be done in a school garden or by bringing the compost pile inside. If neither is available the educator will need to make arrangements with local organizations to utilize an active compost pile, preferably not one with a lot of manure in it.
- Begin the lesson by reviewing what biodegradable means, what compost is, and what material goes into a compost pile.
 - **NOTE:** If the “Nature Recycling” lesson has not yet been taught, the educator will need an additional 10-15 minutes to introduce, describe, and explain compost and biodegradable materials.

- Ask students what insects they have seen in the soil, review with students what decomposers are, and ask why they think decomposers are important. If students are not sure, engage the class in discussion to produce a theory.
 - **NOTE:** If the “Insect Investigation” lesson has not yet been taught ask students what bugs they have seen or think living in the soil. Ask students if they know what decomposers are. Inform define decomposers and ask if they know why or can come up with why decomposers are important.
- Define and explain what decomposers do, and their role in an ecosystem. Ask students what role decomposers have in composting.
 - **NOTE:** When explaining decomposers' role in the ecosystem emphasize the breakdown of organic matter and what breaking down organic matter produces. Educators should also emphasize why what is produced is so important. Since this lesson is not focused on the requirements for plants to grow, educators should inform students of the basics concept, i.e. decomposers eat organic matter and they poop the essential components for plant growth.
- Briefly go over various decomposers, students will investigate them more in-depth later.
- Split students into small groups, no more than 4. Provide groups with a way to identify the decomposers introduced (either a hardcopy or electronic version), this might include images, drawings, and descriptions.
- Ask students what we might find in the pile, introduce these materials as substances we put into a compost pile and that they are physical substances we put in, i.e., branches, leaves, fruit, etc.
- Show students a portion of the compost pile under the projector. Ask if students can see any biodegradable substances in the pile. Can they identify any of the physical substances that went into the pile? Why might it be difficult to identify biodegradable materials? What happened to these materials?

- Introduce and explain the idea of change, i.e., physical vs. chemical change, and ask students what type of change occurs in a compost pile? Ask students why the chemical change occurs.
- Give each group a pile of compost, some sort of mat, forks, toothpicks, gloves, and magnifying glass.
- Before dissecting, ask students to investigate the pile with their eyes (and maybe their noses). Begin a list of substances they are able to easily identify.
 - **NOTE:** Students might say it smells bad, weird, or like poop (hopefully not if the pile did not consist of manure). Simply remind students that a compost pile is the freshest form of dirt and is straight from the source.
- Instruct students to begin dissecting the pile, identifying the various decomposers, and marking how many of each decomposer they see. Once decomposers are found, have students make note of what they identified, and have student groups make a list of additional biodegradable material and organic matter they find. Allow 10 or so minutes for dissecting.
- Have students return their materials.
- Have groups share what they found when dissecting the pile, the educator should add what is shared to the list previously started.
- Ask the class what was just looked at (compost pile, decomposers eating, etc.), what it used to be (biodegradable material that was recycled, plants, fruit, etc.), and what it is becoming (fresh dirt, nutrients for plants, etc.).
- **Educators can end the lesson here or choose to extend the lesson into math standards.**
 - Have groups (students can work in the same groups or individually) refer back to their identification and count of decomposers they found. Students will use this information to approximate how many various categories of decomposers there are in the compost pile dissected by the class as a whole.

- If there were 5 groups, students determine what fraction, decimal, and/or percentage of the compost pile did each group have.
- Using this information, students calculate approximately how many decomposers are in the whole compost pile, approximately how many decomposers had legs, approximately how many had more than six legs, etc. Allow approximately 30 minutes for this, adjust the time to accommodate the length of the worksheet and the level of students.
 - **NOTE:** The educator may need to give additional math lessons, i.e., multiplying multi-digit whole numbers, introducing fractions, decimals, and/or percentages, multiplication of fractions, etc. This will be unique to each class.
- Once groups/students have completed these various calculations they can check their work with the class.
 - **NOTE:** The educator can facilitate this by having each group share their groups count of each decomposer and have students use addition to check their work, the educator can work through the problem on the board, using addition and/or multiplication. OR the educator can allow students to discuss and move amongst themselves, getting the necessary information from other groups to check their work. This is up to the class dynamics and educator. Allow approximately 20 minutes for this.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
- Summative
 - Students draw and/or write a description of the ecosystem within compost
 - Include the movement of matter, i.e. plants, decomposers, and environment.

- Short informative explanation of composts benefits, uses, characteristics, requirements, etc.

A teachers guide to compost. (n.d.). Central Vermont Solid Waste Management District.
https://www.cvsmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvsmd1.pdf

Lesson 3: Let it Rot

Goal: Understand the benefits of composting and how composting works in order to create their own compost pile.

Objectives:

- SWBAT identifying the necessary materials and decomposers in a compost pile.
- SWBAT justify the inclusion of each component and explain its specific role in the pile.
- SWBAT create a “recipe” for a compost pile for the class to follow while making their own compost.

Standards:

Math

- 5.MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
- 5.NF.3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
- 5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

English Language Arts

- W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.5.3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

Science

- 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

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- 4 A. Recognizing rights and responsibilities—Learners explain the rights and responsibilities of community membership and their role in promoting sustainability.
- 4 C. Accepting personal responsibility—Learners describe the broad environmental, social, and economic consequences of their personal and group actions and as appropriate, accept responsibility for their actions.

Duration:

- Approximately two - three 60 minute blocks
 - 15-20 minutes for introduction
 - 20-30 minutes for math component (plan for additional time if first introducing one or more concepts)
 - 20-30 minutes to develop recipe
 - 45-60 minutes to create compost pile
 - Additional work days to complete writing portion

Materials:

Access to outdoors – Brown materials (dry leaves and grasses, newspaper, dead plant clippings, wood branches, hay, straw, sawdust, and pine needles) – Green materials (grass clippings, food scraps, coffee grounds, tea bags, and fresh leaves) – Biodegradables from garbage – Organisms layer (Part of an active compost pile or earthworms, white worms, sow bugs, pill bugs, millipedes, snails, slugs and mites) – Water – Large stick, shovel, or pitchfork to stir compost

Preparation:

Collect or know where the following are available for students to collect: brown materials (dry leaves and grasses, newspaper, dead plant clippings, wood branches, hay, straw, sawdust, and pine needles); green materials (grass clippings, food scraps, coffee grounds, tea bags, and fresh leaves); biodegradables from garbage; and organisms (part of an active compost pile or earthworms, white worms, sow bugs, pill bugs, millipedes, snails, slugs and mites).

Vocabulary:

Biodegradable – Decomposers – Organisms – Organic matter – Ecosystem – Browns – Greens

Discussion Questions:

- What goes into compost? What does compost do?
- How do we start a compost pile?
- What does “caring” for a compost pile look like?

Outline:

- **NOTE:** Lesson preparation required.
 - **NOTE:** Mathematical concepts such as finding the parameter, area, volume, interpretation of fractions, and the multiplication and division of fractions are key components to this lesson which come into play following the introduction. Time may vary due to the review or introduction of one or more concepts. How this is done is up to the educator and will be unique to each class.
- Introduction if “Nature Recycling” and “Let it Rot” were previously taught, alternative introduction below. Ask students to use what they know about biodegradable materials (anything that can decay and can be broken down), decomposers (organisms that can break down organic matter), and compost (recycling organic matter) to write down what materials need to be present in a compost pile (review terms as needed). Encourage students to list specific materials. Allow 5 minutes for students to work individually or in small groups and make lists in their notebooks. Bring students back together and have students share, the educator should record the class list on the board.
 - Alternative introduction, i.e. if “Nature Recycling” and “Let it Rot” were *not* previously taught. Introduce what compost is, that it is made up of biodegradable materials, and the role of decomposers (define or review terms as needed). This can be done via educator explanation and class discussion, short video or article, condensed versions of “Nature Recycling” and “Let it Rot”, etc. Discuss with students what the key

components of a compost pile are. Create a list of these on the board with students, and encourage students to record them as well.

- **NOTE:** If not included, encourage students to think of biodegradable materials that we humans do not eat, i.e. leaves, grass, bark, dirt, etc.

- Encourage the class to discuss the benefits of composting.
- Making a compost pile creates a home. Ask students what will live in this home, i.e. decomposers, and what the decomposers will need to live, similar to what we need to live i.e. food (biodegradables), air, and water.
- Discuss the two types of biodegradables, browns (dead leaves, bark, wood chips, dirt, etc.) and greens (grass, plants, fruits, vegetables, etc.).
- Inform students the class will be making a compost pile (for fun or to use for gardening later). To make a successful compost pile the class will first need to make a recipe and find the measurements of each component we will need. Then we will need to collect our materials, set up the pile, and take care of the compost until it is ready.

- **NOTE:** Mathematical concepts utilized will consist of i.e. finding, parameter, area, volume, interpretation of fractions and the multiplication and division of fractions. A review or introduction of these concepts may be required.

- First students need to calculate measurements for the compost pile.
 - Calculate the perimeter, area, and volume of the designated compost area or compost bin. Provide students with measurements, i.e., 3ft wide x 4ft long x 3ft tall. For this example, **perimeter $3ft+3ft+4ft+4ft = 14ft$, area $3ft \times 4ft = 12ft \text{ sq.}$, volume $3ft \times 4ft \times 3ft = 24ft \text{ cu.}$**
 - Students will use this information to determine the amount of fencing and the ideal location for a compost pile (or bin).
 - Students will use calculations to determine measurements of each component needed. The following questions and calculations are a

continuation of the previous example, the educator can adjust as they see fit.

- If the class uses a box that is 1 ft wide x 1 ft long x 1ft tall as a measuring and transporting container, how many boxes will be needed to fill our compost pile? First students need to find the volume of the box, **1ft cu.** And determine what multiplied by the box volume, 1ft cu. equals the volume of the compost, 24ft cu. I.e. **1ft cu. x 24 = 24ft cu. 24 boxes are needed to fill the compost pile.**
- The compost pile needs to be $\frac{1}{2}$ brown material and $\frac{1}{2}$ green material, how many boxes of each material are needed? **$24 \times \frac{1}{2} = 12$ boxes 12 boxes of each.**
- We want to make even layers of brown and green materials, if we place 3 boxes of brown material down, what fraction of green material do we need to use next? **$3 / 12 = 3/12$ or $\frac{1}{4}$ $\frac{1}{4}$ of green material is needed next or 3 boxes.**
- Since we have to bury our food scraps in the middle of the pile with $\frac{1}{2}$ of the compost volume full, after what layer should we place our food? Explain. **$3 \times \text{what} = 12$ or $12 / 3 = 4$, so 4 layers of brown and 4 layers of green, 8 total layers. When there are 4 total layers in the pile, 2 brown and 2 green we place the food.**
- We need to top our pile with microorganisms (soil, active compost, or manure), we only need $\frac{1}{8}$ of our total compost bin volume. How many bins of micro-organisms do we need to add to our compost pile? **$\frac{1}{8} = 3/24$ we need 3 boxes of microorganisms**
- Since we added $\frac{1}{2}$ the volume in brown material, $\frac{1}{2}$ the volume in green material, and added 3 additional bins of microorganisms, what fraction of the total compost pile volume did we add to the pile? **$\frac{1}{2} + \frac{1}{2} + \frac{1}{8} = 1 \frac{1}{8}$ or $1 \frac{3}{24}$**
- Once given time to complete the activity, work should be checked in small groups or as a class. Then students can begin writing step by step instructions or

“recipes” for a compost pile, students will need to use what they’ve learned and may work in small groups.

- Allow students 10 or so minutes to create a recipe, remind students we want the same amount of browns and greens in some sort of layers, water, and air are important (unless the educator previously discussed this students would not know how much or how to, allow students to develop their own conclusions as it will be discussed later). Students should include measurements previously calculated.
- Bring the class back together and have students help make a recipe the class agrees on. Be sure to include when, why, and the amount of water and air needed.
 - Recipe should be similar to as follows:
 - 1. Identify and build compost area
 - 2. Collect biodegradable materials (food scraps and paper-based materials) from trash bins and separate them into piles of browns (paper-based) and food scraps.
 - 3. Go outside to collect 12 boxes (1 box = 1 ft cu.) of browns, dead leaves, bark, sticks, wood chips, hay, etc. Add the browns found in trash bins to what is found outside.
 - 4. Collect 12 more boxes of greens, grass, weeds, flowers, etc.
 - 5. Add 3 boxes of browns and add 3 boxes of greens on top.
 - 6. Water the 2 layers so everything is moist but not soaking.
 - 7. Repeat steps 5 and 6.
 - 8. Lightly mix the layers then add food scraps from the trash bin.
 - 9. Repeat steps 5 and 6 twice.
 - 10. Lightly mix the final 4 layers.
 - 11. Use 3 boxes of soil or active compost to cover the top with a layer of micro-organisms and lightly mist this layer.
 - 12. Mix the compost pile every few days until ready.

- Split students up into groups and assign collection jobs, i.e. browns, greens, biodegradables from garbage, and micro-organisms layer. Bring student compost recipe and students outside to the compost pile area, and send students to collect materials or measure materials already collected.
- Follow the class recipe and begin making compost. Discuss and review why we are making compost, who it makes a home for, why compost is beneficial, why each component is needed in the pile, what should be grown with completed compost, etc.
 - If possible, allow students to assist with filling, mixing, and watering.
 - **NOTE:** If students are collecting materials, remind them that when collecting 'greens' to not collect materials that are living, i.e. branches on trees or live plants. If applicable the educator can briefly discuss 'Leave No Trace' with students.
- Once complete, bring students inside to discuss what they learned and adjust or turn in their recipe.
- **Educators can end the lesson here or choose to extend the lesson into writing standards.**
 - Once back inside students will write a description and explanation of the components to go along with their recipe and a backstory of the class making a compost pile, i.e. benefits, uses, process, experience, etc. Students will write a blog-style piece on the how, what, and why each component needs to be included.
 - Students should use this blog as an opportunity to inform the reader of the benefits of composting and convince the reader to begin composting their biodegradable materials.
 - This writing assignment will be similar to a recipe blog and can be titled "My Compost Blog".
 - The blog and recipe can be turned in as one piece. If done in a Google Doc, the educator can have students add to their compost blog throughout the process of caring for the pile. Discussing the process of caring for the

compost, the changes they observe, and eventually what is done with the completed compost.

- **NOTE:** The educator may need to give additional writing lessons. Educators can also and/or incorporate a revise, edit, and/or publishing stage of students' compost blogs.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
 - Observe all students are participating in compost creation
 - Review of math prior to moving on (this can also be collected at the end of the lesson to be checked in-depth by educator, i.e. formal)
- Summative
 - Completion of accurate compost recipe
 - Creation of “My Compost Blog”
 - Description and explanation of components used to create compost pile
 - Backstory of making a compost pile, i.e. benefits, use, process, etc.

A teachers guide to compost. (n.d.). Central Vermont Solid Waste Management District.
https://www.cvswmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswmd1.pdf

Unit 5: Starting Your Own

Lesson 1: Growing a Garden

Goal: Introduce students to “growing zones” and identifying the growing needs of various plants.

Objectives:

- SWBAT collaboratively observe the sun throughout the day on school grounds in order to determine the best location for a school garden.
- SWBAT research the growing needs and growing zones of three to five chosen plants to determine which plants should be planted in their school garden.

Standards:

English Language Arts

- W.5.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Science

- 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

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- 1 C. Collecting information—Learners locate and collect quantitative and qualitative information about the environment and environmental topics, using a range of methods and sources. They explain why they used selected information collection methods.
- 1 G. Drawing conclusions and developing explanations—Learners synthesize their environmental observations and findings into coherent explanations.
- 2.1 B. Earth’s living systems—Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the

importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the biosphere.

Duration:

- 60 minutes (plus one full day of sun observations)
 - Plus any additional work time to complete poster

Materials:

Paper – Seed packages – Internet access – Poster

Preparation:

If possible bring in various packets of seeds (they can be empty, only the package is needed).

Vocabulary:

Nutrients – Growing zone

Discussion Questions:

- What do plants need to grow? How do they get what they need to grow?
- Does location and time affect when I can plant my seeds? Does it affect how my plant will grow?
- Do plants grow differently in different places? Can the same thing be grown in Florida as Montana? Why or why not?

Outline:

- **NOTE:** Lesson preparation required.
- Ask students to think of what a plant requires to grow. Allow a few minutes of thinking time before asking students to share.
- Create a class list of student responses. The list should include space, time, temperature, water, light, air, and nutrients (additional responses are also acceptable).
 - Facilitate discussion where each of these come from and how they each affect the plant.
 - Explain where nutrients is found and why it is important in a garden or farm

- Next students will identify their location on a map and determine what growing zone they are in. This can be done individually, in small groups, or as a whole and can be done via handout, educator explanation, or student research.
- Ask students how we can determine where the best sunlight is for a garden. Guide students to tracking the sunlight's location.
 - **NOTE:** If you already have a school garden students can use their findings to determine if the garden was placed in the best location for plant growth. If you do not have a school garden the educator can use this lesson as part of a class project to get a school garden in place.
- Students will then draw a map of the area, i.e. school grounds.
 - **NOTE:** This can be done as a class field trip walking around the school or using Google Maps.
- The class can go on a short walk or student volunteers can go out and observe the sun's location and report back to the class. Observations should be made when the educator arrives, when students first arrive, another time before noon, at noon, afternoon, before students leave, and before the educator leaves.
 - **NOTE:** Observations should be recorded the following day to get the sun's pattern on a full day of school, however, the remainder of this lesson can be continued on the same day it was started.
 - **NOTE:** If the arrival and departure times of educators and students are close, the sun doesn't need to be recorded both times. Also sunrise and sunset will likely be outside of school hours, so the educator can estimate the sun's location, ask for assistance from the janitor, etc.
- Next students will identify 3-5 plants, i.e. vegetables, fruits, or flowers that they would like to grow. The educator can provide students with seed packets to choose from or have students research the necessary information, i.e. planting space and time, and water and light requirements. Students will record this information for each plant they chose.

- Students will take what they've gathered so far to create a poster. Students will first introduce their location and identify their growing zone, state what all plants need to grow (light, water, nutrients) and where the nutrients will come from, then present their chosen plant information, finally, they will identify their ideal location for a garden and use the information gathered throughout the lesson (or through additional research) to justify their chosen location.

- **NOTE:** Students should simply identify soil and or compost as the nutrients.

➤ **Extension**

- Remind students that water is one of the requirements to plant growth. Have students brainstorm ways to get water for plants *without* using a faucet or hose. This can be anything from collecting water from puddles or digging a really big hole to collecting rain from the gutters or melting snow. Allow students to use their imagination.
- Ask students to choose their best option to collect water for their garden and have them draw a diagram of their collection method.
- Ask students to write a few sentences explaining why they think this will be the best method to collect water for a garden.
- Have students write a few sentences or discuss with the class why using alternative methods to collect water could be beneficial to the environment or to the gardener.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in class observations
- Summative
 - Poster of chosen plants' growing needs
 - This poster should include: their location and growing zone; three things plants need to grow, where students will get the nutrients from, identify each plants spacing, timing, and location needs for

growing, and state where they want their garden to be based on their chosen plants.

Lesson 2: Garden Mapping

Goal: Help students understand how to plan and map a garden based on plant requirements.

Objectives:

- SWBAT use a graph plot to create a map/diagram of a garden to understand the planning and preparation required to gardening and farming.
- SWBAT research the specific spacing, soil, water, and light requirements for 5 plants in order to include these in their garden map/diagram.

Standards:

Math

- 5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates.
- 5.G.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

North American Association for Environmental Education

- 1 G. Drawing conclusions and developing explanations—Learners synthesize their environmental observations and findings into coherent explanations.
- 2.1 B. Earth’s living systems—Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the biosphere.

Duration:

- One or two 60-minute blocks

Materials:

Graph paper – Seed packages or internet access – Blank paper – Coloring utensils (not required)

Vocabulary:

X-axis – Y-axis

Discussion Questions:

- Why do farms and gardens need to plan out where things are planted?
- How does spacing affect a plant's ability to grow? Can you relate this to anything in your world?
- What characteristics might be a necessity when farms and gardens plan their spaces? Why?

Outline:

- Ask students what the requirements for a garden, farm, or growing plants are. Inform students that they will be drawing a map/diagram of a garden, this can be a personal garden or a school garden.
 - **NOTE:** If the “Growing Your Own” lesson was previously taught, students should incorporate what was learned into this lesson, i.e. sun position, water, plant information, etc.
 - If the “Growing Your Own” lesson was *not* previously taught, the educator can adjust the lesson by providing additional information to students or by not requiring the inclusion of certain aspects.
- Students will choose approximately 5 plants to include in their garden, for each plant they will need to know when the plant should be planted and how much space each plant needs. These can be the same or different plants students choose in the previous lesson, “Growing Your Own”.
- Provide students with a graph with only the x and y axis, students will label it and add their own units. Students will use the graph to design the layout and spacing of their garden. Encourage students to use colors to distinguish various characteristics like different plants and water and compost locations.

- **NOTE:** A lesson on graphing points should be taught prior to this lesson, ideally the educator should simply review graphs and coordinates for this lesson.
- Provide students 10-20 minutes to work on their garden graph. The educator should check students' work prior to students moving on to the final draft.
- For the final draft the educator can have students create a finalized graph or use what was already checked off. With this finalized graph students will use another graph paper students will use drawing instead of points to represent various characteristics of their garden (this graph should still correlate with their original graph).
 - **NOTE:** If previously taught “Growing Your Own” the educator can ask students to refer back to their sun observations and include in the description the location of the garden in relation to the sun and why.
 - **NOTE:** The educator can ask students additional questions (or be used as an extension for some students). Based on the units of measurements you used approximately how far is your water from the furthest plant? How close is it to the closest plant? Identify these coordinates. Is there enough room to walk between each plant? Can you estimate how much room there is between plants? Approximately how much space is needed for each type of plant? Approximately how much space is needed for the whole garden? Etc.
- Depending on the pace of the class, students may need additional work time/days to complete the final graph of the garden. This will be unique to each class and should be planned for by the educator.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion

- Summative
 - Student finalized garden graph + corresponding illustrated graph
 - Include three to five plants – students will extensions can include additional plants or components such as water, compost pile, etc.
 - This graph should include labels, a legend, units of measurement, and a description of the coordinates occupied by various characteristics, i.e., x and y-axis are measured in yards. Strawberries (2,2) through (2,12) and (4,2) through (2,12). Water is located on (11,7), etc.

Lesson 3: Feeding Yourself

Goal: Introduce students to snacks and meals made from food that they can grow.

Objectives:

- SWBAT collaboratively plan snacks or meals out of the food that is found at the urban farm, school garden, or locally sourced produce from the grocery store to introduce healthy meals and ways people can feed themselves.
- SWBAT journal their process of creating a recipe with ingredients sourced from the urban farm, school garden, or local produce then prepare their recipe.

Standards:

English Language Arts

- 5.W.3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

Science

- 5.SL.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

Duration:

- 60-90 minutes

Materials:

Internet access – Produce harvest from urban farm or school garden (can also be purchased from local sourced store) – Preparation/cooking materials – Journal

Preparation:

The educator will need to bring in locally sourced produce or partner with an organization that will provide the produce or allow students to harvest the produce.

Vocabulary:

None

Discussion Questions:

- What went into growing it, making it, and preparing it?
- How is our snack/meal better because of where our products were sourced? Is it better?

- How is this different from what you prepare or eat at home? What makes this different?
- If this was done often and by more people, how would this impact the environment? Or the economy, i.e. grocery stores?

Outline:

- **NOTE:** Lesson preparation required.
 - **NOTE:** The following lesson is outlined using an urban farm partnership or school garden but the educator can purchase locally sourced produce instead and or make additional adjustments as needed.
 - This can also be completed in a research project format.
- Using what is available and being grown (at the urban farm, in the school garden, or locally available at the store) students will work in small groups or as a collaborative whole to brainstorm, or research) snacks or meals that can be made.
- The students, with the help of the educator, will choose the best option to make with the foods available.
 - **NOTE:** As many or as few of the locally grown foods can be used, this is dependent on what students choose to make. Locally grown food should be all of most of the snack or meal. This could be, applesauce, salad, a smoothie, a veggie plate, hummus, pesto, broth, etc.
- The class will make a list of other ingredients, materials needed, and an outline of the recipe.
- Depending on where your goods are sourced from, students can (should if possible) help harvest the food. Students can and should also help in the preparation of the food.
 - **NOTE:** Allow students to lead and participate in the work.
- While preparing food continue to discuss other topics discussed in previous lessons.

- Eat and enjoy snacks/meals.
- Ask students to journal about the snack/meal they are eating. What went into growing it, making it, and preparing it? How is our snack/meal better because of where our products were sourced? Is it better? How is this different from what you prepare or eat at home? What makes this different?

➤ **Extension**

- The educator can have students calculate specific measurements for the recipe, how to down or up-size the recipe, transportation differences in our locally sourced food vs non-locally spruced options, etc.

Assessment Examples:

- Formative
 - Observe all students are engaged and participating in group/class discussion
 - Observe students are engaged and participating in preparation work
- Summative
 - Observe student journaling
 - Ask for student volunteers to share their journaled experiences
 - Collect student journal entries

Component 3

**Therapeutic Group Home Patients,
Nature-Based Experiences, and The
Promotion of Environmental Literacy**



Overview

Study and Discussion

Purpose and Outline: The final component will be a discussion paper that combines at-risk youth, outdoor experiences, and promoting the development of environmental literacy. While enrolled in EDU 588 Action Research during the Spring 2022 semester I developed a study that looked into the social and physiological effects associated with at-risk youths when participating in outdoor experiences. In this section, I will introduce my study, present my findings, and discuss how the data was used. Following this I will connect my findings with the additional research to discuss the association between nature-based experiences, therapeutic benefits, and the foundational elements of environmental literacy. This will not only future support my suggestion of incorporating nature-based experiences within a therapeutic group home but also extend the potential population of individuals that become environmentally literate.

Below are brief summaries of each element within my final component.

Study Overview: Designed to examine the associated benefits of outdoor experiences and the ability to provide a space for at-risk teen males, residing in the group home, to develop their social and psychological skills.

Purpose: Provide information to the group home director regarding the potential benefits associated with allocating resources towards the planning and implementation of outdoor experiences for group home residents.

Study Population: At-risk teen males age 12 to 17, residents of a group home in Missoula, MT.

Study Participants: Three residents of the group home, teen males ages 13, 14, and 16. Plus two accompanying staff members to supervise and facilitate the experience.

Outdoor Experience: Two day, one-night camping in Lolo National Forest in Western Montana. Participating in activities such as setting up camp, collecting firewood and making fire, preparing meals, group games and exploration of nature, hiking, fishing, and individual time and freedom to explore and experience nature.

Data Collection: Two accompanying staff members assisted with data collection while on the trip.

Qualitative: Tallied observations of attitude, behavior, and interactions while on the trip. Self-assessment surveys were given to the three teen participants.

Quantitative: Interviews with two accompanying staff members pre- and post-outdoor experience.

Outcome: Findings were overall positive and encouraged the group home director to support the idea of additional outdoor experiences.

Literature Review: Discovered evidence of positive behavioral and psychological impacts associated with the frequency of outdoor experiences; compelled the director to provide resources that would support future outdoor experiences.

Additional Research and Supporting Discussion: The integration of nature-based experiences to provide therapeutic benefits as well as direct and indirect benefits associated with the promotion of environmental awareness and appreciation, therefore encouraging the development of environmental literacy.

Below is the study I conducted to examine the potential benefits of implementing outdoor experiences in a therapeutic group home setting.

Outdoor Experiences: Providing A Space For At-Risk Teens To Develop Their Social And Psychological Skills

Abstract

Using an action research framework to examine outdoor experiences' ability to provide a space for at-risk teen boys to develop their social and psychological skills. The purpose of this study was to establish the benefits associated with incorporating outdoor experiences into a group home that houses 12-17-year-old at-risk teen boys. The findings of this study are meant to assist the group home's director in determining whether or not to allocate money and other resources toward the planning and implementation of additional and regular outdoor experiences. For this study, three

at-risk teen boys (ages 13, 14, and 16) in a group home in Western Montana participated. Two of the group home supervising staff members partook in this study by assisting with data collection. Qualitative data collection tools consisted of tallied observations of attitude, behavior, and interactions, and self-assessment surveys taken by the three teen boys participants. Quantitative data was collected through interviews with the two supervising staff members before and after the outdoor experience trip. Analysis of the data identified there to be a greater quantity of positive observations made and self-assessment scores. This allowed the researcher to conclude that there was an overall positive outcome from this outdoor experience. This specific study can be concluded as positive and these findings are beneficial to a particular group home in Western Montana. However, further research is needed to determine the effectiveness of outdoor experiences for developing at-risk teen boys socially and psychologically.

Problem and Purpose

Youths are shaped by the unique situations they experience, which has the potential to create various issues and challenges the youth must cope with. Prior experiences that were problematic for the youth and or involved risky behaviors, situations, and environments often resulted in characteristic challenges associated with their social, emotional, and psychological skills and regulation, therefore establishing them as an “at-risk youth” (Anthony & LeCroy, 2018). Youth dealing with these issues are challenged with transitioning to adulthood and the workforce to make contributions to society and lead a successful life (Schonert-Reichl, 2000). For the study, the following definition for ‘at-risk youth’ will be used. Defined by Anthony and LeCroy (2018) the term ‘at-risk youth’ refers to a wide range of circumstances that cause problem behaviors in youth, such as substance abuse, school failure, juvenile delinquency, and mental health disorders.

Intervention strategies and programs are put in place to assist at-risk youth development and transition into adulthood. Intervention strategies and programs include: mentoring; individual and family counseling; school and community-based programs; academic, social, or employment support services; case management

interventions; traditional therapy; and therapeutic programs (Dobizl, 2002). Interventions and programs that promote positive outcomes for at-risk youth include physical, intellectual, psychological, emotional, and social domains (Crime and Justice Institute, 2006).

Wilderness or adventure therapeutic programs have proven to be successful intervention programs for at-risk youth by utilizing and emphasizing the restorative qualities of nature (Hill, 2007). Although immersion and longer-duration wilderness therapy programs often lead to the most successful results (Dumond et al. 2005), this might not be accessible to all at-risk youth. Due to resource or legal restraints, at-risk youth in long-term programs such as therapeutic group homes, can be out of reach of these long-term immersive wilderness therapy programs. This, however, does not mean these at-risk youths can't or shouldn't benefit from the therapeutic properties of nature.

Statement of the Problem

As previously mentioned, research has found that long-term immersive wilderness therapy programs result in more positive outcomes. Unfortunately, these types of programs are out of reach for some at-risk youth. This is the case for the at-risk youth placed in the therapeutic group home for which this action research study was completed. Due to certain restraints, these at-risk are unable to partake in wilderness therapy programs and spend the majority of their time outside at nearby parks. As the benefits of these programs have been identified, research was needed to determine if similar benefits could be achieved through similar outdoor nature-based experiences. The outcomes of this research will illustrate the benefits gained by these specific at-risk youths and support the allocation of additional resources for the planning and implementation of additional similar outdoor experiences.

Statement of the Purpose

The particular group home focused on in this study requires youth to participate in individual or family therapy sessions in addition to treatment plan check-ins with a case worker and/or their therapist. These requirements are placed to assist the youth in developing socially and psychologically in preparation for transferring out of the group home care and onto the next steps in life. As an alternative intervention wilderness and

adventure therapy programs have shown to be a useful strategy for treating at-risk youth. Hill (2007) researched wilderness therapy and its benefits for treating at-risk youth, stating adventure therapy programs contribute to improved self-concept, decreased behavioral problems, increased internal locus of control, and improved clinical functioning.

As these young at-risk teens brought with them social, emotional, and psychological challenges, wilderness therapy programs had the potential to be beneficial as an alternative and unconventional mode of treatment for these at-risk teens. Due to the restraints of funding and other resources necessary for such programs, the researcher of this study proposed a camp trip to imitate such programs on a smaller scale. Using an outdoor experience as a strategic intervention would deliver similar therapeutic benefits as an immersive wilderness therapy program.

The purpose of this qualitative study is to explore the social and psychological benefits at-risk youths, housed in a therapeutic group home in Western Montana, gain from short-term outdoor experiences to describe these benefits for the group home director to support the redirection of resources towards additional outdoor experiences. With the use of pre- and post- trip interviews of supervising staff, self-assessment surveys taken by participating at-risk youths, and observations of at-risk youth's attitudes, behavior, and interactions taken while on the trip were used to explore the social and psychological benefits gained from this experience. The focused research question of this study is "Can at-risk teen males benefit socially and psychologically from outdoor experiences?".

Hypothesis

Based on the research done and information gathered regarding wilderness and adventure therapy programs in addition to personal knowledge and experiences with the benefits associated with outdoor education. The researcher hypothesizes that at-risk youth will benefit socially and psychologically from short-term outdoor experiences due to the nature of wilderness and the setting it provides for new and interesting experiences. The researcher also hypothesizes that additional and frequent short-term experiences are likely to continue the development and improvement of at-risk youths'

skills socially and psychologically, however, to test this hypothesis additional and long-term research would be needed.

Literature Review

The following section will summarize the research done on therapeutic programs and the impacts and benefits it provides for at-risk youth. A review of the literature was done consisting of therapeutic programs and other strategies to assist the development of at-risk youth, in addition, wilderness therapy programs are reviewed. All literature reviewed below is relevant to the current study being discussed. A literature review specific to the impacts of traditional therapy is not included due to its frequent appearance and discussion in the literature associated with non-traditional therapeutic programs.

Intervention strategies for at-risk youth all have a similar goal of building skills that promote the development of cognitive, emotional, and social functions needed to transition into as well as become independent and successful in adulthood (Crime and Justice Institute, 2006). Social scientists evaluated the effectiveness of different interventions. Intervention strategies that combined skill development and practice in physical, intellectual, psychological, emotional, and social domains increased the development of at-risk youth and promoted a successful transition into adulthood (Crime and Justice Institute, 2006). Single-domain-focused interventions for at-risk youth provide the support that is important to their transition into adulthood. However, intervention strategies that include more features and combine the previous domains listed provide more support to the youth as a whole and likely result in a positive development for the at-risk youth (Crime and Justice Institute, 2006).

Mentoring programs such as Big Brother/Big Sister programs are put in place to help to develop the behavioral, social, and emotional skills of at-risk youth. Mentoring programs can be considered a useful intervention strategy due to the ability of extensive and repetitive interactions youth have with those around them, parents, siblings, peers, teachers, and other adults (Snyder et al., 1997). In a study of over 900 youths that were paired with a mentor, mentees were found to be more trusting of their guardians and felt

more supported and less apprehensive of their peers (Keating et al., 2002). The same study also found that the mentees were less likely to skip class in comparison to the controlled group of at-risk youths without mentors. However, in self-reports of self-esteem, behavior, and attitude, there was no difference in the at-risk youths with mentors compared to those without.

Wilderness therapy, one type of outdoor adventure therapeutic program, can be considered a double approach method to counseling. Using traditional counseling techniques in the natural environment and including adventure-based learning experiences and activities (Hill, 2007). Outdoor adventure and immersive wilderness experience therapeutic programs focus on experiential learning experiences through activities such as canoeing, orienteering, rock climbing, camping, exploring, and other survival skills (Lubans et al., 2011).

Building skills that mitigate challenges as they arise requires the necessary skills that at-risk youth lack for a successful transition into adulthood. Outdoor adventure programs involve natural and direct consequences that require the “development and use of skills, individual ingenuity, collaboration, and cooperation” (Short-Robbins, 2020). The development and immediate use of these skills in outdoor settings assist at-risk youth in implementing these skills and behaviors throughout their life (Dumond et al., 2005). Participating in outdoor adventure programs has been shown to improve self-confidence, teamwork and communication skills, and problem-solving skills (Short-Robbins, 2020).

Wilderness therapy and other similar outdoor adventure programs utilize the restorative setting nature provides and provide a variety of therapeutic benefits for at-risk youth (Hill, 2007). As therapeutic programs at their core, immersive wilderness therapy and outdoor adventure programs have been identified as a successful form of alternative therapeutic treatment for at-risk youth. These programs can immerse individuals and families into unfamiliar experiences that require communication, collaboration, and coordination (Hill, 2007).

Collectively, outdoor adventure-based therapy programs are more effective than traditional counseling (Harper, 2017). In addition, these programs have been shown to

improve self-concept and internal locus of control, as well as contribute to a decrease in behavioral problems (Lubans et al., 2011). These programs provide unfamiliar settings and challenging experiences that create opportunities to change current behaviors as well as create new ones (Hill, 2007). Pre-existing expectations are removed from activities and challenges participants encounter resulting in the learning of new behaviors and skills that better help the youth adapt to the presented stimuli.

In a comparison study of adventure-based, outdoor therapeutic camping, and standard youth development centers (group home) it was concluded that significant positive outcomes were associated with adventure-based therapeutic programs (Harper, 2017). In an additional study reviewed by Harper (2017), at-risk males participated in a wilderness therapy program consisting of 12 single-day sessions and a 4-day backpacking trip. The self-efficacy and cognitive autonomy were significantly improved in the participating, at-risk males when compared to the controlled group who did not participate in wilderness therapy.

The therapeutic benefits of nature have also been unutilized within the criminal justice system. Nature-based interventions resulted in measurable benefits and lower recidivism rates for adults and juveniles within the criminal justice system (Short-Robbins, 2020).

As outdoor adventure therapeutic programs provide a setting for those to learn through experiential encounters, there is an understanding that learning in an outdoor setting has been shown to benefit the youth of a variety of backgrounds and ages (Cooper, n.d.) found that learning in an outdoor setting helps to improve overall learning and cognitive development of children. In addition, the natural setting promotes physical and mental involvement through exploration, collaboration, and constructive experiences for the individual and group (Cooper, n.d.).

Methodology and Research Design

This action research study examined the benefits three at-risk teen boys gained from a two-day - one-night camping trip. Self-assessment surveys, observations, and interviews were used to determine the benefits gained from a camping trip that imitated

a shortened format of outdoor adventure programs to determine the usefulness of additional funding for future experiences. As studies have shown the numerous therapeutic benefits of outdoor adventure and wilderness therapy programs, others stress the importance of immersive and length programs for those benefits. The study used observations and interviews to achieve the most comprehensive overview of the at-risk youth participant's behaviors, attitudes, and interactions before, after, and during this experience. The self-assessment surveys gave insight into the youths' perspectives and opinions. The research design of this study gathered and analyzed data necessary to answer the research question and determining the appropriate funding for these experiences to be implemented into the specific therapeutic group home program.

Setting

The youth examined in this action research study have faced challenges in their past and are now forced to learn how to cope with and positively grow from these experiences. In a therapeutic group home for at-risk teen boys, ages 12-17, in Western Montana; the youth placed here were removed from their homes as a result of domestic issues or in avoidance of juvenile correctional facilities. The outdoor experience mentioned in this study refers to a two-day one-night camping trip completed in the Lolo National Forest in Western Montana. The trip consisted of two supervising staff members that also work with the youth at the group home and three at-risk youths, ages 13, 14, and 16. While on the trip the youth participated in activities like setting up a tent, making fire, preparing meals, exploring, hiking, fishing, and individual time and freedom to explore nature.

As an outsider examining at-risk youths in a therapeutic group home, the researcher was unable to partake in and actively observe the outdoor experience due to clearance issues. Therefore, supervising staff would make all observations while on the trip.

Participants

Participants in this study were all at-risk youth housed in a group home in Western Montana. There were three specific adolescents from this group home that were examined for this study; consisting of a 13, 14, and 16 year old. It is important to

note that the three youth participants were examined for the study, however, two supervising staff members participated in the study as observers and were also interviewed for additional perspectives of these at-risk youths. As a result of the small sample size the results gathered from this study are only conclusive for this particular group home.

The study took place during an overnight, two-day camping trip in the Lolo National Forest in Montana. Although the location of activities and experiences varied throughout the trip, the overall setting remained consistent with a wilderness therapy program: in nature.

Timeline

As this study was a two-day single night camping trip the timeline was condensed. The researcher proposed the implementation to the group home director and received approval. This was followed by five days of assisting staff in planning activities for the at-risk youth participants. The outdoor experience trip was planned for the second weekend of April, therefore, supervising staff interviews took place the week prior. Participants' self-assessment surveys were completed the night they returned to the group home. Supervising staff were interviewed within the following four days of their return, at this time staff observations were also collected. With all data collected, the researcher spent the following days analyzing and interpreting the findings.

Limitations

A major limitation of this study is the researchers' inability to be an active observer on the trip with the at-risk youths. Additionally, the observation and review of the youth's journals is another limitation since the research was required to rely on the supervising staff to have the youth participate in and keep their journal entries from the trip. A limitation of this study is the examination of the at-risk legal or therapeutic files to get a comprehensive overview of the youths participating in the study. Due to this, the researcher relied on interviews with staff members that consistently work with the youth. This, however, did leave room for information to be omitted or skewed at any depth for any reason.

Data Collection

The intervention strategy examined for this study was the implantation of a mimicked outdoor adventure therapy experience. This was done by changing the setting in which these at-risk youths interacted and behaved. Typically these at-risk youths are sequestered in their group home or at school, by manipulating their setting and therefore their experiences, the data collected can exemplify outcomes from this manipulation.

A combination of pre and post-interviews as well as real-time observations were used. Pre-trip interviews were conducted to gather a baseline of the participants behaviors and characteristics. For this the researcher interviewed the two staff members of the group home that would also be supervising the outdoor experience. The staff members were asked the following questions: Are there any problems in their daily lives? In regards to discipline, respecting authority, completing homework or attending school.; How are the interactions between one another? Positive/negative? Elaborate.; and How much freedom or independence do they have on an average day? Post-trip interviews were also conducted to further discuss the observations made during the experience. Observations made during the experiences were made and recorded by the two supervising staff members. While on the trip, these staff members facilitated trip activities as well as recorded data through tallied observations. These staff members observed and recorded three characteristics of the group home participants: attitude-projected thoughts and feelings of the participants; behavior- actions of the participants; interactions- communication or direct interaction between two or more participants. For each of these, the staff members were asked to simply tally positive or negative within each category. The researcher requested observations be made periodically throughout the experience but also outstanding positive or negative observations be recorded. This would result in a total of 60 participant observations made between the two staff members.

As this study will be using data collected from various sources it was important to keep a similar structure for the interviews and expectations for observations. This study being conducted collaboratively with the researcher and the observers will help ensure

the validity and trustworthiness of the data. This collaboration will require observations and findings to be shared and reviewed by multiple parties. However, by using data acquired through supervising staff observations leaves room for staff biases to be present within the data collection process. The possibility of biases along with the small and limited sample size and study duration may lead to these results being inconclusive and therefore require further research to effectively answer the research question.

Results and Analysis

The data used to evaluate the impacts of the outdoor experiences as an additional intervention strategy for these at-risk youths was collected with the use of observations and self-assessment surveys. Pre- and post-interviews were also collected, however, they will be used to get an overview of the youth's behaviors and clarify any observations recorded while on the trip. Observations are tallied to determine the number of observations made in each category; positive and native, attitudes, behaviors, or interactions.

Pre-trip interview questions and responses are as follows.

Are there any problems in their daily lives? In regards to discipline, respecting authority, completing homework or attending school.

Staff 1: As a collective whole there is a struggle with regulation of emotions, following and sticking to a daily routine. Respecting rules and discipline, for example, homework and chores need to be done before the youths are allowed to have free time which can consist of a few different activities. The youth come from a variety of troubled backgrounds and aren't always used to the structure we provide. They are in therapy, adjusting to the group home, working with their case manager, and or their probation officer which all come with challenges of their own but typically the longer a youth is in the group home the less frequent or large their daily problems are.

The youths' ability to respect authority or discipline typically depends a lot on the day and prior events. Usually if a youth is grounded or gets in trouble the night before or in the morning before school, school will be difficult. Completing homework and following directions when they get home from school also tends to be a struggle. On the flip side, completing chores, showing respect, and following directions will be a smooth

ride when the youth has had a “good” day. It all really depends, some youth some days will have no problem and other days that same youth or another youth will not be doing anything you ask of them simply because someone is telling them to do something.

Staff 2: These kids deal with all of these and more on a daily basis. From a young age, most of them are told that they will not make it in life or as they get older we tend to see the lack of hope grow and see them become just another looked-over kid in the system. Attending school has never been a struggle for them, it's a way for them to get out of the house and create friends with kids outside of the group home/other group homes around town. Completing homework has always been an issue. Part of the reason is the homework/classwork that is assigned to them. These kids don't have cellphones so when classwork is given that requires a phone, they get embarrassed and uncomfortable when the teacher asks "why don't you have a phone. Every high school kid has a phone." The other reason is that most of these kids don't want to go to college or they think that going to college isn't an option for them. Most of our kids tend to go into trade programs after high school, so to them learning art or computer technology is irrelevant to what they want to do in their futures, therefore they just refuse to do the work.

Most of the kids that come through our group home have mixed views on authority and discipline. Some do well with discipline since it's something that they lacked in their home life, it gives them more structure which surprisingly is something that these kids tend to crave. We never have an issue with kids disrespecting law officers, but when it comes to the group home workers being authority figures they tend to feel more comfortable with us and push back and see how far they can bend the rules.

How are the interactions between one another? Positive/negative? Elaborate.

Staff 1: Well this also depends. Over time more often than not the youth are able to peacefully live together. However, when there is a new youth that is the one that is blamed or picked on until that youth has been here long enough. The younger youth sometimes try to make friends with one another whereas the older youth don't bother making relationships with anyone other than maybe the therapist.

Staff 2: It truly depends. We are able to house six(6) boys at a time from the ages of 12-17 years old. If we have one 17-year-old and three 13-year-olds, the 17-year-old tends to get annoyed and will have more negative interactions with the younger three. However, the younger three could all be best friends.

There always seems to be a pecking order. Whoever has been there the longest is the role model to all of the other boys. However, he acts toward the staff is how the other boys will act. It tends to be that whoever our newest kid is (we'll call him kid 4), gets the short end of the stick. The boys will normally blame him for something or try and "junior staff" and tell him the rules. But as soon as we get a new kid (kid 5), kid 4 will move up and join all of the older residents, and the pecking order shifts. Now kid 5 gets the short end of the stick and kid 4 becomes included in the main group of kids.

If the same group of kids have been there for a while they normally always end up getting along with each other. There are moments when their interactions are negative but for the most part, they're positive. They get into a rhythm with each other and learn to live with one another.

To their credit, it's not easy to be taken from home and put in a group home with other teenage boys who you don't know. For most kids, our group home isn't the first one they've been to. Sometimes we do tend to see that the kids who are on their 4th+ group home, or the older kids (16+), aren't interested in making friends. They're more focused on completing treatment and moving on to the next chapter of their life.

How much freedom or independence do they have on an average day?

Staff 1: All youth are required to attend routine therapy sessions and complete chores, each youth also is able to play outside whenever they'd like. Their amount of screen time and bed time vary based on the youths' treatment plans and progress in the home. Screen time starts at about 15-20 minutes and bedtime starts around 9:15pm as the youth progresses and improves both can increase. The highest level of freedom we offer the youth is to allow them free time out around the community on their own, soon after this stage we begin preparing them to transition out of our care.

Staff 2: We have different phases in our group home. Depending on what phase you're on, depends on how much independence you get.

Phase 1: Orientation to the group home. You get a minimum of 15 minutes of screentime a day and go to bed around 9:15

Phase 2: you get a minimum of 25 minutes of screentime and go to bed around 9:30

Phase 3: you get a minimum of 45 minutes of screentime and go to bed around 9:45-10 pm.

In phase 3, you can apply for Less House Restrictions (LHR). Based on how your therapeutic treatment is going, how you are doing in the house, etc., you can apply for this. What this means is that you get an hour to go out in the community on your own. Most kids tend to go to the mall, the skatepark, or just for a walk to get out of the house. Each week you can apply for another hour or ask for requests you might have - most of the time they ask for a pet fish.

Phase 4: This is our final phase, whenever kids reach phase 4, we are normally looking at transitioning them out of our care. On this phase, you have a minimum of 2-3 hours of LHR, a minimum of an hour of screentime, and a bedtime of 10-10:30 pm. They can also apply for a job in this phase.

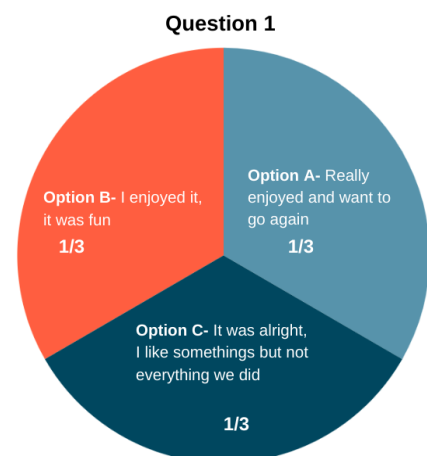
They are free to play outside whenever they want, and all of their phone calls are monitored for safety reasons. Most of these kids are on probation so we have to take extra measures when it comes to doing things. They have to get approval from their probation officer AND caseworker. We are a therapeutic treatment house so they must all attend individual therapy and in some cases also attend family therapy if their treatment team's end goal is for the kiddo to end up back in his family's care.

Following the trip the participants were given a self-assessment survey. The questions and their responses are as follows.

1. How do you feel about the outdoor experiences you had on this trip?

- A. Really enjoyed it and want to go again
- B. I enjoyed it, it was fun
- C. It was alright, I like some things but not everything we did
- D. I didn't like it
- E. I didn't like anything about it and rather be inside at home

Responses



Youth 1: Option C- It was alright, I like somethings but not everything we did

Youth 2: Option A- Really enjoyed and want to go again

Youth 3: Option B- I enjoyed it, it was fun

2. Do you feel like you gained something new from this outdoor experience?

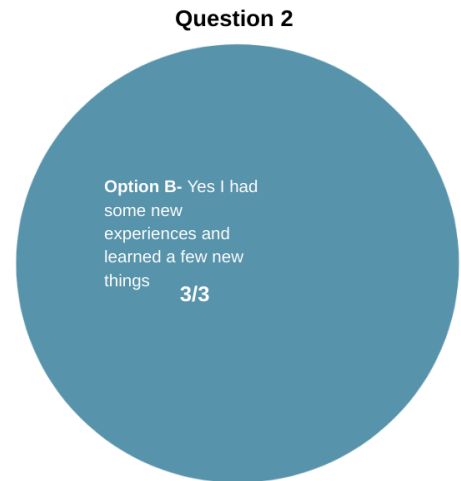
- A. Yes everything on the trip was new for me and I learned a lot
- B. Yes I had some new experiences and learned a few new things
- C. I don't know
- D. No I didn't learn many new things or have new experiences
- E. No I do this all the time, I got nothing new from this experience

Responses

Youth 1: Option B- Yes I had some new experiences and learned a few new things

Youth 2: Option B- Yes I had some new experiences and learned a few new things

Youth 3: Option B- Yes I had some new experiences and learned a few new things



3. Did you feel at peace and calm or anxious and stressed on this outdoor experience?

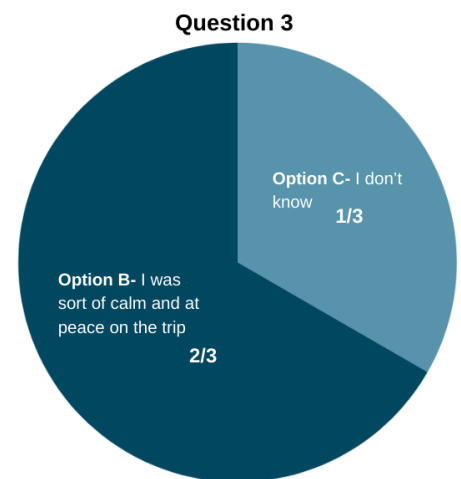
- A. My body and mind were calm and peaceful the entire time
- B. I was sort of calm and at peace on the trip
- C. I don't know
- D. I was a little stressed while on this trip
- E. My anxiety and stress level increased because of and while on the trip.

Responses

Youth 1: Option C- I don't know

Youth 2: Option B- I was sort of calm and at peace on the trip

Youth 3: Option B- I was sort of calm and at peace on the trip



4. Would you like to have more outdoor experiences?

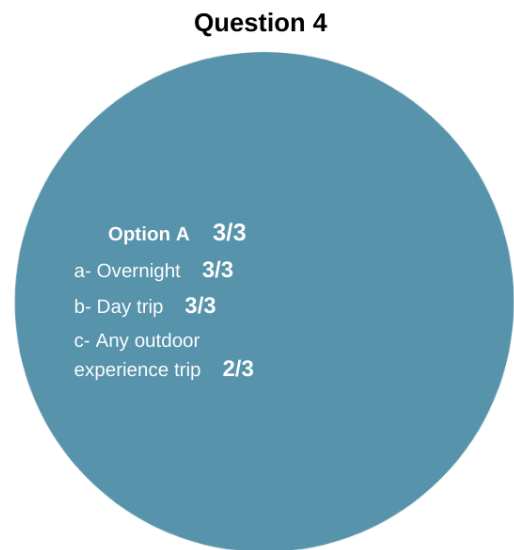
- A. Yes
 - a. Overnight
 - b. Day trip
 - c. Any outdoor experience trip
- B. No
 - a. Why not?

Responses

Youth 1: Option A-
a- Overnight
b- Day trip

Youth 2: Option A-
a- Overnight
b- Day trip
c- Any outdoor experience trip

Youth 3: Option A-
a- Overnight
b- Day trip
c- Any outdoor experience trip



The pre-and post-trip interviews are evaluated to determine the impact of this trip by comparing the youth's before and discussing the observations made while on the experience. As this was a short experience, minimal if any notable change in youth's behavior in their daily life is expected. If these experiences are more frequent and included in their treatment then post-trip interviews will be useful to identify and evaluate differences in the youth's behavior at home. Post-trip interview questions are as follows. Responses were not recorded correctly, therefore, they are unavailable. 1: Overall, how were their interactions? Were there any fights or arguments between the boys? 2: What differences or changes, if any, did you notice while on the trip? 3: How did the boys react to being in a new and unknown environment? 4: What did the boys spend most of their free time doing?

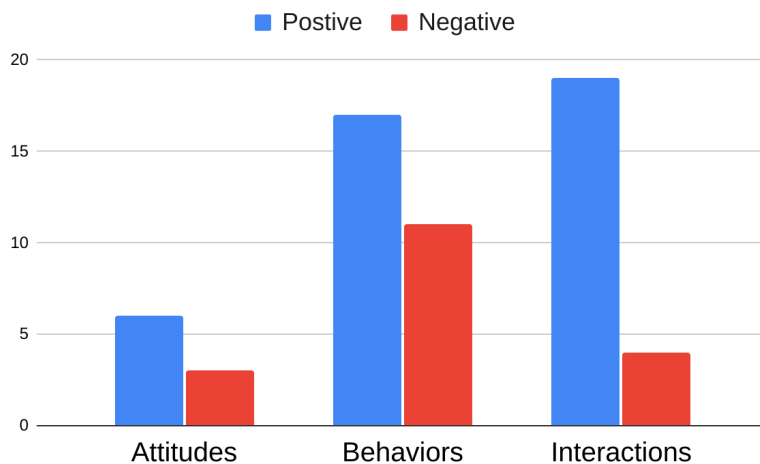
The purpose of this study was to provide evidence to assist the group home director in delegating the necessary resources needed for planning and implementing additional outdoor experiences. By answering the research question; can at-risk teen

males benefit socially and psychologically from outdoor experiences, evidence would be provided to determine the need to or not to implement additional outdoor experiences and in hand the necessity to or not to delegate additional funding towards these experiences.

The researcher chose to divide the observations into two categories; positive and negative. This allowed a conclusion to be made in regards to the experience overall as positive or negative. Along with self-assessment surveys which are used to provide an image of the participants' experiences and personal evaluation of the trip itself. Combined, these provide a brief overview of the benefits or drawbacks participants felt they got out of this experience as well as the impacts that were observed during this outdoor experience intervention strategy.

As previously mentioned, the staff members were asked to record their observations using tallies, categorizing them either positive or negative observations. Staff members record three types of observations, attitude- projected thoughts and feelings of the participants; behavior- actions of the participants; interactions- communication or direct interaction between two or more participants. The original observation documents were converted into a graph. Depicted the two categories, blue- positive, and red- negative, into three types, attitudes, behaviors, and interactions. Below Figure 1 represents these observations.

Figure 1. *Observations During Outdoor Experience*



A breakdown of this graph are as follows. Staff members made nine observations made of participants' attitudes; six were categorized as positive and three as negative. Behavior observations totaled to 28 total; 17 positive and 11 observations were categorized as negative. There were a total of 23 observations of participants interactions with one another; 19 which were categorized as positive and four negative observed interactions. This resulted in 60 total observations made by the staff members throughout the duration of this outdoor experience. Within each type of observation, participants attitude, behavior, and interactions, were more likely to be positive rather than negative.

To further examine the overall outcome of this experience the researcher combined the three types of observations into general observations, only making a distinction between positive or negative observations. This examination showed that 42 out of 60 (70%) of recorded observations are positive and 18 out of 60 (30%) of recorded observations are negative. Based on the data collected from observations the research was able to make an assumption that the outcome of this experience was an overall positive one due to 70% of the observations being positive.

Examination of observations and self-assessments make it easy for the researcher to conclude this outdoor experience to be an overall positive experience for the participants.

Concerns and Limitations of Data

As this study used a small and specific sample group, these findings should not be generalized and the conclusion of this study should only be taken for the particular group home the study was completed for. This study did not consist of a controlled and manipulated group and therefore cannot make a strong conclusion of the positive impacts discovered being specifically associated with the outdoor experience itself. A controlled group and larger sample or multiple outdoor experiences would provide additional data to be examined and would for a stronger and more generalized conclusion to be developed. In addition, looking into the types of activity, duration of engagement or attitude, and excitement towards activities done during an outdoor

experience in comparison to activities done during a normal weekend at the group home would be another direction to take this research.

This study may also include bias in the data collection process. As a result of a third-party participant (the researcher) being unable to attend the outdoor experience and take the results of the observations in the possibility for supervising staff biases of participants to be reflected in observation recordings. As this was a limitation for this particular experience, further similar studies should be conducted to minimize potential biases presenting themselves and skewing the data.

Conclusion

The purpose of this action research study was to provide evidence to the group home director for them to determine the necessity of delegating additional funding and resources towards outdoor experiences. The research question; “can at-risk teen males benefit socially and psychologically from outdoor experiences” was answered with this action research study. With the evaluation and analysis of observations and self-assessment surveys, the research was able to conclude the outdoor experience was an overall positive experience. Creating an unfamiliar space and experiences that provided a setting where measurable more positive experiences and outcomes happened in comparison to negative experiences or outcomes.

The research question; “can at-risk teen males benefit socially and psychologically from outdoor experiences” was answered with this action research study. The researchers' hypothesis of at-risk youths will benefit socially and psychologically from short outdoor experiences was supported by the evaluation of the data. As represented by the data the at-risk youths' behavior, attitude, and interaction were overall positive. In addition, the surveys showed great, good, or neutral responses to personal and mental experiences gained or felt from this outdoor experience.

The findings of this study are compelling enough for group home directors to begin the planning and incorporation of additional outdoor experiences. These findings are not strong enough to convince the director in allocating funding and resources for multiple outdoor experiences to happen monthly. However, the presented data and

findings in conjunction with the evidence discovered during the literature review, showed strong enough evidence of the positive behavioral and psychological impacts and potential impacts of frequent outdoor experiences that lead the director to support that additional outdoor experiences be incorporated into the group home by directing the resources and funding to do so.

Although the findings were sufficient for the particular needs of this study, additional research is needed to identify the long-term effects of implementing frequent outdoor experiences into a group home therapeutic program. Additional research will also need to look into the effectiveness of wilderness therapy techniques when adapted and implemented into a different setting, particularly one of less immersion and duration than a typical wilderness therapy program. Further research regarding this topic is needed to look at the outdoor experiences implemented, examine the effects of more frequent outdoor experiences, the long-term impact on social and psychological skills in the at-risk youth's daily life, and the effectiveness of wilderness therapy techniques outside the specific program setting of wilderness therapy. However, examination of the data gathered from this study provided a strong enough conclusion to be made that supported the need for additional outdoor experience to be implemented into this specific group home.

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Additional Research and Discussion

The innate relationship between humans and nature has been valued by indigenous communities for hundreds of centuries (Kimmerer, 2013). However, in today's society, the connections between humans and nature are diminishing. Due to various reasons such as electronics, access, fear, and a decline in the general importance of nature in public and private sectors, children are spending over 90% of their time indoors per week (Himschoot et al., n.d.). It is suggested that the worsening of the mental and physical well-being of youth in the United States is connected to the decline of time spent outside and experiencing nature (Himschoot et al., n.d.).

As a continuation of the suggestion made at the end of the study above, the incorporation of outdoor experiences in the treatment program, I continue to support this suggestion with the direct benefits of traditional wilderness therapy programs and nature-based experiences. In addition, I will discuss the direct and indirect benefits of incorporating wilderness therapy techniques and nature-based experiences into a therapeutic group home setting.

Several studies suggest that there are numerous physical, mental, and emotional benefits associated with exposure to and experiences with nature, identifying nature as a therapeutic resource (Jimenes et al., 2021). The therapeutic outcomes of exposure to nature have been shown to decrease depression and anxiety in those that experience acute and chronic stress, improved attention, executive function, and other human cognitive capacities lead to physiological relaxation, and positively increase brain activity that is associated with emotional regulation (Jimenes et al., 2021). By providing space and opportunities for physical activity, exposure to natural areas promotes aerobic exercise which not only leads to improved physical health but is also linked to positively impacting the emotional regulation abilities of individuals (Ding et al. 2021). For youth in particular, mental well-being, overall health, cognitive development, and psychological distress improved with access to the natural environment (Jimenes et al., 2021). As a way for at-risk youth and other troubled individuals to reap the benefits of nature, wilderness therapy programs emerged.

Throughout the mid and late 1900s, wilderness therapy gained traction in the United States and was popularized as an alternative to institutionalized therapy programs (Smithson, 2009). Such programs provide therapy in a wilderness setting and incorporate outdoor, adventure, environmental, and experiential education to achieve improvement of social, mental, emotional, and behavioral issues along with other therapeutic goals. (Smithson, 2009). These programs can last anywhere from a minimum of 21 days (Smithson, 2009) and can extend eight weeks or more (DeAngelis, 2013). Between 2021 and 2022 the cost of the treatment programs varied among different states and programs, however, the average cost was five to eight hundred dollars per day plus an additional enrollment fee of a few thousand dollars (Wilderness Therapy Programs, 2022). Despite the lofty cost and time requirements, wilderness therapy programs are utilized to address mental health and behavioral issues. The programs are most effective in improving behavioral issues such as “truancy, promiscuity, running away, substance use, violence, delinquent or aggressive behaviors, conflict difficulties, aggressiveness, breaking of social mores, and destruction of property” (Beck & Wong, 2022). Unfortunately for some, like those residing in the group home, the fees and time commitments associated with effective wilderness therapy programs pose a challenge for those lacking the required resources.

Some that face this challenge are those identified in the study above, at-risk adolescents in a therapeutic group home, who potentially would benefit greatly from a traditional wilderness therapy program. Patient residents of the group home most often present prominent behavioral issues, in addition to mental and social challenges. Within the group home, patients follow an individualized treatment plan, working towards goals of improved emotional regulation, overall mental well-being, and other psychological skills. With the correlation between prominent behavioral issues of patients and wilderness therapy programs' effectiveness in improving behavioral issues, it can be assumed that the group home residents would benefit from the techniques used in wilderness therapy programs. To foster change and growth, such programs utilized wilderness and the unique and unfamiliar environment it provides to present problem-solving tasks and facilitate opportunities that promote self-esteem,

self-awareness, and a sense of belonging (Beck & Wong, 2022). Since traditional wilderness therapy is not an option for these patients, adapting the program and incorporating its techniques to fit the constraints of the group home can offer assistance in improving behavioral issues and achieving other therapeutic goals.

Patients' lives are embedded in anthropogenic and institutionalized environments, exposure and experiences with the natural environment do not have to be therapeutically based for therapeutic benefits to be attained. During the weekends patients participate in various activities at home and around town, chores, homework, board games, video games, free time around the house, sports at the local gym or park, hanging with friends, and group walks around town or short hikes near town. Group home patients are restricted by responsibilities, weather, and/or budget and staff flexibility, therefore it is unrealistic to suggest in-depth exposure to and experiences in the natural environment, i.e. camp trips, full-day hikes, and other resource-consuming activities should be implemented weekly. Activities that simply expose the residents to the natural environment would be beneficial if implemented weekly, such activities might be a short walk in nature, freely exploring a wooded area or river, playing a game, or having lunch in nature, etc. Mental health factors such as physical, emotional, social, school, family, friends, and self-esteem functioning are positively influenced by simply spending time in nature (Tillman et al., 2018). Despite these activities not explicitly constituting recreational activities or being rooted in therapeutic techniques, exposure to nature will still be beneficial for the group home residents. As an intervention strategy, exposure to nature is a more effective approach among at-risk populations, in comparison to the accessibility or experiences with the natural environment (Tillman et al., 2018). Activities that require fewer resources to implement and expose adolescents to nature should be utilized regularly as they offer psychological and physiological benefits that can assist their development and ability to meet their therapeutic goals.

On the other hand, activities that allow adolescents to experience nature will offer similar benefits and create greater opportunities for additional psychological and cognitive development to occur. Experienced-based nature activities, similar to those found in wilderness therapy programs i.e. camping, backpacking, fishing, and other

adventure and recreational activities often require greater preparation and resources to be implemented, making it difficult to suggest frequent incorporation of these more intensive outdoor opportunities. Although greater frequency would more closely mimic a true wilderness therapy program, any implementation of these activities, paired with therapeutic techniques, and other characteristics and techniques of wilderness therapy is likely to produce similar beneficial results. To do so, these activities, when properly planned and executed, should utilize the wilderness or other outdoor natural environments, produce problem-solving tasks, and promote self-esteem, self-awareness, and a sense of belonging through various opportunities and activities (Jimenes et al., 2021). Activities should also be immersive, include teamwork, cooperation, and relationships, invoke responsibility, physical and thought-provoking challenges, opportunities for guidance with positive thought patterns, coping skills, and other personal development (Gupta, 2022). Incorporating each of these characteristics may prove difficult due to the time restrictions of the group home, however, the characteristics can be addressed over multiple experiential nature outings. In addition to the therapeutic benefits these characteristics produce, the outdoor experience element too is an important component of wilderness therapy programs and part of therapeutic change (Smithson, 2009). Therefore, the incorporation of wilderness therapy components within the constraints of the group home should focus on the fusion of therapeutic techniques with experiential-based nature activities and opportunities.

Providing exposure to the natural environment and experience-based nature activities assist at-risk adolescents along their therapeutic journey. By undertaking this, an indirect benefit is achieved, the creation of a foundation for environmental literacy. Environmental literacy, the end product of environmental education, is the knowledge, skills, and motivations required to individually and collaboratively make informed decisions regarding the environment, and improve the well-being of individuals, society, and the global environment (North American Association for Environmental Education, 2019). To achieve environmental literacy four essential elements of environmental education have been identified: awareness, connection, and place-based experiences; knowledge and awareness of ecology and environmental challenges; problem-solving

skills; and taking action and civic participation. The process in which these elements are achieved encourages each to build on the previous, beginning with awareness around kindergarten and progressing to taking action and civic participation near the end of high school. Although the timeline is subject to change, the order of elements should remain consistent. Fostering individuals' awareness and appreciation for the environment, developing it into the skills and motivations required to make decisions and take actions that promote and sustain a healthy environment.

As a foundation of environmental literacy would be a byproduct of the incorporation of nature-based activities in a group home, each element of environmental education may not be addressed. In addition, the level of education achieved will not align with the North American Association for Environmental Education (NAAEE) Guidelines for Excellence. Despite this, developing a foundation for environmental literacy and the building blocks of environmental education through nature-based activities should be the goal. It is suggested that caring for and adopting pro-environmental behaviors is less likely to occur when children and adolescents do not know of and appreciate the natural world (Harris, 2021). Therefore, by capitalizing on the nature-based activities incorporated into the therapeutic process of a group home, place-based experiences are had which develop awareness and connection, and when applicable, provide opportunities to develop environmental and ecological knowledge and awareness.

Not only do nature-based experiences directly provide therapeutic benefits and indirectly a foundation of environmental education, but they also provide access to adolescents in non-traditional living situations the opportunity to experience and recreation as well as opportunities for informal environmental education. For various reasons, residents of the group home are unable to participate in outdoor adventure, recreation, or environmental education opportunities or camps and still do not when discharged. Minimizing their ability to experience nature, access informal environmental education, and develop a connection with the natural world. Although nature-based experiences are motivated by therapeutic benefits, they increase access to informal environmental education opportunities and the development of awareness and

connection to the natural world. This encourages the foundational skills of an environmentally literate individual that promotes and sustains a healthy environment.

Within the setting of a therapeutic group home, nature-based experiences and opportunities will be used as a space to improve the social and psychological skills of patients, assisting them toward their therapeutic goals. By doing such activities, the group home patients are exposed to the natural environment and experience nature through outdoor adventures and recreation. This ultimately will provide opportunities and experiences that foster a relationship with the natural world, indirectly creating a foundation for environmental literacy.

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Conclusion

Each component of my portfolio examined the extent of environmental education, ultimately, to promote environmental literacy, through diverse informal learning spaces - specifically framework integration, curriculum design, and increase of access. The exploration of each component encouraged me to apply and enhance my skills, knowledge, and understanding necessary to the formation of each.

In developing my first component, an outline for ***Environmental Education Framework Integration: Missoula Parks and Recreation Summer Camp***, I utilized my existing knowledge of teaching methods and learning theories to promote environmental education. As the outline was associated with no standardization required, I enhanced my understanding of teaching and learning techniques that support environmental education and promote the development of environmental literacy.

The goal of my outline was to promote environmental literacy by integrating the four general elements of environmental education: awareness/connection to place; knowledge; problem-solving skills; and taking action/service. Within this component adaptation of the environmental education framework was needed to integrate something that focused heavily on the first two elements, awareness/connection to place and knowledge rather than the latter elements. Due to the timeline, structure, and characteristics of the summer camp, the development of awareness/connection to place and knowledge needed to be prioritized to encourage a relationship, sensitivity, and motivation necessary for environmentally responsible behavior and the facilitation of environmental literacy. Still included but with less emphasis were problem-solving skills and taking action/service, rather than completely omitting these elements, they were lightly incorporated to model and partake in the skills and techniques of an environmentally responsible individual. Although a major element of environmental literacy is partaking in positive change on your own, the framework adaptation to fit within a summer camp required that the preparation and execution steps of taking action act as an example and model how the actions we can take every day at any age.

In the design of the curriculum I created for Garden City Harvest Farm to School program, ***Curriculum Design, Fifth-Grade: Garden City Harvest***, the second component of my portfolio allowed me to utilize my experience developing lesson plans and challenged me with applying said skills to an interdisciplinary curriculum. In doing this, I enhanced my understanding and knowledge of how to infuse environmental education with core subjects to not only promote environmental literacy but also enhance student learning. The motivation for and goal of the curriculum was to design lessons that could be used within the fifth-grade curriculum as a way to meet the required standards and provide them with hands-on, experiential learning from a combination of opportunities to interact with their environment - mainly the PEAS Farm and the school garden.

Due to this component using a combination of informal and formal learning opportunities meant there would be a greater amount of structure to the instruction. The learning environment of the PEAS Farm and formal classroom allowed for the adaptation of the framework to focus more on 'educational' ideals than in the previous framework adaptation. For this reason, knowledge and problem-solving skills (or critical thinking with academic subjects) were prioritized. Within this component, taking action was sporadic throughout and veered away from the standard framework by making it a part of lessons rather than the process and execution being the lesson or unit. Regardless, the varied depths and emphasis of each element were appropriate for the formal/informal setting, assisting these students toward becoming environmentally literate individuals.

Therapeutic Group Home Patients, Nature Based Experiences, and The Promotion of Environmental Literacy, my final component was an extension and further analysis of my examination of the effects nature-based experiences had on at-risk adolescents within a therapeutic group home. For this component I worked with a population I have little experience with, however, such experiences allowed me to recognize a unique approach to achieving environmental literacy. Through my initial investigation, I discovered the potential health and therapeutic benefits nature-based experiences can provide. This along with what I've continually learned about

environmental education through coursework and other learning opportunities motivated me to explore the indirect benefits of incorporating nature-based experiences in a therapeutic program, such as environmental literacy. The process of this provided me with the understanding and skills to integrate components of environmental education into unique learning situations to extend its access and promote environmental literacy.

This learning environment created a challenging yet special opportunity to adapt the environmental education framework that would be applicable to the setting as well as appealing to the participants. For these at-risk youth, I knew to make it appealing the adaption could not focus on the education component of 'environmental education', I would have to alter it to be 'environmental engagement'. Meaning, for this program the integration of the adapted framework would prioritize the development of awareness and connection to place, with knowledge subtly and casually being blended in. Although this component lacks definite elements of problem-solving and taking action, it is appropriate for the program and the needs of the at-risk youth. Despite this, these individuals are given an opportunity, one they may not ever get, to develop awareness and connections to place, the building blocks to becoming an environmentally literate individual.

The various constraints and needs of each unique setting required that the environmental education framework be adapted to appropriately promote environmental literacy within each setting. Prior to my graduate school career, I received training to be a formal educator, however, for this portfolio I applied my skills as an educator to a new realm; the informal learning environment. Within this realm I not only applied but enhanced my knowledge and understanding of environmental education by adapting the framework to function properly in each setting. Although the adaptation of the framework created the structure for environmental education with these informal learning settings, achieving environmental literacy is a journey, and the informal environment is only one avenue. By integrating the adapted framework into each of these settings a greater population is exposed to environmental education as well as exposing individuals to frequent environmental knowledge, decisions, and skills embedded into their daily life. For environmental education to be successful and

environmental literacy to be achieved, frequency and reinforcement throughout daily life and in various realms must accompany the suggested means of integration. Ultimately, for the age, time, and structural restrictions, the integration of an environmental education framework, although adapted to fit a specific program, promotes the development of environmental literacy within these realms which is only part of the journey to becoming environmentally literate.

By interacting with these programs and applying my knowledge to the scope of this portfolio, I have gained many unique and valuable skills for a career associated with at least one, if not all of the following, education, nature-based experiences, and environmental education. During the preparation and exploration of each component to formulate my portfolio, I've gained and strengthened my knowledge, applied numerous skills, and discovered many answers and new ideas, yet my curiosity and desire to be part of the environmental education field within the informal learning world have only been amplified.

As a culmination of my time in EVST, this portfolio allowed me to accumulate the knowledge and experiences I've obtained as well as challenged me to not only apply what I've gained in unique ways that created a product applicable to my future endeavors but also one that I could be proud of. With my future unknown, I hope to one day find a position that allows me to combine my love for both educating and the natural world to foster environmental appreciation, responsibility, and sustainability in the coming generations.

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