The Effectiveness of Outdoor Education for Teaching to Multiple Intelligences

Lindsay Marie Bennetts

An Undergraduate Thesis

Submitted in Partial Fulfillment for the Requirements of

Bachelor of Arts

in

Environmental Science: Conservation and Ecology

Carthage College

Kenosha, WI

December, 2009

The Effectiveness of Outdoor Education for Teaching to Multiple Intelligences

Lindsay Bennetts

March 17, 2011

Abstract

Outdoor and environmental education has become even more important than previously with the rise in environmental issues. Outdoor education would be a beneficial addition to school systems across the country if the barriers preventing the implementation of this teaching method are overcome. This study discusses the use of outdoor education in the everyday school system. Using pre- and post- tests results this study expects to support the hypothesis that outdoor education has a positive correlation with higher test scores. It is expected to see a positive correlation between the outdoor lesson and higher test scores for all multiple intelligence profiles present within the test groups and a positive correlation between the indoor lesson and higher test scores for the verbal-linguistic and visual-spatial profiles than other profiles. Teaching with multiple intelligence profiles in consideration is also expected to allow for a great understanding for all of the participants involved in the study. The reason these results are expected is that using the outdoor education method more multiple intelligence profiles may be catered to than using traditional education.

Introduction

Environmental Education:

Environmental education has been around in many forms for years and has been used to promote public awareness about arising environmental issues and to instill a greater appreciation of the natural environment through venues such as public programming (Farmer et al., 2007). National Parks, Conservation Districts, Park Districts and others have used outdoor education

successfully in public programs for decades by providing the public a greater awareness of environmental issues and new experiences in the wild. It is only recently that outdoor environmental education has become something that is drawing the attention of the education department of schools around the United States and is only growing slowly. Outdoor education encompasses not only environmental education but also many different disciplines. Classes can be taught outdoors for many different subjects within a schools' curriculum.

This paper will argue that the expansion of these environmental experiences within the traditional school system is a necessity if future generations are going to be able to understand the action that needs to be taken to assure sustainability. Environmental education will be necessary for the coming generations in view of the fact that the environment is constantly changing and facing larger problems as the years go on. Sustainability and conservation are two very important principles that will be needed to prevent and help resolve the many issues facing the environment (Wheeler and Thumlert, 2007). Rising environmental issues such as climate change and water use show the need to make sure that future generations will have the knowledge and foresight to know how to adequately deal with the problems ahead of them (National NCLI Coalition Website, 2009).

Legislation:

Environmental education and legislation has grown considerably over the past years. Not long after the implementation of the No Child Left Behind Act, which was signed and become a law on January 8th of 2002 by former President George W. Bush, an Act was introduced in July of 2007 named the No Child Left Inside Act (U.S. Department of Education, 2009, Open Congress, 2009, GovTrack, 2009). Unlike the No Child Left Behind Act, the No Child Left Inside Act has a narrow focus on environmental education. The No Child Left Inside Act passed the vote in the House in September of 2008 but was not voted upon in the Senate and did not become a law (GovTrack, 2009). Even though the No Child Left Inside Act did not become a law the first time around, the supporters of this environmentally friendly act have not given up the fight. In April of 2009 the No Child Left Inside Act was reintroduced with slight changes (Open Congress, 2009). The revised No Child Left Inside Act referred to as the No Child Left Inside Act of 2009 plans to increase the amount of environmental education students receive as well as increasing the amount of training that educators receive in the environmental education

field (Open Congress, 2009). The No Child Left Behind Act of 2009 also proposes grants for both states and other environmental organizations to help fund and increase the amount of environmental programs available for schools (Open Congress, 2009).

The United States has been progressively evaluating the different subjects taught in public schools as a part of the No Child Left Behind Program. The science department has yet to be evaluated and it is not a certainty that the government will take a closer look at the effectiveness of schools that use outdoor education regularly in their curriculum compared to those who use outdoor education in limited amounts or even have no exposure to outdoor education. The reason this is not a certainty is because of the lengthy amount of time that has been spent on the No Child Left Behind Program evaluating the Language Arts and Mathematics in school systems.

Laws for environmental education may be fighting for a start on the national level but many states have taken environmental education to heart and have implemented laws of their own. In Washington State, for example, many laws are currently on the books regarding environmental education for all age levels (Wheeler and Thumlert, 2007). One of these laws is WAC 392-410-115, passed in 1990, which requires that at every grade level in common schools to educate their students on the problems facing the environment, human impact on the environment and conservation through many different areas of study (Wheeler and Thumlert, 2007). Washington State also had a No Child Left Inside program that was aimed at making sure that students were able to have a chance at having outdoor education experiences through the Washington State Parks and Recreation Commission (Wheeler and Thumlert, 2007). Due to unfortunate budget cuts to government organizations due to the current downslide in the economy Washington State's version of the No Child Left Inside legislation is currently not being funded (Washington State Parks, 2009). In Wisconsin the Wisconsin Department of Public Instruction Chapter PI 8 legislative mandates that environmental education be a part of the curriculum for all schools from kindergarten through 12th grade. This provides the basics for children in these school systems learning about everything from conservation to awareness and sustainability (School District Standards, 2008).

Resistance to Outdoor Education in the Public School Systems:

Many educators embrace the idea that outdoor education is potentially one effective method for reaching more students by appealing to more of the variety of multiple intelligences including verbal-linguistic, logical-mathematical, visual-spatial, bodily-kinesthetic, musical-rhythmic, interpersonal, intrapersonal and the naturalist (Lazear, 1999). However, there are many barriers to having outdoor education implemented more broadly in the traditional school system including reluctance on the part of the teachers or the administration, budgetary considerations, and issues with transportation and safety.

Though schools aim to provide a great education for the children enrolled in their programs, many schools are relying strictly on traditional classroom education instead of utilizing all of the resources available to them. Field trips to natural areas are a great start to using the natural environment for the education of children, but right now these natural experiences are few and far between for many schools and school districts. Restrictions such as time and budgets may prevent many schools from going on elaborate field trips to huge nature preserves but long-distance field trips are not a necessity. Outdoor education need not be restricted to field trips; rather, it could be as simple as holding a class outdoors while studying transpiration or the changing of the seasons. During fall and spring seasons when the weather is nice teachers could have their lessons performed outside in a school court yard or even a nearby park. Local organizations such as Conservation Districts may also provide programs at the schools for minimum or no charge. These programs can be done outside on the school grounds or held at the site of the nature preserve or district.

Teachers are an important part of the education process and if the teacher is not comfortable with the subject at hand, the education of their students suffers (Carrier, 2009). Given that many teachers are not yet comfortable with outdoor lessons, many conferences and programs have been designed specifically for teachers who want to learn more about the growing trend of using outdoor lessons while teaching science. These conferences can be held many different places and expose teachers to materials and lesson plans that can make environmental and outdoor education easier.

Complex lesson plans are not necessary to use outdoor education and outdoor education is not only limited to use in environmental science but can be used with many other subjects.

Chemistry, Physics, Biology and even non-science courses such as English and History are great candidates for outdoor education. Recreating scenes from English literature or historical events can be brought to a new level outdoors using natural settings, even following the nutrient cycles in nature or calculating the wind resistance needed while watching a bird fly over head. Recreation combined with education gives students a chance to get hands on and active in their studies while at the same time taking care of their physical health. Limited exposure to outdoor education is better than having no exposure because along with helping the students remember the lesson longer (Farmer et al., 2009) outdoor education is also believed to help with students with special needs in and outside of the classroom.

One special need that is currently under study is the effect of outdoor education on individuals with ADD (attention-deficit disorder) and ADHD (attention deficit hyperactivity disorder). Support has been found for a correlation between outdoor experiences and a reduction in the severity of symptoms from ADD and ADHD (Frances E. Kuo and Andrea Faber Taylor, 2004). This study found that the greener the area that the participants were exposed to for controlled activities the more reduced their symptoms became in comparison to areas that were urbanized or indoors (Frances E. Kuo and Andrea Faber Taylor, 2004). While conducting the study participants had to remain as active while being observed indoors as when being observed outdoors. By keeping the participants at the same level of activity in the different environments being observed the possibility of the participants becoming exhausted therefore affecting their behavior due to activity instead of environment was decreased (Frances E. Kuo and Andrea Faber Taylor, 2004).

In 2003, a study was conducted that incorporated a larger variety of special needs. These needs, referred to as emotional and behavior difficulties or EBD, not only include ADD and ADHD but also range to difficulties such as Asperger syndrome, autistic disorders and obsessive compulsive disorder or OCD (Paul Fox and Elias Avramidis, 2003). The study was conducted to observe the relation between outdoor education and participants' behavior and academic performance. Participants were placed into two different groups (the third group of participants did not participate throughout the entirety of the study) and were observed and then interviewed about the experience and activities in order to obtain academic and behavioral results. The first study group showed the greatest positive change in their behavior during and after the outdoor education experience. The participants involved with the first study group represent a varied

assortment of EBD at various levels of severity, ADHD and Asperger syndrome were the dominant EBDs encountered in this study group. The second study group generally maintained a relatively positive behavior both in the outdoor educational setting and in other general settings. The participants in the second study group were mainly diagnosed with an autistic disorder or OCD (Paul Fox and Elias Avramidis, 2003). The study concluded that a positive correlation was found between outdoor education and an improved behavioral response in individuals with EBD, while there were no significant results to support a correlation between outdoor education and academic improvement in individuals with EBD (Paul Fox and Elias Avramidis, 2003).

The use of outdoor education in schools in the United States remains a rare occurrence. In other countries, however, traditional education is becoming a thing of the past being steadily mixed with outdoor and other innovative new teaching methods in this trend of integrating outdoor and other new teaching methods has not caught on as strongly in the United States. Being taught about the environment using outdoor education gives children and adults a chance to connect with the subject of the lesson being presented. The hands on experiences provided from teaching a lesson outdoors allows the participants to keep an active memory of the skills and information taught (Farmer et al., 2007).

Successful Outdoor Education Programs in the US and Abroad:

Education is an essential program in every culture but how the education is provided tends to vary from country to country in many ways. Outside of the United States many countries have established outdoor education programs within their schools that are not just for physical education. The use of outdoor education in these countries has shown that outdoor education can be successfully integrated into a previously existing school system for science as well as other subjects. Foreign countries are an example of what could potentially be implemented into the school systems in the United States. New Zealand, for example, has been practicing the use of outdoor education in their school system for over one hundred and fifty years though outdoor education has only been an official part of the school curriculum for barely ten years (Zink, 2006).

On an individual level certain schools have made changes towards using more outdoor education without waiting for the rest of the country. Schools like Prairie Crossing Charter

School in Grayslake, Illinois use the environment as an integral part of the school. Prairie Crossing Charter School is a public elementary school that is located on a developing sustainable community and has been in operation for over ten years. Due to the popularity of this school the admission is determined by a lottery system and is open to two different school districts. Currently Prairie Crossing Charter School is the only free public school of its type to exist in the state of Illinois. Prairie Crossing Charter School uses its surroundings such as natural prairie and a sustainable farm to help give its students hands on education with an emphasis on the environment.

Schools similar to the Prairie Crossing Charter School elementary school in Grayslake Illinois are breaking ground for other schools to become more open to outdoor education. The "green fad" is still growing in popularity and along with it comes a need to educate the youth on the environment and how it can be utilized in everyday life. By bringing the children of Prairie Crossing into their own farming environment it teaches those students not only the importance of soil nutrients and the water cycle but shows how the environment affects the food that the students consume every day. Outdoor education helps make this connection in the students mind and not only teach a lesson but help the students understand how to apply the lesson to real life because real life examples are used to teach the lesson. If students cannot connect how the quality of the environment around them affects their everyday life then it is possible that the students will not understand the importance of taking care of the environment. By using outdoor education it is easy to show a student how they are personally connected with the environment.

Multiple Intelligences:

The use of outdoor education encourages the use of all five senses and has potential to reach all learning types. The different profiles for multiple intelligences are verbal-linguistic, logical-mathematical, visual-spatial, bodily-kinesthetic, musical-rhythmic, interpersonal, intrapersonal and the naturalist (Lazear, 1999; Figure 1). By using the outdoors the students are exposed to new experiences that can help them create a solid memory of the experience that they may not have received sitting in a classroom. For students that learn best by reading handouts are an effective tool in the field that so the student may read and have a real visual to associate the lesson with. Students that learn best with hands on experiences will have a great time with

outdoor education where they can physically touch and feel the lesson while being able to commit the lesson to memory. Verbal-linguistic learners will still be able to hear the lesson and will have other sounds to associate the lesson with while all the students will be able to smell and possibly even taste new things.

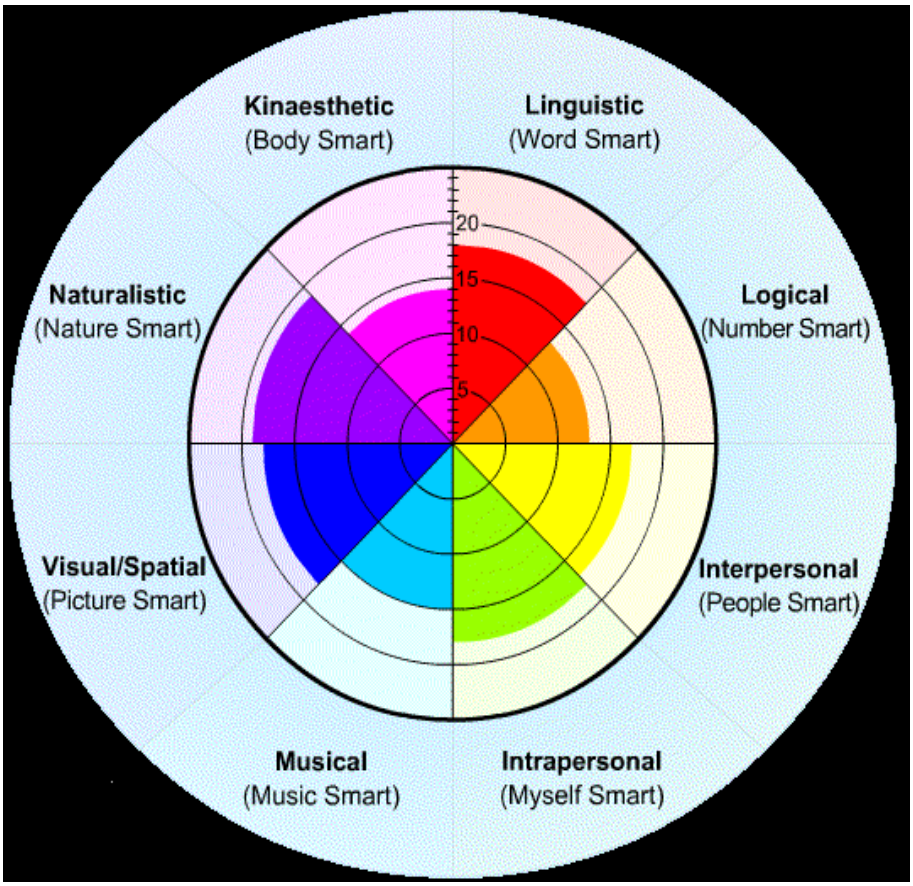


Figure 1. Multiple Intelligence Wheel (Cheek, 2006).

A multiple intelligence wheel is often used to place individuals within the proper profile or multiple profiles of their multiple intelligence learning style (Figure 1). To test for an individual's intelligence type using the multiple intelligence wheel approach an individual simply rating on a scale from one to five an average of twenty to forty questions (depending on the source of the test) based on a how much each question applies to them. When all questions are completed the individual then totals their scores from each section that can then be plotted for

each section of the multiple intelligence wheel. In many multiple intelligence tests the plotted points are then connected often forming an odd shaped diamond covering either one complete learning style or for many people a diamond that overlaps many different learning styles (Cheek, 2006). The multiple intelligence wheel (Figure 1) is an example primarily for profiling adolescent individuals although the design can still be effective for older age groups.

Verbal-linguistic as a multiple intelligence applies to students that usually have a higher grasp of verbal skills and learn well from reading and discussion based lessons. Oral presentations, creative writing, and debate tend to be excellent programs for students that are verbal-linguistic (Armstrong, 1994). In an outdoor educational setting these students would benefit from hand-outs and open discussions in a natural environment. A great activity for verbal-linguistic learns in an outdoor setting would be a crossword using vocabulary being studied in the natural environment or even giving a report on the lesson once it is completed (Lazear, 1999). To get students involved with the lesson while being in the natural environment students could even be allowed to teach a portion of the class allowing them to give an oral report and retain the information while teaching information to other students. Even though verbal-linguistic students learn best from an aural method of teaching this can be applied to outdoor education in a way that is unique. These students can also benefit from the hands on activities that outdoor education offers, canoeing for example would be an excellent chance to merge both the verbal-linguistic learning style with a hand on approach. When teaching a class how to canoe not only is an aural lesson given but also a hands on example of how to perform the strokes needed to be able to effectively maneuver the canoe. The verbal lesson helps the verbal-linguistic learner understand the procedure while also helping to give them a unique experience that will hopefully broaden their horizons.

Logical-mathematical as a multiple intelligence applies to students that think abstractly and use processes such as classification and categorization (Lazear, 1999); (Armstrong, 1994). Students that are profiled as logical-mathematical relate to patterns and work well with numbers (Lazear, 1999). In an outdoor education setting these students would benefit from using formulas in the field along with doing lab reports as the class progresses in the natural environment. Patterns are one of the most important tools for students that are logical-mathematical. By connecting the outdoor lesson to a pattern that these students are familiar with they will be able to make a solid connection to the lesson. Techniques that help students that

are profiled as logical-mathematical retain knowledge longer are things such as outlines, acronyms, and Venn diagrams. These techniques can easily be applied in outdoor education through hand outs and coming up with clever acronyms in the field about the processes or topics being studied (Lazear, 1999). Students that are profiled as logical-mathematical could benefit from finding formulas and patterns in the environment. A simple canoe trip could allow these students to calculate the flow of the river along with depth to help figure out the discharge of the river which would allow these students to experience the outdoors and learn while being comfortable in their own learning style.

Visual-spatial as a multiple intelligence applies to those students that have a strong perception of colors and space. These students learn visually and can realize the relationships between lines, shapes and forms (Armstrong, 1994). Students that are profiled as visual-spatial respond well to graphics and diagrams of topics being covered. In an outdoor education setting these students benefit from being shown the actual object or topic being covered. For instance if the class is studying invasive species then it would be best for these students to visually see the plant and see an ecosystem that is being overrun by the invasive species. Creating maps or models based off of things being studied outside will help these students connect visually to the topic. A great tactic for a student that is profiled as visual-spatial while doing an outdoor lab is to have these students that may excel at art do a drawing or create a visual diagram of the area or organism being studied. This will give these students a chance to work creatively while also closely studying the topic or area of the lab.

Bodily-kinesthetic as a multiple intelligence applies to those students that are physically coordinated and create with their hands (Armstrong, 1994). Students that are profiled as bodily-kinesthetic learn well with hands-on activities that allow them to be physically active in the lesson. Bodily-kinesthetic learners can often learn by watching a demonstration then repeating the demonstrator's actions. In an outdoor educational setting bodily-kinesthetic students excel in hands on activities such as collecting data, performing skits and games based on the lesson plans. Techniques that help students that are profiled as bodily-kinesthetic retain knowledge are acting out specific scientific processes (such as the hydrologic cycle), making a scavenger hunt or other hands-on activity and even playing charades to add movement to different topics being studied. Students that are profiled as bodily-kinesthetic could benefit greatly from the wide variety that outdoor education has to offer. An opportunity like a canoe trip could give these students a

chance to integrate a hands on experience with lessons that may not have been previously considered hands on. If students were taken on a canoe trip, many different topics could be combined with the activity. Allowing the students to canoe while giving them an assignment to complete on the way is only an example of how an outdoor experience could help cater to the learning style of a bodily-kinesthetic learner. An example of this would be assigning the students different types of symbiosis and requiring the students observe the river system for these symbiotic relationships while on the canoe trip.

As a multiple intelligence musical-rhythmic applies to students who use music and sound as a way of learning (Armstrong, 1994). Students that are profiled as musical-rhythmic relate well to music and expressing themselves through sound. In an outdoor educational setting students that are musical-rhythmic learn well through putting lessons to music. Creating songs in the field based off of the subject matter or even a dance to music about the specific processes used in a scientific process (Lazear, 1999). Students that are profiled as musical-rhythmic could benefit from outdoor education in many different ways. Taking a class out into nature can surround them with many different sounds that may normally be missed due to urbanization. Students that learn well through music can benefit from the sounds of nature because the sounds can give the students a way to be able to recall the event.

Interpersonal as a multiple intelligence applies to those students who can heavily influence the feelings and intents of other people (Armstrong, 1994). These students that are profiled as interpersonal work very well in group activities and group tests. In outdoor educational settings students that are interpersonal can be great motivators for other students especially in group activities that may be a little more strenuous (such as a ropes course). Activities such as teaching the other students and being a team leader help these students retain information and for testing it is best to use group methods (Lazear, 1999). Students that are profiled as interpersonal can benefit from outdoor education because of the many opportunities outdoor education allows for leadership. Creating an obstacle course based off of the lesson plans, even just in the school yard, can give these students a chance to take a leadership position within their group and help both the students that are interpersonal and those with other learning styles complete the course and have a memorable experience.

Intrapersonal as a multiple intelligence applies to those students who are very in touch with themselves. Students that are profiled as intrapersonal usually have a great amount of self

esteem and are very in tune with their moods and feelings (Armstrong, 1994). In an outdoor educational setting intrapersonal intelligence can allow the student to bond with nature and their selves. Techniques that would help these students retain information are helping these students apply the lesson to situations in everyday life, keeping a journal of outings that the class makes and setting goals and priorities (Lazear, 1999). Due to the effectiveness of intrapersonal learners associating lessons with everyday situations, outdoor education could prove extremely affective with this learning style. A class or even community restoration project is a great example of an outdoor education experience that would benefit an intrapersonal learner. By being a part of the project the student would be able to see firsthand the effects of different issues such as invasive species. This experience would allow the learner to observe the issues and develop awareness to these issues in their everyday environment.

One of the newest multiple intelligence classifications is the naturalist intelligence (Lazear, 1999). The natural intelligence is the multiple intelligence that would most benefit from outdoor education as a teaching method. Students that are profiled as naturalists learn and understand the natural environment better than in traditional classroom settings. In some ways the naturalist intelligence does not differ to far from the bodily-kinesthetic intelligence. The naturalist learns well from hands-on experiences but also thrives from environmental patterns, classifications, sensory activities and community projects helping restore the natural environment. In an outdoor educational setting the naturalist does best with setting up and conducting their own experiments or comparing natural systems (Lazear, 1999). Students that are profiled as a naturalist learning style can benefit greatly from outdoor education. An example of an outdoor education lesson that a student of the naturalist learning style would benefit from is a group or individual study/experiment. By allowing the students to choose and conduct their own study, within school and class guidelines, the students can focus on a part of environment that sparks their interest along with learning scientific method.

Multiple intelligences help categorize students so that they can learn in ways that help specialize lesson plans to help cover every students need in the education system. Many students do not just fall into just one profile on the multiple intelligence scale. Students can be a combination of many different profiles but in some cases students can be strictly in one profile which is when teaching can become difficult. The best lesson plans in an outdoor educational

setting are lesson plans that take into consideration all of the different profiles possible for teaching methods that can pertain all of the possible learning styles in a class.

To attempt to show a connection between outdoor education and academic performance this study will use pre- and post-test scores from a control class taught inside under traditional education settings and compare those results to a class taught using outdoor education. The students will also be tested to determine which multiple intelligence profile or multiple profiles they belong to. Using the results of the multiple intelligence profiles the test results will be compared to the results of the pre and post tests of the environmental lesson. It is expected that the results will show that the students that are taught in by using outdoor education will have higher test results on the post test than the students given the same lesson in a traditional classroom setting. It is also believed that post test results will differ less significantly between the multiple intelligences in the outdoor group than in the classroom group.

Unfortunately, standardized tests often are the driving force behind education goals in the United States of America even though standardized tests do not take into account the whole picture of students' education or learning abilities. Students learn and therefore test in many different ways. By relying solely on standardized testing to raise education goals and test knowledge and application of that knowledge students that retain knowledge through alternative methods do not get adequately tested (Lazear, 1999). In order to take into account students that learn and test differently the standardized tests need to take into account the different multiple intelligences.

Methods

This study was originally designed for participants enrolled in the fourth or fifth grade age level. In this study two groups of ideally equal numbers will be tested with a confidential ten question multiple choice pre- and post- tests on an environmental lesson with one group being the control receiving an indoor lesson while the other group receives an outdoor lesson. The two lesson plans are about the adaptations and survival mechanisms of organisms during the winter and was planned for students in the fourth or fifth grade. The groups will also be given a

confidential survey (ideally take home) before the lesson to determine which of the multiple intelligence profiles or multiple profiles they belong to.

Due to complications that will be discussed further on, a pilot study was conducted with two groups of ten participants each ranging in age from nineteen to twenty-two were assigned a number (one through twenty) and given the multiple intelligence profile survey, the pre- and post- tests and an environmental education lesson with one group having the indoor lesson while the second group had an outdoor lesson. The multiple intelligence profile survey was given to the participants to complete on their own time approximately two to three days before the lessons were administered. On the morning of February 27th, 2010 ten of the participants assembled at Petrifying Springs in Kenosha, Wisconsin for the outdoor lesson. The pre- test was given to the participants upon their arrival and was collected before the beginning of the lesson. The outdoor lesson, which can be found in Appendix 1, was not altered even with the advanced age range of the participants but the duration of the lesson was reduced considerably. Upon the completion of all the activities in the lesson plan the post- test was given to the participants and then returned before their departure from the site.

The indoor lesson was administered to the remaining ten participants on the morning of February 28th, 2010 in the lounge area of the Todd Wehr Center on the campus of Carthage College in Kenosha, Wisconsin. The pre- test was handed out to the participants upon their arrival and was collected before the beginning of the lesson. Similarly to the indoor lesson, which can be found in Appendix 2, the lesson plan was not altered because of the age range of the participants but the duration of the lesson was still reduced considerably. Upon the completion of the activities the post- test was given to the participants and returned before the participants' departure. Following the conclusion of both lesson plans the results of the multiple intelligence survey and pre- and post- tests were complied into a table according to the participants' assigned group and number.

For the original age group the lesson plans that appear in Appendixes 1 and 2 would not alter and would follow the assigned durations with more accuracy than the older age group. The first step for conducting the study would be preparing parental release forms for the participants and submitting the multiple intelligence survey and pre- and post- tests to the principal or superintendent of the school participating in the study, these steps should be done at least a month before the date that the lessons are to be administered.

Once the material is approved by the school system an appropriate site and transportation for the outdoor lesson should be secured. For the indoor lesson it would be optimum for the person conducting the study to visit the school to see what style of classroom the lesson will be performed in. The multiple intelligence survey should ideally be numbered ahead of time and handed out at least two days before each lesson for the participants to take home for completion. Pre- tests should be given to the participants in class a day or two before the lesson with emphasis that these tests are not graded and will not affect the students in any way. Lessons should be completed within a normal class period for the classes (altering the lesson plan as time allows) and the post- test can be given to the participants immediately following the lesson plan and collected upon its completion.

Results

Due to the fact that all participants in this pilot study were enrolled in college and have taken basic science classes both on a high school level and a college levels the results of the pre- and post- test were both the same, with all participants receiving perfect scores. The age range of the participants had a significant effect on another section of the lesson configuration. The lesson plans were originally prepared for participants currently enrolled in the fourth or fifth grade level and had an estimated duration of approximately forty-seven minutes. This duration was not reached when the lessons were administered to the college age group due the higher education level of the participants.

The omission of the pre- and post- tests leave one variable to be discussed from the trial run of the indoor and outdoor lesson plans which are the multiple intelligence survey results. When asking participants to partake in this study it was crucial to ensure that the participants had not all declared the same major in college, if a vast majority of the participants were to have the same major it could result in having a dominant multiple intelligence profile. The multiple intelligence profile has a possibility of a result of twenty-five as a top score for each profile. For this study any result between twenty-two and twenty-five or the highest score results in a multiple intelligence profile for the participant.

Table 1. Distribution of the multiple intelligence profiles for the outdoor lesson group and their corresponding majors

	Outdoor Lesson	
Participant Number	**Multiple Intelligence(s)**	**Major**
1	Naturalist	Biology
2	Logical-Mathematical/Visual-Spatial	Business Administration
3	Intrapersonal	History/ Music
4	Intrapersonal /Logical-Mathematical	Social Work
5	Musical-Rhythmic/Verbal-Linguistic	Spanish/ Music
6	Verbal-Spatial/Musical-Rhythmic	Music/ Theater
7	Logical-Mathematical	Computer Networking
8	Bodily-Kinesthetic	Neuroscience
9	Verbal-Linguistic/Visual-Spatial	Theology/Theater
10	Bodily-Kinesthetic/Visual-Spatial	Athletic Training

Nearly all of the multiple intelligence profiles were represented at least once for those involved in the outdoor lesson, with the exception of interpersonal (Table 1). The indoor group had a similar distribution (Table 2).

Table 2. Distribution of the multiple intelligence profiles for the indoor lesson group and their corresponding majors

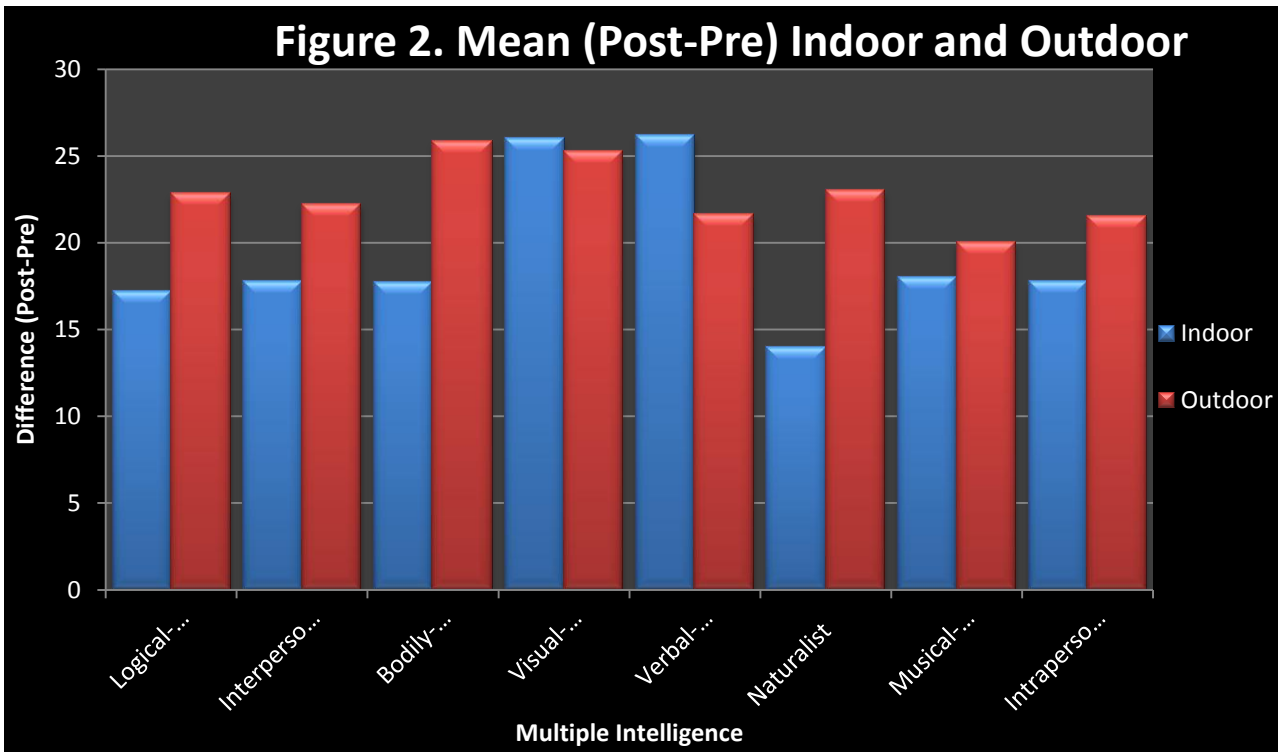
	Indoor Lesson	
Participant Number	**Multiple Intelligence(s)**	**Major**
1	Bodily-Kinesthetic	Biology/Neuroscience
2	Naturalist/Logical-Mathematical	Chemistry
3	Interpersonal	History
4	Musical-Rhythmic/Visual-Spatial	Music/Mathematics
5	Verbal-Linguistic	English
6	Visual-Spatial/Verbal-Linguistic	Secondary Education/Spanish
7	Bodily-Kinesthetic	Massage Therapy
8	Intrapersonal	Psychology

9	Musical-Rhythmic/Verbal-Linguistic	Music/Theater
10	Logical-Mathematical	Economics

Given that there were no differences between the pre and post tests of the college-age students, hypothetical results for younger students were created. It was assumed that both classes would have an equal amount of students (25 in each class) and a similar class average on the pre-test. The results of the pre- test for each participant will then be subtracted from their post- test result and categorized by their multiple intelligence profile but still separated by class. If a participant has more than one multiple intelligence profile the mean of the differences in their test scores will be represented for each of their profiles (Fig 2).

For the indoor class, the multiple intelligence profiles expected to improve the most were logical-mathematical, visual-spatial and verbal linguistic , while all multiple intelligence types were expected to benefit in the outdoor setting (Fig 2).

Figure 2. Mean change in test scores for 25 students before and after receiving an indoor or outdoor lesson.



Discussion

Though this study was not conducted with the intended study group, the pilot test group had interesting results none the less. Working with college students created issues with the study design. Due to the advanced education of the participants the time required to complete the lessons was minimized greatly. The benefit of having a pilot group was that by conducting the different lessons with test groups the flaws of the lesson plans were able to be fixed.

When the test groups were given the pre- and post- tests the results showed no significant difference. Due to the fact that all of the participants had gone through science classes of at least a high school level every participant received at least a ninety percent on both the pre- and post- test making the data unusable for comparison. Though the data from the tests was unusable the results of the multiple intelligence survey were functional. It was found that participants with multiple majors were more likely to have more than one multiple intelligence profile, also there was a wide range of multiple intelligence profiles and almost every profile was represented. This distribution would be unlikely when surveying two classes of fourth or fifth grade students. It would be more likely that the musical-rhythmic, interpersonal and intrapersonal profiles would be nonexistent or rare while the bodily-kinesthetic, visual-spatial and verbal-linguistic profiles would most likely be dominant. Musical-rhythmic, interpersonal and intrapersonal profiles are complex profiles that when conducting the multiple intelligence survey participants of a younger age group may not completely grasp.

During the process of attempting to acquire a school in order to teach two different classes of students it became apparent that that one of the reasons that outdoor education is so rare in schools, at least in the United States, is the difficulty of getting new ideas and programs into school systems. School systems are designed around specific curriculum and program to keep students safe while learning as much information as possible. The specific curriculum makes it difficult to pass through the regulations put into place by the schools. While having

specific goals and regulations allow the schools to run efficiently and smoothly for the most part it also prevents change.

When initially starting this study the outlook was optimistic that acquiring access to two different class rooms of students would not be an issue so originally two local high schools were approached about participating in the study. After weeks of waiting for a response, other schools were contacted to participate with the same result. Finally an opportunity presented itself with a local elementary school, because of this opportunity the lesson plans and surveys were rewritten for a younger age group. After talking at great length with the teacher in question the school decided that there was not enough time to fit in the study and for the school to continue with the planned curriculum. At this point in time it was aware that help was desperately needed. Communication was started with a contact at a conservation district to possibly be able to conduct the outdoor portion of the study during a field trip by a school group. Information including the pre- and post- tests, multiple intelligence survey, and the lesson plans were sent to a school planning on having a field trip to the conservation and were initially approved. The day before the lesson was to take place a phone call was received saying that the study was too personal to be conducted without parental permission.

In order to show some of the barriers that were faced in conducting this study information on rules and regulations for a nearby school district, D200, in Woodstock, Illinois were researched using the District website and information gathered personally by talking to district personnel. The rules and regulations quoted are specific to District 200 but are similar to rules and regulations used around the state of Illinois and the entire country.

Each district and state has its own specific curriculum and many of these curriculums include environmental science. The 2009-2010 Handbook for Parents for D200 states in their curriculum content that required by state:

> "Conservation of natural resources including but not limited to air pollution, water pollution, the effects of excessive use of pesticides, preservation of wilderness areas, forest management, protection of wildlife, and humane care of domestic animals (Handbook for Parents, 2010)."

Though the state requires that the schools teach environmental education, there is no regulation on how the school districts must present this education. After reading the entire Handbook for Parents there was no mention of teaching to an individuals' learning style. The state requires

education but does not mention the methods used in this education or the restrictions of the teachers when considering teaching methods.

The curriculum is not the only barrier when it comes to implementing new methods and ideas into the current school systems. Field trips are not only strongly regulated but are also expensive for the school districts. For the bus driver alone schools can pay around $17.35 per hour for driving for a field trip plus $2.75 per mile not including the time for preparation before the trip and clean up of trash after the trip (Anderson, Pers.Comm.). These prices add up quickly over time and can be a major decision breaker when it comes to taking the students on field trips. With school funding being cut and the states becoming in debt to the school districts field trips are becoming more expensive for the students and less frequent. Though outdoor education is not limited to field trips, field trips are a beneficial way for students to experience hands on education that they may not receive in classrooms.

If students are financially unable to go experience outdoor education, outdoor educational experiences could come to them. Many conservation districts and even national parks have educational programs that are willing to travel to schools and help students have an outdoor experience that they otherwise may not have the chance to have. Unfortunately these programs are often under publicized and therefore underutilized. School districts could utilize these programs if the districts broadened their search for new educational experiences. This is not to say that there are no schools taking advantage of these wonderful educational programs, just that these programs are few and far between.

As far as conducting a study within a school district, even more problems arise. Student visitors in D200 “is prohibited as of the beginning of the 2009-2010 school year” which is in the interest of protection for the enrolled students of the school but makes conducting a study extremely difficult (Sorensen, Pers. Comm.). The protection of students is completely understandable and a necessary regulation with in a school district but in the interest of education exceptions to this rule should occur from time to time. This regulation applies to students and all visitors within the classroom, but student surveys are allowed as long as rules and regulations are followed.

According to the 2009-2010 Handbook for Parents student surveys “must advance or relate to the District’s educational objectives or assist students’ career choices. This applies to all

surveys regardless of whether the student answering the questions can be identified (Handbook for Parents, 2010)." Though the survey for this study applies to the education objectives "to help each student strive for excellence and instill a desire to reach the limit of his or her potential" the survey was deemed too personal by the principal s of schools within the district and surrounding districts (Handbook for Parents, 2010). This study completely meets the objective of helping each student realize and reach their potential. By determining the students multiple intelligence profile(s) that student would become more aware of the methods that could be applied to their everyday life for greater understanding. Again these rules and regulations are in place for the safety of the students enrolled but when the students' identities are protected and the study is for the benefit of education questions arise as to when there are too many regulations.

If this study would have been allowed to occur the issues that may arise with this lesson could be the unpredictability of the weather that tends to occur during the winter season in Wisconsin. Students would have to be prepared long before the class that so proper clothing and preparation is taken to be careful of the weather. To avoid transportation costs to the participating school district the outdoor lesson could be conducted on the school grounds or at a park within walking distance for the participants. If the study were to be conducted at Carthage College then arranging transportation through the college (with approval from the college and the participating school) could possibly be arranged, eliminating the problem of funding.

Another issue that could arise in the data of this study is that not every multiple intelligence profile may be represented in the study group or that there is an overwhelming majority of one multiple intelligence. A missing multiple intelligence or overwhelming majority could be an issue because of the fact that, especially for the hands on multiple intelligence profiles, their data is crucial for a comparison to the more traditional learning styles. Ideally the study would be conducted with both class sizes being the same but that may not be the case when actually conducted. As long as the class sizes are similar exact numbers are not necessary but more than two classes may need to be surveyed in order for each multiple intelligence profile to be represented in sufficient numbers to make a comparison.

When comparing the pre- and post- test results another issue that could arise is that one class could have a significantly higher class average for the pre- test than the other class. A significantly higher average could negatively affect the data because the room for improvement

for both classes on the post- test ideally should be as close as possible to get an accurate comparison of the improvement for the different multiple intelligences.

It seems in order for this study to be conducted plans must be made months ahead of the time desired to conduct the lessons. Even when arrangements were made with a specific school with all materials sent a month ahead of time for approval the lesson was terminated the day before it was to be administered. The reason for this could be that school systems and their principals and superintendents become incredibly busy throughout the year and if plans are not made and approved long before the program date it is not likely that the lesson will take place. This can be avoided by contacting the school in question at least three months before the lesson time and arranging a meeting between yourself and the superintendent. By arranging a meeting it guarantees that if the school is interested that you will be able to personally go over the material with the superintendent and avoid the possibility that it slips their minds and eventually gets rejected.

When this thesis was first started little thought was given to the length of time that would be required to be approved to work with a class of students. After contacting more than six schools it became apparent that though this started as a study of the effectiveness of outdoor education it ends as a realization that outdoor education is in for a long battle. The difficulties a undergraduate college student faced trying to gain access into one school shows that implementing outdoor education in to schools all over the country is going to take more time, effort and funding than originally thought. Hopefully as with the No Child Left Behind Act the No Child Left Inside Act will receive its chance to alter the educational system and leave behind a broader idea of education and install a new love of nature that the new generations will need in the years to come.

Overall even though this study was not conducted the lesson plans, pre- and post- tests, and multiple intelligence surveys are ready to be used when it is possible to get into a school district to conduct the study properly. Unless major change occurs in the United States educational system the original results expected from this survey would differ from when this study was originally created.

Appendix 1:

Outdoor Lesson Plan:

Season: Winter
Grade: 4th-5th
Total Duration: ~47 Minutes
Subject: Environmental Science

1. Topic-

Winter Woodlands

2. Content-

The changes that occur in nature over the winter season along with the adaptations that trees and wildlife utilize to survive the winter. The many reasons humans rely on trees and the connections within woodlands.

Terms: migrate, adapt, hibernate, dormant, cache, evergreens, deciduous.

3. Goals: Aims/Outcomes-

1. Use outdoor observation to show the differences between trees.
   2. Use outdoor observation and brainstorming to find possible examples of wildlife adapting to the winter.
   3. Use hands on interaction to create a web of life.

4. Objectives-

Participants will learn:
1.Three changes that occur during winter
2.Two different mechanisms that trees use to survive the winter
3.Two different mechanisms that wildlife use to survive the winter
4.At least one interaction within a woodland ecosystem

5. Materials and Aids-

Woodland animal puppets, leaf samples, twig samples, pictures of plants and animals, display board, string, bingo sheets, pencils, bingo prizes.

6. Procedures/Methods-

A. Introduction- Approximate Duration- 10 minutes

(Introduction will take place indoors)
1. Place representations of native woodland wildlife on a table. (Pictures, puppets, etc.)
2. Go through each inhabitant and ask the children if they know ways those animals survive winter and which survival method applies to each inhabitant.
3. Introduce the terms migrate, adapt, hibernate, dormant, and cache and their application to the inhabitants.

B. Development- Approximate Duration- 2minutes

1. Hand out blank bingo sheets to each student.
2. Set up pictures or words of plants and animals in the winter woodlands on the board.
3. Have each student fill in the blanks on the bingo sheets with the plants and animals.

C. Practice- Approximate Duration- 5 minutes

1. Make sure all children have used the restroom.
2. Prepare the children for a hike.
3. Discuss preparation for winter exposure.

D. Independent Practice- Approximate Duration- 10 minutes

1. On the hike, look for signs of animal activity and discuss the wildlife that is active.
2. Look for areas that could provide shelter to any wildlife – active or otherwise.
3. Have the students break into small groups in the area and find examples of as many signs of animals and plants as possible on their bingo sheets.

E. Accommodations (Differentiated Instruction) - Approximate Duration- 10 minutes

1. Next discuss tree identification. First have students guess what trees may be which.
2.Pointing out that leaves are no longer on the trees, show some same leaves first, discussing shape, size, and bark, and then discuss twig identification.
3. Look at the plants under the trees and discuss their adaptations. Explain evergreens and their differences from deciduous trees plus how humans depend on trees for resources.

F. Checking for understanding- Approximate Duration- 5 minutes

1. Have children stand in a circle (depending on weather this can also be done inside).
2. Have the teacher be the sun (holding the end of the string) and have the children raise their hands when they think of an organism that depends on the sun (then pass the string to each child as they make a connection).
3. Continue until each child has a hand on the string web.
4. Pick one child and discuss how if their organism was to be removed from the web the rest would fall as well.

G. Closure- Approximate Duration- 5 minutes

1. Return inside and have everyone sit in a circle.
2. Have everyone go around the circle and say their favorite part of the lesson and what they learned.

7. Evaluation-

1. Use the pre- and post- test method.

Appendix 2:

Indoor Lesson Plan:

Season: Winter
Grade: 4th-5th
Total Duration- ~47 Minutes
Subject: Environmental Science

1. Topic-

Winter Woodlands

2. Content-

The changes that occur in nature over the winter season along with the adaptations that trees and wildlife utilize to survive the winter. The many reasons humans rely on trees and the connections within woodlands.

Terms: migrate, adapt, hibernate, dormant, cache, evergreens, deciduous.

3. Goals: Aims/Outcomes-

1. Comparison of samples to show the differences between trees.
2. Use brainstorming to discuss examples of wildlife adapting to the winter.
3. Use hands on interaction to create a web of life.

4. Objectives-

Participants will learn:
1.Three changes that occur during winter
2.Two different mechanisms that trees use to survive the winter
3.Two different mechanisms that wildlife use to survive the winter
4.At least one interaction within a woodland ecosystem

5. Materials and Aids-

Woodland animal puppets, leaf samples, twig samples, pictures of plants and animals, display board, string, bingo sheets, pencils, bingo prizes.

6. Procedures/Methods-

A. Introduction- Approximate Duration-5 minutes

1. Place representations of native woodland wildlife on a table. (Pictures, puppets, etc.)
2. Go through each inhabitant and ask the children if they know ways those animals survive winter and which survival method applies to each inhabitant.
3. Introduce the terms migrate, adapt, hibernate, dormant, and cache and their application to the inhabitants.

B. Development- Approximate Duration-2 minutes

1. Hand out blank bingo sheets to each student.
2. Set up pictures or words of plants and animals in the winter woodlands on the board.
3. Have each student fill in the blanks on the bingo sheets with the plants and animals.

C. Practice- Approximate Duration-10 minutes

1. Read a clue discussing a survival method of an organism.
2. The students should then answer you with one of the plants or animals, and then they should cross it off on their bingo sheet.
3. Do not give out bingo prizes until each child has a bingo.

D. Independent Practice- Approximate Duration-10minutes

1. Discuss in more details some of the amazing animal adaptations that have helped animals survive.
2. Show different pelts, skins and feathers as comparisons for survival and talk about what habitats each may be found in.
3.Leave time at the end for bringing the fur, etc. around to be touched.

E. Accommodations (Differentiated Instruction) - Approximate Duration-10 minutes

1. Next discuss tree identification. First have students guess what trees may be which from pictures of trees without leaves.
2.Pointing out that leaves are no longer on the trees, show some same leaves first, discussing

shape, size, and bark, and then discuss twig identification.
3. Explain evergreens and their differences from deciduous trees plus how humans depend on trees for resources.

F. Checking for understanding- Approximate Duration- 5 minutes

1. Have the children stand in a circle.
2. Have the teacher be the sun (holding the end of the string) and have the children raise their hands when they think of an organism that depends on the sun (then pass the string to each child as they make a connection).
3. Continue until each child has a hand on the string web.
4. Pick one child and discuss how if their organism was to be removed from the web the rest would fall as well.

G. Closure- Approximate Duration- 5 minutes

1. Have everyone sit in a circle.
2. Have everyone go around the circle and say their favorite part of the lesson and what they learned.

7. Evaluation-

1. Use the pre- and post- test method.

Appendix 3:

(Questions modified from http://www.gptraining.net/protected/training/theory/multint/question.doc (Cheek, 2006))

Multiple Intelligence Number

Remember this survey does not test your intelligence; it is just a way to help determine which way you learn best. All results will remain private so please do not write your name just the number assigned to you at the beginning of class.

Rank each statement from a 0 to a 5. A 5 being a statement that describes you very well and 0 if the statement does not apply to you.

1. I know a lot about nature including names of different plants and animals	
2. I think before I act and try to plan ahead	
3. I like using advanced words and expanding my vocabulary	
4. I have a good visual memory	
5. I have good balance and control of my body	
6. Writing things down helps me remember the information better	
7. I like having time to myself	
8. I like having pets or being around animals	
9. I learn well by listening and take directions well	

10. I like participating in activities in the community and going to special events	
11. Music can affect my mood	
12. I work well with my hands	
13. I like to talk out problems and ask a lot of questions	
14. I enjoy doing puzzles and brain teasers	
15. Visual aids help me to understand and remember lessons	
16. I remember music beats and can repeat them easily	
17. Being outside and in nature is very calming for me	
18. I can easily tell if my friends are upset without them telling me	
19. I work best when I am organized and make lists	
20. I work best when I am physically involved in the lesson	
21. I think best while I am physically active	
22. It is easier for me to understand a topic if I can apply it to my own life	
23. I have a good sense of direction and rarely get lost	
24. I am able to explain things clearly to others	
25. I memorize lyrics to songs very easily	
26. My friends come to me for advice with problems	
27. I enjoy team sports and games	
28. I enjoy taking things apart to see how they work and attempting to put them back together	
29. I have a great ear for music and can sometimes tell the difference between instruments	
30. When I do homework I like privacy in a quiet area	
31. I work well in groups and support my classmates	
32. I often find patterns in school work and everyday life	

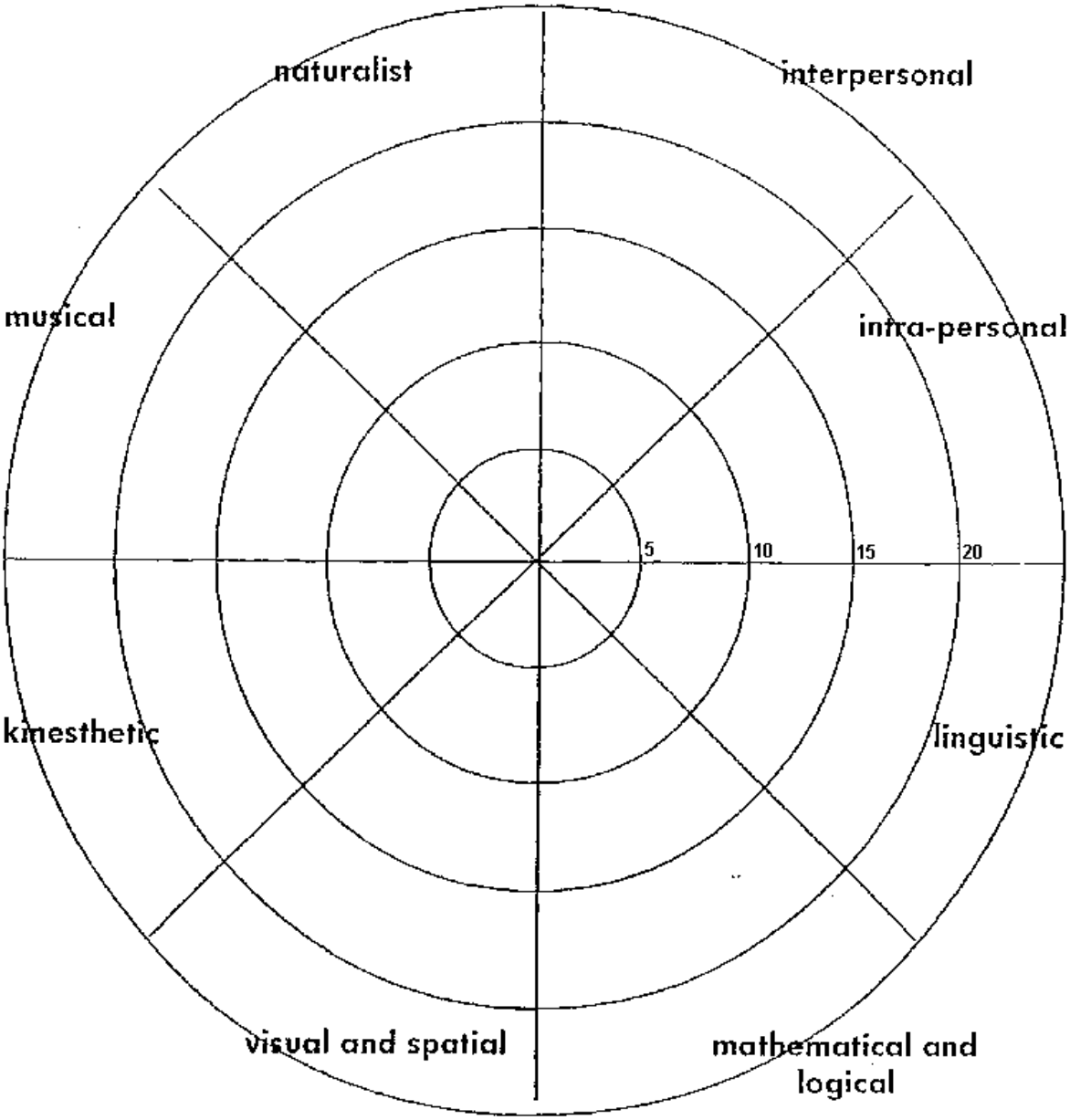
33. I pay close attention to detail and often notice things my friends do not	
34. I am interested in the human mind and why people act the way they do	
35. I like to work by myself instead of in groups	
36. I prefer to be active as much as possible	
37. Pollution and habitat destruction upset me	
38. I enjoy playing music	
39. I make up my own mind and can be very independent	
40. I enjoy working with numbers and solving problems	

Now add the total for each section and plot the total score for each individual intelligence on the wheel provided.

Intelligence	**Question Number**	**Total**
Interpersonal	10, 18, 26, 27, 31	
Intrapersonal	7, 22, 30, 35, 39	
Verbal-Linguistic	3, 6, 9, 13, 24	
Logical-Mathematical	2, 14, 19, 32, 40	

Intelligence	**Question Number**	**Total**
Visual-Spatial	4, 15, 23, 33, 28	
Bodily-Kinesthetic	5, 12, 20, 21, 36	
Musical-Rhythmic	11, 16, 25, 29, 38	
Naturalist	1, 8, 17, 34, 37	

Using the lines representing 5, 10, 15 and 20 (the outside line is 25) shade in the boxes for the number that you got as a total above for each different type of learning style. When you are completed a description of each learning style is provided on the back of this sheet.



http://www.alite.co.uk

Appendix 4:

Pre- Test:

(The Pre- Test is labeled as a Pre- Survey to ensure no confusion on behalf of the students that may be misled by the title Pre- Test)

Pre - Survey

Number _____.

1. My current grade is ___.
   A. 4th
   B. 5th

2. An example of hibernation is ___.
   A. Prairie Dogs poking their heads out of their mounds
   B. A snake losing its skin
   C. A bear sleeping in a log in December
   D. Frogs under the water in summer

3. Each of these is an example of migration EXCEPT __.
   A. A raccoon climbing a tree to get over a river
   B. Pacific Salmon swimming upstream
   C. Monarch butterflies flying to Mexico
   D. Geese flying south

4. Which of these defines dormant?
   A. A maple tree in the winter
   B. A budding Juniper tree
   C. A tulip blooming in the spring
   D. An erupting volcano

5. Which is NOT a sign of seasonal change?
   A. Prolonged change in temperature
   B. Leaves changing color
   C. Birds flying south
   D. Smoke coming out of a smokestack

6. Plants make their own food. Used this way, the word "food" means something that ___.
   A. Needs sunlight and carbon dioxide
   B. Tastes good
   C. Is eaten by animals
   D. Contains stored energy

7. An example of a winter adaptation for a beaver is_____.
   A. Moves rocks on the shore
   B. Swims back and forth across the pond
   C. Builds a tree house
   D. Stores small branches for a food cache

8. All of these things can come from trees EXCEPT____.
   A. Food
   B. Energy
   C. Shelter
   D. Metal

9. Trees have many adaptations that allow them to survive the winter, one example is ___.
   A. Branches growing at the base of a tree trunk
   B. Moss grows on the side of the tree trunk
   C. Spruce tree has needles to help shed snow
   D. Roots growing above ground at base of tree

10. What is the first step in twig identification?
   A. Test if the twig bends without breaking
   B. Observe the twig bark
   C. Check the twig for buds
   D. Check if the twig has leaves

Appendix 5:

Post- Test:

(The post- test is labeled as a post- survey because it is at the teachers' discretion on whether or not a graded test will be given)

Post - Survey

Number _____.

1. A deciduous tree sheds their leaves ___.
   A. Completely for part of the year
   B. Gradually through the year
   C. They do not lose their leaves
   D. Deciduous trees do not have leaves

2. Plants make their own food. Used this way, the word "food" means something that ___.
   A. Needs sunlight and carbon dioxide
   B. Contains stored energy
   C. Is eaten by animals
   D. Tastes good

3. Which of these defines dormant?
   A. A maple tree in the winter
   B. A budding Juniper tree
   C. A tulip blooming in the spring
   D. An erupting volcano

4. Which is NOT a sign of seasonal change?
   A. Prolonged change in temperature
   B. Leaves changing color
   C. Birds flying south
   D. Smoke coming out of a smokestack

5. Each of these is an example of migration EXCEPT __.
   A. A raccoon climbing a tree to get over a river
   B. Pacific Salmon swimming upstream
   C. Monarch butterflies flying to Mexico
   D. Geese flying south

6. An example of a winter adaptation for a beaver is_____.
   A. Swims back and forth across the pond
   B. Moves rocks on the shore
   C. Stores small branches for a food cache
   D. Builds a tree house

7. All of these things can come from trees EXCEPT___.
   A. Energy
   B. Food
   C. Metal
   D. Shelter

8. Trees have many adaptations that allow them to survive the winter, one example is ___.
   A. Branches growing at the base of a tree trunk
   B. Roots growing above ground at base of tree
   C. Moss grows on the side of the tree trunk
   D. Spruce tree has needles to help shed snow

9. What is the first step in twig identification?
   A. Check the twig for buds
   B. Observe the twig bark
   C. Check if the twig has leaves
   D. Test if the twig bends without breaking

10. An example of hibernation is ___.
   A. A snake losing its skin
   B. Prairie Dogs poking their heads out of their mounds
   C. Frogs under the water in summer
   D. A bear sleeping in a log in December

Works Cited:

"A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study." *National Center for Biotechnology Information*. Web. 03 Dec. 2009. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448497/>.

Aikenhead, Glen S. *Science Education for Everyday Life: Evidence-based Practice*. New York: Teachers College, 2006. Print.

Anderson, Michelle. Dispatcher. March 17th, 2010.

Armstrong, Thomas. *Multiple Intelligences in the Classroom*. Alexandria, Va.: Association for Supervision and Curriculum Development, 1994. Print.

Carrier, Sarah J. "The effects of outdoor science lessons with elementary school students on preservice teachers' self-efficacy.(Report)." Journal of Elementary Science Education 21.2 (Spring 2009): 35(14). Academic OneFile. Gale. Carthage College/WAICU. 4 Oct. 2009 <http://find.galegroup.com/gtx/start.do?prodId=AONE>.

Comber, L. C., and John P. Keeves. *Science Education in Nineteen Countries; an Empirical Study*. New York: Wiley, 1973. Print.

Gardner, Howard. *Frames of the Mind: the Theory of Multiple Intelligences*. New York: Basic, 1993. Print.

Gardner, Howard, Mindy L. Kornhaber, and Warren K. Wake. *Intelligence: Multiple Perspectives*. Fort Worth, TX: Harcourt Brace College, 1996. Print.

Farmer, James, Doug Knapp, and Gregory M. Benton. "An elementary school environmental education field trip: long-term effects on ecological and environmental knowledge and attitude development.(REPORTS & RESEARCH)(Report)." Journal of Environmental Education 38.3 (Spring 2007): 33(10). Academic OneFile. Gale. Carthage College/WAICU. 4 Oct. 2009 <http://find.galegroup.com/gtx/start.do?prodId=AONE>.

Fox P & Avramidis E (2003) An evaluation of an outdoor education programme for students with emotional and behavioral difficulties. Emotional and Behavioral Difficulties. Vol 8. No 4. 267-283.

Handbook for Parents 2009-2010. Woodstock Community School District. Web. 17 Mar. 2010. <http://www.d200.mchenry.k12.il.us/schools/Handbooks/DistrictEnglish0910.pdf>.

"H.R. 2054: No Child Left Inside Act of 2009 (GovTrack.us)." *GovTrack.us: Tracking the U.S. Congress*. Web. 12 Dec. 2009. <http://www.govtrack.us/congress/bill.xpd?bill=h111-2054>.

"H.R.2054: No Child Left Inside Act of 2009 - U.S. Congress - OpenCongress." *OpenCongress - Track Bills, Votes, Senators, and Representatives in the U.S. Congress*. Web. 28 Nov. 2009. <http://www.opencongress.org/bill/111-h2054/show>.

Lazear, David G. *Multiple Intelligence Approaches to Assessment: Solving the Assessment Conundrum*. Tucson, Ariz.: Zephyr, 1994. Print.

"No Child Left Behind - ED.gov." *U.S. Department of Education*. Web. 03 Dec. 2009. <http://www2.ed.gov/nclb/landing.jhtml>.

"No Child Left Inside." *Chesapeake Bay Foundation | Save the Bay*. Web. 02 Dec. 2009. <http://www.cbf.org/Page.aspx?pid=687>.

"No Child Left Inside." *Washington State Parks Home Page*. Web. 03 Dec. 2009. <http://www.parks.wa.gov/NoChildLeftInside/>.

Sorensen, Wendy. Personal Secretary to the Principal of Woodstock High School. March 17th, 2010

Wheeler, G. and Thumlert, C. (2007). *Environmental Education Report.* Olympia, WA: OSPI.

Wisconsin. Department of Public Instruction. *School District Standards*. Mar. 2008. Web. 18 Mar. 2010. <http://www.legis.state.wi.us/rsb/code/pi/pi008.pdf>.

Zink, Robyn, and Michael Boyes. "The nature and scope of outdoor education in New Zealand schools." Australian Journal of Outdoor Education 10.1 (Jan 2006): 11(11). General OneFile. Gale. Carthage College/WAICU. 5 Oct. 2009 <http://find.galegroup.com/gtx/start.do?prodId=ITOF>.