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ENVIRONMENTAL ADVENTURES COURSE: AN ANALYSIS OF STUDENT WRITING TO GUIDE CURRICULUM DEVELOPMENT

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By

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Abstract

Environmental Adventures (EA) is a six-unit course that has been taught at Negaunee Middle School for more than 16 years. The current research on the EA course extends curriculum and assessment methodologies for the field of outdoor and environmental education. EA curriculum hones the development of middle school students' problem solving and decision-making skills, which parallel Boyer's (1990) four forms of scholarship. To examine the effects of the EA course on student learning, 20 middle school students' writings about their post-EA experiences were analyzed using Boyer's four forms of scholarship: The Scholarship of Discovery (or Research), the Scholarship of Integration, the Scholarship of Application, and the Scholarship of Teaching.

The author, Chuck Delpier, developed two EA adventures: "The Rock Climbing Trip" and "The 24-hour Wilderness Experience", which are the focus of the students' writings and this research. EA students wrote two post-EA experience reflection papers on the rock climbing and 24-hour wilderness activities. From 39 papers analyzed, 23 passages identified at least one of the Scholarship areas. Overall, 55% of the 20 EA students made at least one connection to a Scholarship area. Eight students logged 87% of the Scholarship connections. Of the four Scholarship areas, the Scholarship of Application (i.e., using learned ideas, skill, and knowledge to solve real-life problems) accounted for 39% of the instances from EA student writings. The Scholarship of Integration (i.e., making connections across the disciplines, placing the specialties in larger context, illuminating data in a revealing way, often educating non-specialists) was the lowest of the four categories with only 9% of the EA student writings relating to this

Scholarship area. In the author's teaching experience, these findings are consistent with the maturity level of a typical 13-14-year-old eighth grade students, who tend to learn quickly, apply what they know, and interpret new observations and experiences literally.

In addition to Boyer's Scholarship areas, EA student writings were analyzed using "Life Effectiveness Questionnaire" (LEQ) factors developed by Dr. James Neill (Neill, 2007). LEQ Factors include Time Management, Social Competence, Achievement Motivation, Active Initiative, Intellectual Flexibility, Task Leadership, Emotional Control, Self Confidence, and Environmental Stewardship. All nine LEQ Factors were identified in passages from EA student writings, lending validity to the LEQ survey for use in assessment of middle school environment education curriculum. The highest LEQ Factor was Achievement Motivation (i.e., the learning of new ideas) at 23.7%. The lowest LEQ Factor was Time Management at 2.6%. The percentages of each LEQ Factor appeared to correspond with themes that students experienced through their activities in the curriculum. Other evaluative tools for the EA curriculum are being planned for future research and use, such as the LEQ pre- and post-experience survey. Classroom and outdoor lessons from EA units, plus notes on teaching techniques on the two EA units used in this research, are included in Appendix D, which is intended to serve as a resource for outdoor education teachers.

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Chapter 1: Introduction

Chapter 1 includes the background of the Environmental Adventures (EA) course at Negaunee Middle School. Next, Dr. Ernest Boyer's (1990) four forms of Scholarship are introduced: The Scholarship of Discovery (or Research), Scholarship of Integration, Scholarship of Application, and Scholarship of Teaching. The four forms of Scholarship are used to help evaluate EA students' writing. Next, a second method of evaluating EA student writing is introduced, the LEQ Factors developed by Dr. James Neill (2007). Finally in Chapter 1, the reader will find the research questions that guide this paper.

Background of the Environmental Adventures Program

This paper focuses on the development and improvement of the Environmental Adventures (EA) curriculum and the effects of the EA course on student learning. Both the EA course curriculum and the student writing methodology for the EA curriculum evaluation are offered as unique contributions to the field of outdoor and environmental education.

The Environmental Adventures course is offered at Negaunee Middle School for students in grade eight. The EA course is an elective course that has many science components but is not designed to replace science courses. EA does not serve as a prerequisite for any course and entry is open to all eighth graders. As a result, EA has drawn a wide diversity of students. EA is offered with other electives at Negaunee Middle School such as Chorus, Band, Physical Education, Woodshop, iMovie, Small Engines, Computer Applications, and Drafting.

The EA course is a semester-long course, typically 19 to 20 weeks in duration. Many short-term outdoor programs are typically one to three days in length. Shorter

programs may be popular because pressure from administrators and/or parents is applied to outdoor educators to deliver shorter programs often linked to budget constraints. Some longer-term programs such as Outward Bound, are often 10-30 days in length. A meta-analysis of "96 studies published between 1968 and 1994 concluded that Outward Bound programs stimulate the development of personal competencies, enhance leadership skills, and have positive effects on adolescents' senses of empowerment, self control, independence, self-understanding, assertiveness and decision-making skills" (Hattie, Marsh, Neill & Richards, 1997, p. 51). Outward Bound is mentioned throughout the literature for the quality of its programming. Given the analysis of these researchers, suggesting that longer programs have more overall impact on students, the EA program within 19-20 week framework is in compliance with the research literature.

Negaunee, Michigan, is in the heart of the Marquette Iron Range. As iron became increasingly expensive to extract, all but two of the dozens of mines eventually closed. This iron mining community in Michigan's Upper Peninsula still provides iron ore for steel mills in Cleveland, Ohio. Negaunee is a blue-collar town better known for football, basketball, hunting, fishing and snowmobiling. Introducing backpacking, survival skills, winter camping and rock climbing has been a challenging, yet rewarding experience for the author.

For twenty-nine years, selected lessons in adventure programming and environmental activities have found their way into Chuck Delpier's classroom. Lessons occurred at the elementary, middle school, high school and college level. No matter what the teaching assignment, adventure and the environment were vital components. In the late eighties, the author developed a weekend, extra-curricular program called the

"Wilderness Trekkers" at Redmond Junior High School near Seattle, Washington. At that time, the state of Washington set up a series of grants. The grants were available to educators who demonstrated methods of preventing teens from using tobacco, alcohol and drugs. Rather than watch G-rated movies with popcorn treats on a Friday night, the Wilderness Trekkers were packing for a backcountry trip on the Washington Coast, Mt. St. Helens, Mt. Rainier or the Northern Cascade Mountains. The strategy was straightforward. Students were to make a promise to avoid tobacco, drugs and alcohol. Next, student members were to insert a program of healthy choices or "alternatives to substance abuse" into their evolving lifestyle. One student spoke bluntly, "Why would I smoke, get drunk or high when I have a mountain to climb tomorrow?" The Wilderness Trekkers was a warm-up-program for what was to come: "Environmental Adventures at Negaunee Middle School".

Sixteen years ago, the opportunity to teach adventure/environment was formalized into the "Environmental Adventures" course at Negaunee Middle School. The school was inviting new electives due to a surge in student enrollment coupled with the retirement of some electives teachers. Environmental Adventures was the brainchild of teachers, Janet Koehs and Chuck Delpier. Several grants were written for supplies. Grantors for the EA program included the Marquette Community Foundation, The Negaunee Community Foundation, Upper Peninsula Environmental Coalition, Cliffs Natural Resources, West Marquette County Community Partnership, Wal-Mart, ING, Down Wind Sports, and the Negaunee Middle School Parent's Group. Grant funded supplies of the current program including tents, backpacks, handheld GPS units, carabiners, climbing ropes and harnesses could not have been imagined by those first groups of students in the mid-nineties. Those

"pioneers" were subject to torn, broken and borrowed equipment that was often donated by well-meaning yard sale purveyors. Each semester, since 1995, the program has consistently drawn 35%-55% of the students in the eighth grade at Negaunee Middle School. The evolution of the EA course is largely due to the feedback from the students' writing.

The EA curriculum integrates the adventure experiences and environmental activities into a semester-long course. The commitment by the school administrators to retain a program of this (19-20 week) length has contributed positively to the success of the Environmental Adventures program at Negaunee Middle School.

In 2007, teachers at Negaunee Public Schools were motivated by the Negaunee administration, through professional development training, to encourage students to write across the curriculum. As a result, students were asked to write about their experiences on the EA Rock Climbing Trip and The EA 24-Hour Wilderness Experience. Students were eager to express their experience on paper about these two important components of the Environmental Adventures course. The EA Rock Climbing Trip and the EA 24-Hour Wilderness Experience are the focus of the curriculum and EA students' written reflections.

"No Child Left Indoors" by Anna Dravland is a memoir by a former EA student. Ms. Dravland embraced the opportunity to chaperone an EA Rock Climbing trip with the Environmental Adventures class last fall. She was a member of the first class of Environmental Adventures students at Negaunee Middle School sixteen years ago. Now, Ms. Dravland was compelled to write about the EA course. Ms. Dravland's sentiments are similar to the interviewees from the program at the University of New Hampshire.

Ms. Dravland (2011) writes that the Environmental Adventures program, "Sparked a lifelong love and respect for all things outdoors…spreading knowledge and passion (for the outdoors) to otherwise technology overloaded youth…(the course provides) an opportunity to embrace the beauty and natural wonder" (p. 2).

Boyer's Four Forms of Scholarship

Dr. Ernest Boyer, former chairman at the Carnegie Foundation for the Advancement of Teaching, advanced the idea of scholarship in his seminal work, Scholarship Reconsidered: Priorities of the Professoriate. Boyer's report has been called a "best seller" (Glassick 2000, p. 877). This paper utilizes Boyer's work as a lens through which we can analyze the EA course curriculum. Overall, the EA program heeds Boyer's advice and honors his convictions. Boyer refers to the scholarly trilogy of teaching, service and research.

According to Dr. Charles Glassick (2000), most faculty at the four-year institutions reported the reward system was heavily weighted toward published research, not effective teaching. Even at research universities, a surprising 42% agreed with this conclusion (p. 878). The Environmental Adventures program aspires toward each of the four components, the Scholarship of Research, Integration, Application, and Teaching. Perhaps Scholarship should be important to all teachers regardless of the level of education. Although EA is a program for middle school students in a rural community, the program aspires to the convictions that Boyer asserted in reference to U.S. universities in 1990.

The Scholarship of Discovery

Chuck Delpier continues to teach, evaluate and develop the EA course. In 1995

the EA program was launched affirming Boyer's "big idea" on U.S. education in the tiny hamlet of Negaunee, Michigan. Over a period of 16 years, the one-semester curriculum, designed specifically for middle school students has evolved. The EA program has received positive attention from the media on the local, state and national level in the U.S. The EA curriculum is presented in this paper as a creative contribution to the fields of adventure programming, environmental education and outdoor education.

The EA program is vastly different from most science courses that are taught at the middle school or high school level. First, the EA curriculum does not follow a textbook. The EA curriculum has been developed, changed and refined by many evaluative tools (especially student feedback) and by utilizing hundreds of resources. One textbook would not suffice for the hands-on, largely outdoor, participatory EA course.

The Scholarship of Integration

The EA curriculum often integrates and overlaps with other disciplines. Unlike a traditional science course, the EA course curriculum is largely thematic. For example, during the Rock Climbing Unit, students are learning or reinforcing topographic map reading, igneous, sedimentary and metamorphic rock classification, gravitational physics, friction physics, trust, teambuilding, leadership, communication, journaling and written expression. All of the learning is "under the influence" of a powerful motivational force termed "Challenge". Teacher-craft is required to weave the components from multiple disciplines into a multi-faceted yet focused unit.

Boyer (1990) quotes one of his predecessors, Van Doren, "It is through 'connectedness' that research ultimately is made authentic" (p. 19). Boyer continues, "Integration is closely related to discovery, it involves, first, doing research at the

boundaries where fields converge" (p. 19). Boyer asked university faculty to respond to this statement, "Multidisciplinary work is soft and should not be considered scholarship" (p. 20). Only 8% agreed, 17 % were neutral, while a striking 75% disagreed with the statement. The results of Boyer's faculty poll suggest that integration of disciplines is not soft and is worthy of scholarship. The EA Rock Climbing unit is one example of the integration in the EA program, a virtual potpourri of disciplines anchored within decisive themes.

The Scholarship of Application

The Scholarship of Application is solving real-life problems. One of the goals of the EA program is to empower students with application skills for employability. For example, students may have fancy phones with a GPS application but when asked to use the "app" or explain coordinates, students are dumbfounded. "Digital geography" is a current hot topic and a prerequisite for many future jobs. We use GPS units that blend topographic maps with electronic compasses, a mix of low-tech with high-tech.

During the "GPS Rescue Activity", a student "victim" is sent outdoors with a cell phone and a GPS unit. The "victim" chooses a specific outdoor location and acquires satellites with their GPS and hunkers down on the ground. Next, the student uses a cell phone and calls our classroom and reports a broken leg, snakebite or other fake injury. We simulate a real-life emergency. We use real tools for navigation. The main idea is to respond by doing the actual procedure required to rescue the victim.

The Scholarship of Application also refers to the contributions teachers can make since teachers have the "special knowledge" from insights gained from young people through knowing their problems and their concerns about people, society and our planet.

The Scholarship of Application requires teachers in our current society to be proficient in many areas. The Scholarship of Application requires teachers to be connected with current technologies yet be able to draw a diagram in the dirt, light a fire without a match, or console an upset child. The EA program embraces all of these roles.

The Scholarship of Teaching

The EA program is a candidate for Scholarship of Teaching because it affirms all three criteria:

1. The work must be made public.
2. The work must be available for peer review and critique according to accepted standards.
3. The work must be able to be reproduced and built on by other scholars (Hutchings & Shulman, 1999, p. 12)

The EA program is public, it is available for peer-review, and it provides a framework for other educators to reproduce and build on the structure of the EA curriculum. “The Scholarship of Teaching has the potential for advancing the field of education, not just individual students’ learning” (Fincher & Work, 2006, p. 293). “The Scholarship of Teaching becomes consequential when it is understood by others” (Boyer, 1990, p. 23).

Ruth-Marie Fincher and Janice Work (2006) suggest that the “Scholarship of Teaching is not a fourth, distinct form of scholarship, but, rather, may involve discovery, integration or application” (p. 294). Boyer does not articulate that the Scholarship of Teaching is integrated but his definition was intended to be a starting block, a discussion starter. The EA program strives to live up to the Scholarship of Teaching.

The EA course reinforces students' science knowledge, skills, and abilities, and as such, could serve as a supplement to standards linked to the Michigan Science Content Expectations. The teaching and learning is largely thematic, hands-on/minds-on and takes place largely outdoors. The course contains two main trips that require extensive preparation by the students and the teacher. The EA course and its teacher aspire to the Scholarship of Discovery, Scholarship of Integration, Scholarship of Application and Scholarship of Teaching. An examination of students' engagement in the EA program reflects each of Boyer's Scholarship areas.

LEQ Factors Used to Analyze EA Students' Writing

Neill and other researchers in pre- and post-experience surveys use the LEQ Factors. In addition to Boyer's Scholarship areas, the author analyzes the EA students' writing passages identified with Boyer's Scholarship areas and the LEQ Factors: Time Management, Social Competence, Achievement Motivation, Active Initiative, Intellectual Flexibility, Task Leadership, Emotional Control, Self Confidence, and Environmental Stewardship (Neill, 2007).

One Set of EA Student Writing Passages, Two Analysis Techniques

In summary, the EA student writing passages are analyzed in two different ways. The first is an academic approach using Boyer's four forms of Scholarship. Then the same passages are analyzed using the LEQ Factors popularized by Dr. James Neill (2007) Neill's background is psychology and outdoor education. Using the goals established by Boyer's Scholarship areas and the LEQ Factors explained above with the methodology in Chapter 3 below, the research questions in this study are:

1. Can EA student writing be analyzed through the lenses of Boyer's Scholarship

areas and Neill's LEQ Factors?

2. Can the Scholarship areas and the LEQ Factors display what the students are learning through the EA curriculum?
3. Based on the analysis of the EA student writing data in this study, are there strong areas in the EA curriculum?
4. Are there areas of concern in the EA curriculum based on the analysis of the EA student writing data of this study?
5. Are there other techniques of analysis that can measure the EA curriculum?

The EA curriculum is composed of six-units of mostly hands-on activities. At this point, only a few of EA activities have been analyzed in an attempt to identify their relationship to the Scholarship areas and the LEQ Factors. The analysis of every EA activity is beyond the scope of this paper may be a subject of future research.

Chapter 2: Literature Review

In Chapter 2, an interpretation of Boyer's Scholarship model is provided. Next, the short-term and long-term effects of a wilderness experience program at the college level are compared to the EA program. Then, an analysis of how student writing is used as an evaluative tool, specifically by teachers that utilize the outdoor "classroom". Later in this chapter, a challenge by Dr. James Neill (2008), is presented for researchers and educators to describe their environmental programs, not just the post-results of their research (Recommendations section, para. 1). Finally, in Chapter 2 are some inspirational words from Kurt Hahn about the reasons for student challenges in the outdoor education curriculum.

Interpretation of Boyer's Scholarship Model

In 1990, Boyer wrote about the four Scholarship components in relation to university instruction. The EA teacher interprets the Scholarship components in a wider sense including all levels of education. The challenge is to embrace the Scholarship components and work to design and continue to improve curriculum to meet these standards.

The principles developed by Boyer focuses on students being active participants in their education. Boyer created a model for teachers and administrators to use to communicate about teaching practices at all levels from elementary school through university. "Amidst an educational establishment that worships the quantitative approach to pedagogical problems, Boyer dared to question aptitude tests and to stress the importance of the qualitative factors in the lives of children. Where many academicians see value only in the attainments of the head, Boyer championed the values of the human

heart" (Schwartz, 1996, p. 1).

Longitudinal Study Reveals Short-Term and Long-Term Effects

The University of New Hampshire uses a wilderness orientation program for first year college students. The wilderness program was intermittent, quite different from the EA program, yet shared some similarities that may provide some insights. The students committed to 1-3 days of wilderness programming every 3-4 months throughout the school year. The students participated in the same group at each stage of the program and gained familiarity with the other participants. The participants within a group were intentionally formed from diverse programs of study at the university (Gass, 1987, p. 30). A successful program, is expected to translate into lower student attrition rates, greater levels of emotional and social development, and more positive attitudes towards the institution (Evans, Forney, & Guido-Dibrito, 1998, p. 26). Later, a longitudinal, interview-style study revealed that even after 17 years, the participants in the University of New Hampshire program were positively affected in the short-term and in the long-term. For example, the program participants had fewer dropouts, the students developed friendships with peers that the students may otherwise not have met, and the students maintained a good to excellent grade point average. Seventeen years later, a pattern emerges. The following are three themes that the participants elicited when they were interviewed.

1. The program altered their previously held beliefs about themselves and others.
2. Contacts and friendships were sustained during, and in many cases, after their college experience.

3. The program not only had short-term effects during their undergraduate education but a continuing positive impact on their personal and professional lives after graduation (Gass, Garvey & Sugerman, 2003, p. 36).

Neill and Richards (1998) present the idea that with most forms of intervention and training, researchers note a steady loss of benefits once the program is finished. As a result, the long-term results of an outdoor program, reported by Gass, Garvey and Sugerman (2003) are particularly impressive. “Educational methodologies that produce long lasting positive changes in self-perceptions are needed. These positive results for outdoor education deserve wider recognition and further application” (Neill & Richards, 1998, p. 3).

Paxton and McAvoy (2000) devised a battery of open-ended survey questions that were posed to the adventure/environmental participants just before the experience, just after, six months later and finally once more after one year by telephone. The methodology included inferring themes from the answers received.

Using Student Writing as an Evaluative Tool

Teachers that utilize the outdoors with students often use writing in the form of journals, as a means of evaluating curriculum or as a formative assessment in their program. Teachers should use nature journaling in their classes because, whether they are at home or at school, students spend most of their time indoors. According to Cormell and Ivey (2012), although nature journaling was implemented in life science class, “nature journaling is an easy way to connect science literacy to any classroom, regardless of the science topic taught” (Why nature journaling? section, para. 1).

In Richard Louv’s 2006 book, “Last Child in The Woods: Saving our Children

from Nature Deficit Disorder", Louv points to the idea that often our children are not connected to the outdoors, as shown by this comment by a San Diego, fifth grader, "I like to play indoors better 'cause that's where all the electrical outlets are" (Louv, 2006, p. 10).

The EA teacher's conviction is to participate in the growing movement to "reintroduce" young people to nature and ask students to write about their experiences. One technique is journaling. Using the journaling technique, the students observe nature or participate in an outdoor activity and then write about it almost immediately. The advantage to this technique is that the details are often quite accurate. Journaling may be the preferred technique while observing.

The quality of the writing is often attributed to the parameters established by the teacher. Janet Dyment and Timothy O'Connell (2010) list several factors that motivate and guide students toward writing journals or reflection papers:

1. What is the purpose of the journal or reflection paper?
2. How does the journal fit into the overall program?
3. Who will read the journal?
4. What are the assessment criteria and standards?
5. How much does the journal count?
6. What are the technological boundaries? Handwritten? Word-processed?
7. Length? What is the due date for completion of the journal? (What are specific requirements? section, para. 1).

Because the EA Rock Climbing Trip and EA 24-Hour Wilderness Experience are intense experiences, the students are asked to write about them later, as a reflection. The

students are asked to produce a Word document that is at least two pages in length for each of the experiences. The reflection is a homework assignment; this designation helps the students work independently on their writing.

Dr. Richard Louv alludes to the idea that outdoor experiences for young people are alarmingly rare. It is the author's viewpoint that if we are going to invest in the gear, teach outdoor skills, motivate the students and chaperones in a "rare" outdoor event, writing about the experience, thus extending the experience is a logical procedure. Many students provide insight into what they are actually learning and insight into the EA curriculum. Curriculum improvements and changes are a key goal of the EA program.

Other styles of writing may become part of the future plans for the Environmental Adventures course curriculum. For example, Lisa Marie Connors, a fourth grade teacher, motivates students by using a class set of ten iPods to write scripts for digital field guides that describe the trees along a trail on the school grounds (Connors, 2011). Another teacher, Janita Cormell, motivates her sixth graders by using prompts for nature journals. Ms. Cormell also asks the students to sketch the environment or some aspect of the environment in their journals (Cormell & Ivey, 2012).

Teachers have an obligation to help students make a connection to their natural world. This, which can be difficult with some schools' prescribed curriculum that dictates what and when topics are taught. Often, topics such as plant growth are taught during months when most plants are not active. Nature journaling can also provide an outlet for teachers to take their students out of the classroom and into the outdoors throughout the year (Cormell & Ivey, 2012). A secondary teacher from Maine uses nature journaling as a formative and summative assessment (Griset, 2010).

EA Course Curriculum Is Described

The EA program is serving a dual purpose. Many programs (worldwide) subject themselves to evaluation and actually publish their results. However, very few of those programs provide descriptions of the program itself. Environmental Adventures, through this paper and through presentations past and present, is providing qualitative analysis, plus a detailed description of the course and the methodology behind many of the EA outdoor adventure/environmental activities. In a recent paper, Neill (2008) scolds researchers:

> Firstly, future research should describe the programs methods in more detail. All five outdoor education meta-analyses were consistent in calling for future research to provide more details about the educational methods used in the program being investigated. The lack of methods information in the primary empirical studies limited the extent to which meta-analysis could analyze process variables. A lack of more detailed information about program features such as program philosophy, type of activities, instructional techniques and facilitation style, instructor experience, program difficulty, weather, environment, group sizes, activity sequencing, and methods for dealing with behavior problems was noted. Given the wide variation of outcomes between different types of programs, future research is critical. Researchers must document, in much greater detail, the nature of the programs being conducted (Recommendations section, para. 1).

The EA course curriculum is described in Appendix D. This paper attempts to address the shortcomings identified by Neill, inspire other educators, spark new ideas, and to allow

for changes to evolve with the current methodology in the Environmental Adventures course.

Future Research with Additional Methods of EA Curriculum Analysis

Student writing was analyzed to identify themes that correlate the EA curriculum with the educational goals outlined by Boyer: The Scholarship of Discovery, Scholarship of Integration, Scholarship of Application and Scholarship of Teaching. Student writing is only one of many methods for curriculum analysis. Other analysis techniques are planned for the EA curriculum. One of the methods for future consideration is the Life Effectiveness Questionnaire (or LEQ).

Life Effectiveness Questionnaire (or LEQ)

Neill calls for more research using the LEQ (Neill, 2008). “Outdoor education scholars (three words that we do not see in the same sentence very often) might also consider other innovative research reviewing methods” (Conclusions section, para. 5). The Life Effectiveness Questionnaire or LEQ is a research tool for measuring personal change. Born and raised in Perth, Western Australia, Dr. Neill is a psychologist and a researcher, with expertise and interests in outdoor education, experiential learning, and personal development. The LEQ has typically been used to measure the short-term and long-term effects of intensive personal development programs, such as outdoor education programs, with adolescents or adults. The LEQ focuses on measuring the extent to which a person's actions/behavior/feelings are effective in managing and succeeding at life, or more specifically, life skills.

The domains of life effectiveness are key aims of many personal development programs. Whether positive growth occurs, depends on the quality of programming,

particularly program philosophy and program design, not to mention the actual implementation of the program and the individuals involved. By using the LEQ one might be able to analyze the effects of a course on the course participants. When analyzed and interpreted, the results might be informative for program coordinators and instructors to help improve program quality (Neill, 2007). The LEQ Factors are measured using survey questions in a short questionnaire format that is in Appendix B.

Challenge: The Ideal of the EA Program

Kurt Hahn (1970) the modern-day father of outdoor/adventure education, believed that youth would take pleasure in learning if the environment were attractive to the total person (the emotional, physical and social aspects of a person). Both intra and interpersonal lessons are the basis for experiential education—that is, the total person is involved in the learning process. Experiential and adventure education has used this philosophy as the cornerstone of their development. One essential element of this philosophy is a series of intense experiences in a natural setting that produce increasingly complex and difficult challenges for an individual to master to go on to the next challenge. Through the process of trying to succeed at accomplishing these challenges, the individual builds a sense of self worth and concern for those in danger (Hahn, 1970), which is the ideal of the Environmental Adventures program at Negaunee Middle School.

Chapter 3: Methodology

In Chapter 3, the method for analysis of the EA student writing is explained in regard to Boyer's four forms of Scholarship and in regard to the LEQ Factors. In addition, EA students' terms are deciphered for the reader.

EA Student Writing

An analysis of EA student writing to identify passages that have elements of the Scholarship of Discovery, Scholarship of Integration, Scholarship of Application and Scholarship of Teaching. The same EA student passages are used to identify elements of the LEQ Factors.

The data included 23 passages from anonymous, EA students' writing (N = 20 students). The students' assignment was to write about their experiences with the EA Rock Climbing trip and the EA 24-Hour Wilderness Experience. The specific prompt for the EA Rock Climbing Trip two-page reflection paper was presented as a statement to ponder on the first day of classes and then periodically throughout the unit: "Explain how and why rock climbing is a lot like life." The prompt for the two-page EA 24-Hour Wilderness Experience reflection paper was presented after the trip: "Did you feel challenged? Did you meet the challenge? What is your hypothesis, does meeting a challenge as a student become useful as an adult? Delve deeply (explore) just two or three activities that happened during the trip and evaluate the activities from many viewpoints."

The 2011-2012 First Semester EA class was composed of 20 students. All of the students attended classes regularly. All 20 students attended the Rock Climbing Trip in September 2011. One student did not attend the 24-Hour Wilderness Experience in

January 2012, due to post-surgery rehabilitation. (The rehabilitating student is invited to attend the 24-Hour Wilderness Experience with the students that are planning the May 2012 outing.) Twenty student-written papers were received that focused on the Rock Climbing trip and a total of 19 student-written papers were received that focused on the 24-Hour Wilderness Experience. (The one paper that was not completed is attributed to the student that did not attend the 24-Hour Wilderness Experience. This student's paper will be completed after the 24-Hour Wilderness Experience.

Using the Scholarship Areas to Analyze EA Students' Writing

The EA teacher and two assistants performed a subjective analysis of all the writing. The analysis included identifying all student-written prose that related to the educational goals outlined by Boyer: The Scholarship of Discovery (or Research), Scholarship of Integration, Scholarship of Application and Scholarship of Teaching. In order for the passage to qualify, the EA student had to write at least a full sentence that correlated with one of the four Scholarship areas. The EA student papers were anonymous and coded for identification. The selection process for the passages included the EA teacher plus corroboration from a student volunteer who was not connected with the program and another teacher. The student is a secondary school student with strong reading and writing abilities. The other teacher has a master's degree in education focusing on history and language, plus a post-graduate degree in psychiatric nursing. Each evaluator had equal authority. One dissenting vote removed the EA student's passage from the list of those that were identified as connected with one of the four Scholarship areas.

Using LEQ Factors to Analyze EA Students' Writing

In addition to Boyer's Scholarship areas, Neill's LEQ Factors were used to analyze the same EA student passages that were selected for the previous Scholarship area analysis. The LEQ Factors, which were actually designed by Neill to serve as descriptors in the LEQ survey tool. The pre-selected (Scholarship areas) EA student passages were analyzed and correlated with the nine LEQ Factors. The EA teacher without assistance carried out this process. The method included reading the EA student passage and identifying characteristics that corresponded with the LEQ Factors' descriptions. The EA student passages were coded for reference with the type of Scholarship, and using an Arabic numeral.

Chapter 4: Results

Below is an analysis of EA student writing using the lenses of Boyer's Scholarship areas and Neill's LEQ Factors. The student writing is from two reflection assignments on the Rock Climbing Trip and the 24-Hour Wilderness Experience. In addition, Chapter 4 includes results of ongoing progress in the EA course such as a question and answer dialogue concerning young women in the wilderness. Also, there is a section on the updated transportation arrangements for EA trips. The new transportation scheme has added more parent involvement to the EA program. Finally, a section is included on the updated adult leaders' safety checklist and a checklist of expectations for adult leaders.

Analysis of EA Student Writing Using the Scholarship of Discovery

According to Boyer (1990), "The Scholarship of Discovery contributes not only to the stock of human knowledge but also to the intellectual climate. Not just outcomes, but the process, and especially the passion, give meaning to the effort" (p. 17). Boyer speaks of process and "especially the passion" in the Scholarship of Discovery.

Scholarship of Discovery #1: "*When I started coming down I was able to grab the rope, lean back, and just feel the air on me. The feeling was incredible, I could trust my belayer and I was having this rush going through me. Just like climbing, in life, once you've hit your peak, you are having the greatest moments of your life. For most people it is high school or college. I think that once you are a parent and you have a child, you are going to be proud and you'll feel the winds of life blowing through you. Climbing gave me an amazing feeling, I'm just waiting to reach my life's peak.*" In addition to Boyer's Scholarship areas, Neill's LEQ Factors are also used to analyze each writing passage.

The data is summarized in Tables 1-4 below. LEQ Factors for this passage: Emotional Control and Self Confidence.

Sometimes, students "discover" that their initial ideas are not feasible or more flexibility is required as displayed in the next three excerpts:

Scholarship of Discovery #2: *"The swing activity was also a great challenge to me. I quickly had an idea. I took the lead and told my tent members my idea. I wanted to make a rope swing that would swing out over a gully. That proved to be a more difficult challenge than I anticipated."* LEQ Factors: Active Initiative, Intellectual Flexibility.

Scholarship of Discovery #3: *"Packing up in the morning was not easy. I woke up and went outside to but on my boots, but they were frozen solid. I had to walk around with my boots half-on for quite some time. I was cold and had trouble fitting my sleeping bag into the main pouch on my backpack. My sleeping bag was too large to fit into a compression stuff sack. It was a rough morning."* LEQ Factors: Achievement Motivation and Emotional Control.

Scholarship of Discovery #4: *"Most people had to breathe on the frozen tent poles to get them to fold up."* LEQ Factor: Achievement Motivation.

The following "discovery" was during the EA 24-Hour Wilderness Experience. Students had the experience of wearing a pirate patch on one eye, allowing the pupil in that eye to dilate and become accustomed to the darkness. Pirates actually used this technique to overcome their victims. Despite the tough-talk, I can assure that no siblings were brutalized due to new knowledge (discoveries) made by the following student.

Scholarship of Discovery #5: *"I didn't know that pirates were actually that smart. Most of all, I didn't know that having an eye patch could actually be an advantage at*

night. I use that technique all the time now, just to freak my siblings out." LEQ Factor: Intellectual Flexibility.

Quite often, discoveries occur because students are encouraged to work in groups. The students are presented with challenges that would be daunting or impossible for an individual to accomplish.

Scholarship of Discovery #6: *"The swings were fun, and setting them up took teamwork and cooperation. Taking down the swings was super hard. The reason was because we had to reach up and loosen the girth hitches so that the loop would slide down the tree low enough where we could reach it and undo the loop. In the end, we had one person that stood on another person's back and then the third person handed her a long branch that she would use the branch to grab the carabiner and drag the entire loop down the tree. Now, I call that teamwork."* LEQ Factors: Active Initiative, Intellectual Flexibility and Task Leadership.

Analysis of EA Student Writing Using the Scholarship of Integration

In proposing the Scholarship of Integration, Boyer underscores the need for scholars who give meaning to isolated facts, putting them in perspective. "By integration, we mean making connections across the disciplines, placing the specialties in larger context, illuminating data in a revealing way, often educating non-specialists" (Boyer, 1990, p. 18). Boyer may have been pleased with the biological connections that this middle school student made on the EA 24-Hour Wilderness Experience while we visited the bog:

Scholarship of Integration #1: *"I learned countless things about bogs and that I will keep mind if I ever run into one. First of all, I never knew that someone could*

disappear in a bog; this was proven when one of the chaperones fell through to his knees. Second of all, I'd never dreamed that there'd be berries to eat in the middle of the winter, although the wild cranberries may not be pleasantly appetizing, they would give you nutrition in a survival situation. Finally, I learned that there is a bug catching plant that grows in bogs. This was astonishing to me. I'd previously thought that such plants could only be found in the southern part of the continent." LEQ Factors: Intellectual Flexibility and Environmental Stewardship.

Another student helps us connect-the-dots while coming to a personal realization about the cold realities of winter. When this student studies people that live in the far north or researchers that work in Antarctica, she may be better able to integrate her visualizations with reality:

Scholarship of Integration #2: *"I am glad I was able to participate in the 24-Hour trip because it helped me realize how difficult winter conditions can be. I didn't know how difficult sleeping in winter conditions would actually be. The trip was an experience that has changed my view on the elements of nature. I have a new respect for the harsh conditions of the winter elements."* LEQ Factors: Intellectual Flexibility and Environmental Stewardship.

Analysis of EA Student Writing Using the Scholarship of Application

The Scholarship of Application is using learned ideas to solve real-life problems. One of the goals of the EA program goals is to empower students with application skills for employability. The ideas that outline the Scholarship of Application by Boyer inspire EA students and staff to make connections between the skills and knowledge learned in class and the real world. Boyer may be labeled an academician, but this leading educator

also dedicated his life of service to the community. “Boyer’s lifetime commitment to service as part of education was a natural basis for the Scholarship of Application” (Glassick, 2000, p. 878). The first two passages exemplify the importance of learning a skill and putting it into real world context. The “mistakes” may have caused some short-term discomfort, but the life lessons are likely to be long term:

Scholarship of Application #1: *“Finally, we get to the most challenging part of the trip, packing in the morning. This was quite the experience, as our trip was in the winter and we woke up to find all of our gear frozen solid. My partners helped me learn a lesson that I won’t forget. Keeping your equipment out of the weather is a necessity. I brought my boots in the tent, but my tent partners made the mistake of keeping their boots outside. When my partners woke up, they found their boots frozen solid and filled with snow, as it had snowed and the snow had slid down the fly and into their boots.”* LEQ Factors: Active Initiative, Intellectual Flexibility and Task Leadership.

Scholarship of Application #2: *“Our swing was iced to the tree. It took us ten solid minutes to get it down. Another surprise thrown at us in the morning was the intense cold. It filled every crack in your body and it made working without gloves virtually impossible. Having to work with gloves delayed the process greatly. While I found the cold, morning work a fun challenge, my partners (one in particular) found it agonizingly painful. My partners couldn’t get their boots on for the first twenty-five minutes (and I’m not exaggerating), and worked with frozen hands and feet. As a result, it took us longer to pack up than the rest of the group and we were one of the last groups to finish packing.”* LEQ Factors: Active Initiative, Intellectual Flexibility and Task Leadership.

Life skills such as preparation for an event, making decisions about packing, making decisions about purchases, independence, and learning to work with people are major themes in the next four student writing selections. Boyer may be tickled to see young people embracing the pillars of his standard of Scholarship of Application.

Scholarship of Application #3: *"I think the preparation was by far the longest and hardest part. The whole class worked on our skills and learned survival tips all semester. About two weeks before the day of the trip, it finally hit me that it was real and I needed to start packing. I knew I had to pack extras of everything in case it got wet but I didn't know how much extra to pack because I didn't want my backpack to be heavy."* LEQ Factors: Achievement Motivation and Intellectual Flexibility.

Scholarship of Application #4: *"I had to make decisions on how much stuff I wanted to carry, how much to buy, and what I could go without. What I think will be useful when I'm an adult is the decision making process on life's necessities and life's desires. Deciding what is affordable will help me not to buy anything that is not affordable. Another thing that I learned is about making choices. We make hundreds of choices every day, but you can't always let people make those choices for you. I learned how to make choices for myself and how to cooperate when my choices may not be the best. I think that I learned a sense of responsibility getting prepared for this trip and on the adventure itself."* LEQ Factors: Achievement Motivation, Social Competence and Intellectual Flexibility.

Scholarship of Application #5: *"Learning how to interact with different people will help me a lot when I get a job. Cooperating with people that I don't know will help me if I go into banking, being a clerk, working at a nursing home, or a business man, or*

any kind of career that I choose. This will also help me be a better person to people that do not have any friends or people that get picked on." LEQ Factors: Social Competence and Self Confidence.

Scholarship of Application #6: *"I think having the trip in the winter made the trip more worthwhile. I think all the skills that I learned in the class will someday come in handy and help me become a more independent adult."* LEQ Factors: Social Competence and Emotional Control.

Skills, or attitudes acquired by some students are actually themes of appreciation and trust. Boyer may be proud to realize that not only academic skills transfer to the real world. Attitudes that open doors to learning are part of the take-home package for EA students as demonstrated by these three passages:

Scholarship of Application #7: *"The trip really changed me as a person. It made me realize how taking a nice shower, a nice warm bed and the food my mom cooks for granted. I'm glad I got to go on that trip, because if you get lost in the woods or feel like camping, I know what to do and how to do it."* LEQ Factors: Self Confidence.

Scholarship of Application #8: *"In life, there is one, or two, or maybe three events that are hardest in your lifetime. Some people may consider turning 40 one of these. This might be the crux of your life, like the crux of the climb. After you get past the crux of your life, life gets easier. The same goes for rock climbing. Finally in rock climbing you get to the top. This would be like achieving your dream goal in life. That is the best time in your life and the best time in rock climbing. On the way down the rock, it's easy and it's time for a relaxing descent. In life it is the same way. In the end, your*

500 piece puzzle comes together and you have achieved a colorful, wonderful, complete picture: your life." LEQ Factors: Emotional Control.

Scholarship of Application #9: *"In your life, you should definitely have a support system. For me it is my family and for rock climbing it was the belayer. I had to put my trust my trust in them that if I fell they would catch me. You can feel the trust when you get to the top of a climb and you realize how high you are and that the belayer didn't let you fall."* LEQ Factors: Self Confidence.

Analysis of EA Student Writing Using the Scholarship of Teaching

"When defined as scholarship, teaching both educates and entices future scholars" (Boyer, 1990, p. 23). Boyer goes on to write, "Teaching is a dynamic endeavor involving all the analogies, metaphors, and images that build bridges between the teacher's understanding and the student's learning. Pedagogical procedures must be carefully planned, continuously examined and relate directly to the subject taught" (Boyer, 1990, p. 23). In many cases the EA students not only learn the material but are inspired to pass it on to others. This free-distribution is one of the goals of both the Scholarship of Teaching and the EA program. Boyer may be delighted by the following strategy used to engage an eighth grader's younger brother in learning.

Scholarship of Teaching #1: *"I especially liked the Pirate Activity because when I took the patch off and looked around, I felt blind in one eye. The feeling of being blind felt weird and unnatural, and now I feel like I know what it is like to live with being blind every day. Inside, I have gained a new respect for blind people. They are very strong for going through that feeling day and night. During the Pirate Activity, I enjoyed listening to the story of why pirates really wore patches. I didn't know the real reason before. I*

had always believed what most people thought that pirates wore eye patches because one eye was missing. When I went home, I actually asked my brother why pirates wore eye patches and he said: "Because they lost an eye, and they had to cover it up somehow." He liked hearing the actual story of why a pirate patch was worn." LEQ Factors: Intellectual Flexibility and Task Leadership.

Learning though trial and error sometimes causes a certain quantity of embarrassing "pain". With middle school students, the pain seems to quickly dissipate, but the learning endures. In the following vignette, a group of boys get a taste of "humble pie".

Scholarship of Teaching #2:*"Finding the perfect tree for our bear rope was more fantasy than reality. Finding even a decent tree was difficult. So then we thought we found one that was going to be good enough for us. We used the two-rope system that we learned, and succeeded in getting the food off the ground. We were impressed with ourselves at first. When we saw everyone else's bear ropes we didn't feel so great. When it was our turn to show off our bear rope system, we realized that our food was only three feet off the ground."* LEQ Factors: Intellectual Flexibility.

EA students are encouraged to be inventive. After a session of swing building, the class tours the area in a "grand–rounds fashion" and each group demonstrates their swing. This, not only brings a sense of pride, but also demonstrates two criteria for the Scholarship of Teaching:

1. The work must be made public.
2. The work must be available for peer review and critique according to accepted standards (Hutchings & Shulman, 1999, p. 12).

Scholarship of Teaching #3: *"We had two caribiners and two long pieces of webbing to make a swing. We saw that many of the groups were constructing the type of swing that you sit on, and you just go back and forth. We wanted to do something that was different than the others. My partner threw a piece of webbing over a tree. I tied that end to a fallen tree. Next my partner grabbed the (free) end and started to run, jump and it twirled all around the tree. We were surprised and excited on how well our simple design worked. When the class came around to look at each swing, I think they liked ours the most."* LEQ Factors: Active Initiative and Task Leadership.

The next three scenarios are comparative prose. These (rather deep) teachings are coming from thirteen and fourteen year old EA students that are comparing the activity of rock climbing to life itself. The students' insight is thoughtful and the passages have been identified with the Scholarship of Teaching:

Scholarship of Teaching #4:*"The rock represents life itself. The bottom of the rock is like when you were born. Climbing the rock is like going through life. The crux is the biggest challenge in life. The other little difficult areas on the rock are like little challenges in life. The belayer is someone or something that helps you get through the challenges in life. The different climbing routes are like different paths you can take in life. Some are more difficult than others, but the more difficult ones can lead to success. The rope is something in life that can be like a guide to the end of life as well as something that keeps you safe from harm and injury."* LEQ Factors: Achievement Motivation and Emotional Control.

Scholarship of Teaching #5:*"When rock climbing, and the rock is slippery and you have no where to put your feet you might slip, but you have to get right back up. In*

life, you may go through a rough spot and feel like you are falling and you can't get up. That's what your friends are for, when you are falling they will be there to catch you. Your friend in climbing is your belayer." LEQ Factors: Emotional Control.

Scholarship of Teaching #6: *"Rock climbing is a lot like life because the path to success is not straight, paved and wide. There are many obstacles and it is easy to get overwhelmed, lose your motivation and give up. This is where your friends and family come into play. If you are struggling to find out who you are inside, it may be a good idea to try rock climbing. Maybe you'll understand life just a little bit more."* LEQ Factors: Emotional Control.

Results of EA Student Writing Analysis

Considering all 39 papers, there were 23 instances of prose identified that related to one of the four Scholarship areas. Twenty-three examples of Boyer's four forms of Scholarship were found in papers authored by 11 students. Nine students did *not* have passages that connected with any of Boyer's four forms of Scholarship. Each of the 23 instances is posted above with commentary that demonstrates precisely how each relates to the particular Scholarship area. Table 1 summarizes the data.

Table 1

Summary of Student Writing Examples of Scholarship Areas

Scholarship Areas	Number of Examples	Percentage of Total
Scholarship of Discovery	6	26%
Scholarship of Integration	2	9%
Scholarship of Application	9	39%
Scholarship of Teaching	6	26%
Total	23	100%

Note. N = 39 papers.

For some student papers, more than one connection was identified as relating to the Scholarship areas. In other EA student papers, there were zero connections to the Scholarship areas. Overall, 11 of the 20, or 55% of the EA students made at least one connection to the Scholarship areas. Table 2 below shows these results. Eight EA students logged 87% of the connections to an area of Scholarship. Nine EA students did *not* have passages that were connected with any of Boyer's four forms of Scholarship. Eight EA students accounted for 84.6% of the passages connected with Scholarship areas.

Table 2

EA Writing Connected with an Area of Scholarship

Number of Connections	Number of EA Students	Percentage of Total
Zero Connections	8	0.0%
One Connection	3	13.0%
Two Connections	5	43.5%
Three Connections	2	26.1%
Four Connections	1	17.4%
Total Students	11	100.0%

Note. Twenty-three passages were identified that were connected with Boyer's four forms of Scholarship in papers authored by eleven students.

Conclusions: Using Forms of Scholarship to Analyze EA Students' Writing

The data above suggests that some students did not make a connection with any of the four Scholarship areas. The student writing that did not contain connections was largely positive, but lacked the depth of the more "mature" student writing. Despite the writing prompt, which encouraged students to "delve deeply (explore) just two or three topics". Some students simply devised a "cheerful laundry list" of the day's event. For example, one student listed nine events during the 24-Hour Wilderness Experience that he "enjoyed, liked or loved". Another student composed a similar list with twelve events. All the writing was appreciated and accepted, but clearly only some of the student writing reveals information that may be useful toward the development and improvement of the EA curriculum.

Of the four Scholarship areas, the Scholarship of Application accounted for the highest percentage identified, 39% of the instances from EA student writing. The Scholarship of Application is using learned ideas to solve real-life problems. One of the goals of the EA program is to empower students with application skills for employability. The ideas that outline the Scholarship of Application by Boyer inspire EA students and staff to make connections between the skills and knowledge learned in class and the real world. The students were confronted with many real challenges such as wet, cold and snowy weather. Other challenges such as "devise a swing in the woods" were admittedly contrived, yet so enjoyable that the "fun factor" provided the motivation. The data suggests that application or solving real world problems might be the strongest Scholarship area of the EA curriculum.

The Scholarship of Discovery netted 26% of instances of prose relating to the Scholarship areas. The Scholarship of Discovery is the concept of students finding out and sharing new ideas plus a very important caveat according to Boyer; the discoveries are to be shared with others. In this course, the mechanism for discovery is often through observation and not as likely through experimental research. Eighth grade students figure something out and often "announce it loudly".

The Scholarship of Teaching also showed 26% of the instances identified. Recall that the Scholarship of Teaching is "scholarly teaching that is shared with peers". Middle school students, of course, are not concerned with publication. These students identify with the Scholarship of Teaching in a broader sense. For example, this 13-year-old's passage reveals a deep, philosophic tone: *"Rock climbing is a lot like life because the*

path to success is not straight, paved and wide. There are many obstacles and it is easy to get overwhelmed, lose your motivation and give up."

The Scholarship of Integration was the lowest of the four categories with only 9% of the prose instances relating to this Scholarship area. "The Scholarship of Integration is about making connections across the disciplines, placing the specialties in larger context, illuminating data in a revealing way, often educating non-specialists (Boyer, 1990, p. 18).

Table 4 reveals that eight out of the twenty students accounted for 87% of the instances that connected to the Scholarship areas.

Using LEQ Factors to Analyze EA Students' Writing

Table 3 Has LEQ Factors and Descriptions established by Neill (2007). The LEQ Factors are used by Neill and other researchers in pre- and post-experience surveys. In addition to Boyer's Scholarship areas, the author uses the same students' passages and analyzes this writing using the LEQ Factors and Descriptions.

Table 3

LEQ Factors and Descriptions

LEQ Factors	Descriptions
Time Management	The extent that an individual perceives that he/she makes optimum use of time.
Social Competence	The degree of personal confidence and self-perceived ability in social interactions.
Achievement Motivation	The extent to which the individual is motivated to achieve excellence and put the required effort into action to attain excellence.
Active Initiative	The extent to which the individual likes to initiate action in new situations.
Intellectual Flexibility	The extent to which the individual perceives he/she can adapt his/her thinking and accommodate new information from changing conditions and different perspectives.
Task Leadership	The extent to which the individual perceives he/she can lead other people effectively when a task needs to be done and productivity is the primary requirement.
Emotional Control	The extent to which the individual perceives he/she maintains emotional control when he/she is faced with potentially stressful situations.
Self-confidence	The degree of confidence the individual has in his/her abilities and the success of their actions.
Environmental Stewardship	A sense of responsibility for quality of surrounding environment.

Note. One or more of the LEQ Factors above were identified in the 23 samples of EA students' writing that were also utilized in the Scholarship areas analysis.

Table 4 below summarizes the EA students' writing connected with the nine LEQ Factors. The method was a qualitative analysis by the author.

Table 4

LEQ Factors and Number of Examples Identified in EA Students' Writing

LEQ Factors	Number of Examples	Percentage of Total
Time Management	1	2.6%
Social Competence	3	7.9%
Achievement Motivation	5	13.2%
Active Initiative	4	10.5%
Intellectual Flexibility	9	23.7%
Task Leadership	5	13.2%
Emotional Control	5	13.2%
Self Confidence	4	10.5%
Environmental Stewardship	2	5.3%
Total LEQ Factors Identified	38	100.0%

Note. The LEQ factors were identified in the 23 samples of EA students' writing that were utilized in the Scholarship analysis.

Conclusions: Using LEQ Factors to Analyze EA Students' Writing

The leading LEQ Factor for EA student writing was Intellectual Flexibility. This is actually accommodating new information, or what many people may call "learning". Intellectual Flexibility was identified, individually by the author, nine times in the 23 passages. Of the 38 LEQ Factors identified, Intellectual Flexibility appeared 23.7% of the

time. This suggests that “learning new things” was strongly reflected in the EA student passages. “Learning new things” is the job of most middle school students. Most other categories such as: Social Competence, Achievement Motivation, Active Initiative, Task Leadership, Emotional Control and Self Confidence were identified with a fairly even distribution of 3, 4 or 5 instances. The lowest category was Time Management, identified only once.

Chapter 5: Discussion and Concluding Remarks

Chapter 5 has a summary of the implications for EA student writing on the EA curriculum and concludes with a section on the strengths and weaknesses in specific areas of the curriculum. Next, is a discussion of how the EA program spans the gap that exists in the literature about outdoor/environmental education. Also in this chapter is a discussion comparing other outdoor programs to the EA program. Next, an argument for research as a tool to secure funding is presented. Finally, an overview of the appeal for the EA program is offered.

EA Student Writing: Implications for the EA Curriculum

The results in Chapter 4 above indicate some strong areas and some areas where the EA curriculum could change and improve. Even though there has not been a complete analysis of the EA curriculum, the following paragraphs include a discussion of the strongest areas of the EA curriculum and areas that may require attention using the lenses of the Scholarship areas and the LEQ Factors:

Some EA students' writing seems to indicate that some EA students are "learning new things", as indicated by the highest LEQ Factor, Intellectual Flexibility, with nine instances comprising 23.7% of the passages identified. Unfortunately, this is very general category and it does not point toward individual EA activities. Nevertheless, like having a healthy heart, this positive area supports the whole body of the EA curriculum.

Some EA students seem to be able to apply what they are learning to new situations. Some EA students' writing indicates that nine instances, comprising 39% of the passages identified were associated with the Scholarship of Application. Pinpointing the exact activities in the EA curriculum that are connected is not possible at this time,

but it does provide a reason and framework for further study. Taken together, the strongest areas suggest that some EA students learn new things (Intellectual Flexibility) and some EA students are able to apply the things they learn to real life situations (Scholarship of Application).

There were nine of the twenty EA students or 45% that did not write a qualifying passage for one of Boyer's Scholarship areas. As a result, these EA students were also not qualified for evaluation using the LEQ Factors. One goal may be to get more students into the "ballpark". To accomplish this goal, clarification of the writing prompts may be helpful. Also, utilizing every possible teaching/learning situation with full cognition of Boyer's Scholarship areas may serve to improve EA students' connections with the Scholarship "platform".

Some EA students' writing indicates that some EA students are not well connected with the Scholarship of Integration. Only two EA students (9%) connected to the Scholarship of Integration. This area requires melding ideas from different disciplines and other higher-level skills. These skills may be beyond the scope of many of the 13-14 year old EA students. As a teacher of young teens, it is not surprising that that this area is the lowest. In the author's teaching experience, these findings are consistent with the maturity level of a typical 13-14-year-old eighth grade students, who tend to learn quickly, apply what they know, and interpret new observations and experiences literally.

Placing specific observations in a larger context requires maturity, which will come with years and should not be considered a weakness. Knowing this, teaching strategies can be employed that will encourage students to take note of connections with other disciplines. Teacher awareness of the environment can often be implemented via

guided inquiry. This is standard practice for many aspects of both the EA Rock Climbing Trip and the EA 24-Hour Wilderness Experience. One way to improve curriculum and encourage students' awareness of their environment is to increase the number of guided inquiry "teaching moments".

For example, on the summit of Hogsback Mountain, students in the past have enjoyed the climb, marveled at the views and even appreciated the rock type (granite). To date, no student has yet appreciated (and voiced) the obvious glacial striations. There is no reason to keep this a secret. Perhaps through guided inquiry, characteristics of the rock can be "discovered" and categorized as a correlation to Earth science. This may be the scenario, "Nice job climbing. After you catch your breath, you may want to investigate the massive rock on which you are now sitting. One clue: It was changed about 11,000 years ago. What happened? Turn to your tent partners and explain the story."

EA students' writing indicates that most EA students are not well connected with two LEQ Factors in particular. The lowest LEQ Factor, Time Management, showed only one instance comprising 2.6% of the passages identified. As mentioned in the results section above, this may be associated with the fact that parents, teachers and other adults manage young teens' time. Time Management is often a low priority at school for some students. In the woods, without clocks and bells, some students are less aware of time. At this age level, time is often managed for students by parents, teachers and administrators. Tracking college students in the area of Time Management may offer an interesting contrast when compared to middle school students. This particular factor may remain a low priority because it is largely unattainable and likely to self-repair as the student ages and matures.

One low LEQ Factor, Environmental Stewardship, is of particular concern. This factor accounted for only two passages cited or 5.3% of the passages identified. Environmental Stewardship was not on the minds of most EA students as they were writing. It is clear where to start in the quest to bolster the activities in the EA course! An entire unit in the EA course curriculum is devoted to "Nature Interpretation" which would correlate well with Environmental Stewardship. This area is a concern for the teacher and raises some questions. The EA students learn *about* nature and the environment, but are they developing the positive *attitudes* about nature that are intended in the course? Do students' parents hold values about the environment that counter the values of those that are taught and nurtured in the EA course? Are there ways to compromise? For example, there are many hunters in the community, the attitude (among many hunters) concerning predators (mostly wolves and coyotes) borders on hunting to extirpation. Are EA students hearing two opposing messages? One goal is to have students think *independently* (not necessarily differently) from their parents at this level.

The four Scholarship areas are not mentioned or promoted during the course. Should the four Scholarship areas be used as a reference point during activities? In other words, should the four Scholarship areas be infused into the activities of the curriculum? There are other possibilities that may point to the reason that some EA students are not connecting the for Scholarship areas. Do all of the EA students understand the writing prompt? Students are often excited to write about the experience and seem to enjoy making lists of favorite activities and favorite moments.

Do portions of the EA curriculum lack strong connections to the Scholarship areas? The teacher has identified a few activities in the curriculum that are connected to

certain Scholarship areas and certain LEQ Factors, but most activities in the EA curriculum have not yet been analyzed in this way. On a practical note, the activities are analyzed first for their ability to illustrate environmental concepts. Safety factors and the "Fun Factor" have also been higher priorities for the teacher's analysis than the four Scholarship areas or the nine LEQ Factors. A full analysis of the EA curriculum considering the Scholarship areas and LEQ Factors may be considered for future study.

Bridging Gaps

In the EA course, students often note, "Everything seems to fit together." The "fit" of all the components in the EA program is due to the program's intended design. The fit is not accidental. In Appendix D, is the description of the EA course, units 1-6. The thoroughness in the description of the course is a direct response to a request from researcher, Dr. James Neill. Neill (2008) suggested that a description of the curriculum methodology be included to facilitate complete analysis. As the EA curriculum was forming, policies for student safety developed. The information in Appendices E, F, G, and H refer largely to safety concerns and may be of some interest to the practitioner that may be planning an outdoor program. Appendix I is a list of terms that are used in outdoor education. The terms are well known to EA students and appear frequently in EA student writing.

A gap in the literature seems to exist. Descriptions of courses similar to that of EA were not found in the literature. In the future, the opportunity to compare methodologies and adventure/environmental activities with other programs in the Great Lakes region and worldwide is welcomed. In fact, the EA program welcomes visitation by other educators to experience the program. At this point, six teachers (some from local and

distant districts) plus dozens of college students have 'observed' the 24-Hour Wilderness Experience by participating.

Neill is clear his conviction, (Neill, 2008), "Outdoor education programming methods needs to receive greater attention in future research" (Future Research Should Describe the Program's Methods in More Detail section, para. 3). The explanation of the EA lessons and methodology in this paper answered Neill's request.

Adventure/environmental educators seem to fall into two categories that can, at times, be mutually exclusive. Either the educator is a practitioner and is up to her/his elbows in the bog with the students or she/he is techno-geek, crunching data on the computer. This paper is an attempt to bridge this chasm. The author is the teacher, the hands-on practitioner and also the researcher.

LEQ Survey Plans

To conduct a quantitative study of the EA program, a pre-experience and post-experience survey questionnaire is being planned. Neill developed the LEQ survey for evaluating outdoor adventure programs (Wang, Neill, Liu, Tan, Koh & Ee, 2008, p. 24). Neill allows free use of the LEQ with acknowledgement. The LEQ may be an effective method for quantitative analysis of the EA program. The "Life Effectiveness Questionnaire" or LEQ is a well-known and widely used tool for assessing personal development outcomes associated with outdoor/adventure education programs.

Using the LEQ survey, students circle their choice on this eight-point Likert rating scale from False (Not Like Me) to True (Like Me). Typically, one-group, pre-post research designs have been used (Neill, 2007). Refer to Appendix B to view the actual survey form that may be used for future study. Note that the LEQ would be modified to

include the category Environmental Stewardship. Neill's website specifies that this type of modification is acceptable. The environmental questions in this category are from the 'Environmental Objectives-Youth at Risk' version of the LEQ by Dr. Neill. The format is pre- and post-experience survey.

The intention in the future is to first analyze the EA activities and identify how they match LEQ Factors. Second, utilize the LEQ survey to analyze the EA curriculum. Third, make changes to the EA curriculum and continue the cycle of reanalysis.

Comparing EA to Other Outdoor Education Programs

While the EA program is unique, several outdoor education programs have some common components to the EA program. Jonathon Orelove (1995) outlines a 'theoretical framework for a curriculum' on a summer stream study for young teens in Olympia, Washington. This program was in the proposal stage when Orelove was writing. He describes activities that he has researched but has never actually led with students. Distancing himself further, he has no intention of leading students in the program if the funding (the actual impetus for the paper) is realized. Mr. Orelove's work is extensive and seems well organized but does not inspire due to the several degrees of separation. In contrast, the EA program has been up and running for several years. Ongoing student-centered empirical research in the EA program is needed.

Funding: Another Reason for Research

Aside from curriculum development, another reason for verifying data obtained through a program such as Environmental Adventures is future funding for the EA program. Considering the U.S., State of Michigan and local school district economies, funding for environmental programs may be drying-up due to budget constraints. To

guard against ‘premature evaporation’, adventure/environmental educators should provide data on their existing programs. Paucity of information may give hesitant administrators cause to withhold the purse. Administrators seem to like pointing to data. Data is a “talking point” for the defense of an outdoor/environmental program. So, aside from improvement of a program, data may be used for program preservation. Show administrators that the program is largely self-supporting. For example, the Environmental Adventures program has been largely funded by grants written by the teacher. Most of these grants are for $50-$200 from local contributors. The local grantors have local people, including school district administrators, on their boards. In a rural community such as Negaunee, Michigan, the circle is small.

Program accountability, is paramount in the minds of many administrators. Using the data, show administrators that your program is retaining students. Show administrators that parents are selecting this school district because this outdoor/environmental course is offered. Encourage administrators to look for correlations. For example, administrators may see a connection between the confidence that students display (gained from a course such as EA) and their performance on standardized tests. Testing ability is typically a point that administrators will rally. Do not hide your outdoor program in the woods. The principal at Negaunee Middle School is well informed, and this may be one reason that he is supportive of the EA program. Get your administrators on your team.

What if we could actually get the administrators to run the numbers? In Traverse City, Michigan, a program administrator evaluated an adventure/environmental program for emotionally impaired youth. His data (lots of it) is well displayed and especially well

articulated and the data clearly supports the program. He balances all the 'white bread' with acknowledgement of complaints about the behaviors of certain students that have had a negative impact on other students. He makes a convincing case for continued funding and barters for additional programming for the emotionally impaired youth and their teachers that he serves (Freed, 1991). This spirit of cooperation is inspiring. This administrator is a team player.

Another notable adventure program is lead by Michael Gass of the University of New Hampshire (Gass, 1987). The program functioned partly to retain students, bring about positive outlook on the institution, establish lasting friendships, etc. The program at University of New Hampshire has evolved and is thriving. Its new moniker is (we certainly knew an acronym would be in use by now) UNH PrOVES or Pre-Orientation Volunteer Experience in Service. The program invites first-year students to volunteer and gain leadership skills during the week before fall semester begins. Northern Michigan University has many orientation programs. Given the abundant wilderness and natural beauty of the central Upper Peninsula of Michigan, perhaps a wilderness skills program may assist NMU in a similar manner that UNH PrOVES assists at the University of New Hampshire.

Similar to students at the University of New Hampshire, the students at Negaunee Middle School often proclaim that Environmental Adventures is their favorite course and "it's the reason that I came to school today". It is unknown if the EA course has curbed attrition rates, middle-school dropouts are uncommon. However, an informal inventory of parents imbues that the Environmental Adventures course has figured positively in their school-of-choice decision.

Environmental Adventures Course Appeals to Many

The extensive outdoor component of the EA course seems to appeal to many students, and to their parents. Dr. Richard Louv has brought the concern of “nature deficit disorder” to the forefront and courses such as EA may serve to address those concerns. Louv says, "Now, my tree-climbing days long behind me, I often think about the lasting value of those early, deliciously idle days. I have come to appreciate the long view afforded by those treetops. The woods were my Ritalin. Nature calmed me, focused me, and yet excited my senses” (Louv, 2006, p. 10). Gathering and analyzing data on the EA course to show that it actually has calming and focusing effects on students is a project for future consideration. For now, let us conclude that the EA course is a step in the direction that Louv affirms.

The challenge of wilderness survival or simply outdoor exposure during the EA course seems to have sparked many instances of lasting friendships, sometimes from diverse camps, perhaps due to the common “hardship” endured by students. There is something about withstanding low wind-chill values, finding geocaches, waking up to find frozen boots in one’s tent and belaying a climber that helps form bonds with people at nearly any age. Have EA students developed positive attitudes toward their institution: The Negaunee Middle School? This question has not been fully documented. However, after the 24-Hour Wilderness Experience, “Survivor” T-shirts emblazoned with Negaunee Middle School and our Environmental Adventures class logo are popular with the student participants. Apparently, some affinity with the institution and with the Environmental Adventures course exists.

Special needs students are welcome in the EA course and many have excelled in this program. Several students have noted that the Environmental Adventures course is their favorite class. The highest praise a teacher can hope to hear from a student (about a lesson plan) may sound like this: *"We get to look for goldenrod galls today."* Or, *"We got to eat larva in class yesterday." Or, "We got to cook on a camp stove in class last hour."* One student noted, that if you don't do your homework (prepare your clothes and food for the trip) you might not (literally) survive. Staying alive is an excellent reason to prepare for class. He may have been a bit dramatic (as middle school students can be at times). On all outings, especially during the winter, safety is our number one concern. Students learn through daily recognize that winter camping in the U.P. is not a walk in the park, and they approach discussion topics such as frostbite and hypothermia quite seriously.

The extensive hands-on component in this course is very attractive to many students. Some reluctant learners and students who have truancy concerns have been lured to attend school daily with this course as a reward. The students engage in the course wholeheartedly partly because this course does not resemble traditional classes. For high achievers, the course addresses many National Science Content Expectations and Social Studies Content Expectations. From a teacher's viewpoint, we feel fortunate to have won the trust of many families and have inspired a diverse set of students. Successful "graduates" of this course include students that were: learning disabled, drama students, skate boarders, hearing impaired, athletically inclined, emotionally impaired, valedictorians, cheerleaders, vision impaired, good readers, struggling readers, forensics team members, salutatorians, physically disabled, and students with poor spelling. The

list goes on to include nearly every type of student including a blind young man that was able to attend all of the EA classes including the 24-Hour Wilderness Experience. He was pleased that the snow was deep in the woods that day because he found it easier to navigate the trail by "feeling the edges" with the snowshoes that were strapped to his feet.

Former students and parents make contact with the EA program regularly with updates. One former student, now a local financial advisor, pointed out that despite some great courses in high school and college, he found Environmental Adventures the most memorable. *"Although building a fire with flint and steel is not directly linked to the financial world, the confidence that those activities instilled in me have made a positive difference in my career."* Making a positive difference in the lives of young people is the goal of the EA program.

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Appendix A: IRB Approval

APPENDIX A

Northern Michigan University

College of Graduate Studies
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Memorandum

February 21, 2012

TO: Chuck Delpier
Education Department

FROM: Brian Cherry, Ph.D.
Dean of Graduate Education & Research

SUBJECT: IRB Proposal HS12-450
"Using Middle School Students' Science Essays to Investigate Effects of Environmental Adventures Curricula on Discovery"

Your proposal "Using Middle School Students' Science Essays to Investigate Effects of Environmental Adventures Curricula on Discovery" has been approved under the administrative review process. Please include your proposal number on all research materials and on any correspondence regarding this project.

Any changes or revisions to your approved research plan must be approved by the IRB prior to implementation.

kjm

Appendix B: LEQ Survey

LEQ-H©

PLEASE DO NOT TURN OVER YET. PLEASE READ THESE INSTRUCTIONS

This is a chance for you to consider how you think and feel about yourself in some ways. This is not a test - there are no right or wrong answers, and everyone will have different responses. It is important that you give your own views and that you be honest in your answers and do not talk to others while you think about your answers. They will be used only for research purposes and will in no way be used to refer to you as an individual at any time.

Over the page are a number of statements that are more or less true (that is like you) or more or less false (that is unlike you). Please use the eight point scale to indicate how true (like you) or how false (unlike you), each statement is as a description of you. Answer the statements as you feel now, even if you have felt differently at some other time in your life. Please do not leave any statements blank.

FALSE							TRUE
NOT LIKE ME							LIKE ME
1	2	3	4	5	6	7	8
This statement doesn't describe me at all; it isn't like me at all		More false than true		More true than false		This statement describes me very well; it is very much like me.	

SOME EXAMPLES

A. I am a fast thinker. 1 2 3 4 5 6 7 8
(The 6 has been circled because the person answering believes the statement "I am a fast thinker" is sometimes true. That is, the statement is sometimes like him/her.)

B. I am a good storyteller. 1 2 3 4 5 6 7 8
(The 2 has been circled because the person answering believes that the statement is mostly false as far as he/she is concerned. That is, he/she feels he/she does not tell good stories.)

C I enjoy working on puzzles. 1 2 3 4 5 6 7 8
(The 8 has been circled because the person really enjoys working on puzzles a great deal, therefore the statement is definitely true about him/her.)

** ARE YOU SURE THAT YOU KNOW WHAT TO DO? **

If yes, then please turn the page over, write your name, today's date, and circle your answers for all the statements.

If still unsure about what to do, ASK FOR HELP. PLEASE GIVE HONEST, PRIVATE ANSWERS

Name _____ Date _____ Period ____ Male or Female

STATEMENT

FALSE TRUE

not like me like me

01. I plan and use my time efficiently. 1 2 3 4 5 6 7 8

02. I am successful in social situations. 1 2 3 4 5 6 7 8

03. When working on a project, I do my best to get the details right. 1 2 3 4 5 6 7 8

04. I change my thinking or opinions easily if there is a better idea. 1 2 3 4 5 6 7 8

05. I can get people to work for me. 1 2 3 4 5 6 7 8

05.5 I think conserving natural resources is necessary. 1 2 3 4 5 6 7 8

06. I can stay calm in stressful situations. 1 2 3 4 5 6 7 8

07. I like to be busy and actively involved in things. 1 2 3 4 5 6 7 8

08. I know I have the ability to do anything I want to do. 1 2 3 4 5 6 7 8

09. I do not waste time. 1 2 3 4 5 6 7 8

10. I am competent in social situations. 1 2 3 4 5 6 7 8

10.5 I believe humans must live in harmony
with nature in order to survive. 1 2 3 4 5 6 7 8

11. I try to get the best results when I do things. 1 2 3 4 5 6 7 8

12. I am open to new ideas. 1 2 3 4 5 6 7 8

13. I am a good leader when a task needs to be done. 1 2 3 4 5 6 7 8

14. I stay calm and overcome anxiety in new or changing situations. 1 2 3 4 5 6 7 8

15. I like to be active and energetic. 1 2 3 4 5 6 7 8

15.5 Humans have the right to modify the natural environment
to suit their needs 1 2 3 4 5 6 7 8

16. When I apply myself to something I am confident I will succeed. 1 2 3 4 5 6 7 8

17. I manage the way I use my time well. 1 2 3 4 5 6 7 8

18. I communicate well with people. 1 2 3 4 5 6 7 8

19. I try to do the best that I possibly can. 1 2 3 4 5 6 7 8

20. I am adaptable and flexible in my thinking and ideas. 1 2 3 4 5 6 7 8

20.5 I believe humans have a responsibility to solve
environmental problems. 1 2 3 4 5 6 7 8

21. As a leader I motivate other people well when
tasks need to be done. 1 2 3 4 5 6 7 8

22. I stay calm when things go wrong. 1 2 3 4 5 6 7 8

23. I like to be an active, ‘get into it’ person. 1 2 3 4 5 6 7 8

24. I believe I can do it. 1 2 3 4 5 6 7 8

24.5 I am concerned about environmental issues. 1 2 3 4 5 6 7 8

Appendix C: No Child Left Indoors

Anna Dravland EN111 9/24/11 Essay #2 Profile

No Child Left Indoors

This simple set of words translates to a style of teaching and learning that is missing in most of our education curriculum. Learning in, and about, the outdoors. In a world filled with ipads for fourth graders, computers in every classroom, and eight hours a day of sitting on our rumps, it seems like a foreign concept. In a very small town, in a very small school, you will find a class and a teacher that embodies learning and activity in the most effective way I have been blessed to experience.

It was 1995, I was a bouncy little sixth grader at Negaunee Middle School with zero ability to sit still. Shortly into the school year we were informed we would be joining Mr. Chuck Delpier for a new class a few days a week: Environmental Adventures (or E.A, as I will refer to it).

On the first day of class, I entered the room with a sincere curiosity. I was struck by a flurry of movement immediately. This new teacher zoomed around the classroom with uncontained energy and enthusiasm. With bright eyes and a sincere smile, his gusto was completely contagious. It did not take long for this to become a favorite for all the students. His lessons included a hike to Hogsback, learning to make fire without fire, putting together a skit to promote more peaceful animal/human existence, and an overnight camping trip. The class had been an instant success with students, parents, and locals. A front-page article was written in The Mining Journal highlighting this innovative learning program.

The following year offered a full year class of E.A. There was one lesson in particular I

have remembered with amusement and appreciation. We came into class to find flyers strewn all over the classroom. The overhead projector confirmed the information on the flyers: Six Flags theme park to be built over Hogsback Mountain. With his usual fervor Mr. Delpier looked sincerely concerned: “Okay, class, what do you think we should do about this? Do you support the decision to build an amusement park?”

Now, picture a classroom full of seventh graders processing that information. We did not have a theme park within 300 miles of us. With barely a moment passing, the entire class began planning our petition efforts. Under no circumstances would they tear apart our mountain to build a theme park. Mr. Delpier waited about 15 minutes into our heated discussion to inform us that he had lied. There were no plans to build a Six Flags. The response was a testament to the success of his class. A group of kids had chosen nature over entertainment.

Fast forward to six months ago, imagine my surprise to find myself enjoying karaoke in the same jovial atmosphere as my former teacher. Same full throttle energy, same sincere smile. I could not resist going and saying hello. In a slightly tipsy state, I even began listing off remembered lessons. Reciting what I learned may have been overkill, but I was compelled to share my gratitude and appreciation. Shortly after, he invited me to help chaperone his current E.A class on their rock climbing adventure. The class had been evolving and growing for a decade and a half. Mr. Delpier continued his education at Northern Michigan University and is currently getting his masters in Science Education.

We kept in touch and it worked out perfectly to go and assist with their endeavor.

Flashbacks to life as a pre-teen aside, there is always such a strange feeling of

familiar unfamiliarity when you walk back into a world from fifteen years ago. His classroom was in a different place, but the set-up triggered memories. Science and nature books of all kinds filled the shelves. Beakers, scales, and plants spread throughout. Tables full of various rock climbing equipment tossed on wooden work stations were prepared to be packed. Several large, heavy-duty backpacks sat nearby. They have significantly more equipment than was available before. This little class had grown and expanded its reach in doing so. As my mind settled on the memories, I was brought to the thirty or so young faces around me. They were familiar, too. I knew all of them, was them. They were separated into obvious cliques for their adolescent comfort in numbers. It struck me as sweet and young that the boys and girls still seemed to mingle separately. It was a reminder of how new they are to life and how impressionable.

My position was of an observer that day. What an insightful education. They were clearly an energetic and easily distracted bunch. Yet, they listened and performed flawlessly. Without question, they all knew every step of every action. The steps were completed with an ease that only comes through training and experience. Mr. Delpier did not have to tell them what they needed to do. His reminders were of the naturalist kind. “Pick up your wrappers… Do not damage trees or land deliberately… If it came with us, it leaves with us.”

The most significant thing I was blown away by was their joy. Here they were, outside on a beautiful day climbing rocks: Outside learning how to respect and enjoy some good old-fashioned activity, and together to meet a shared goal. This class and this teacher sparked a lifelong love and respect for all things outdoors. Sixteen years later, he is still spreading that knowledge and passion to an otherwise technology overloaded

youth. He has given them the opportunity to embrace the beauty and natural wonder that is so often taken for granted. Words are difficult to express what this class does so I will surrender to the words of Albert Einstein:

> *"The most beautiful and most profound emotion that we can experience is the sensation of the mystical. It is the sower of all true science. He to whom this emotion is a stranger, who can no longer stand in rapt awe, is as good as dead. That deeply emotional conviction of the presence of a superior reasoning power which is revealed in the incomprehensible universe forms my idea of God."*
>
> *This quote represents the feeling of standing on the top of a mountain gazing at the never ending skyline filled with trees, clouds, water, and the sun. Feeling that moment of "Wow, I can't believe this is even possible." It is possible, we just need to open our eyes and go outside.*

Appendix D: A Description of the Six Units in the EA Course

The Environmental Adventures curriculum is a one semester elective at Negaunee Middle School. Dr. James Neill advises, "future research should describe the programs' methods in more detail" (Neill, 2008). Teachers may use any portion of the EA curriculum. The research in the body of this paper is based on the EA curriculum below. The EA program has six units:

EA Unit One: Rock Climbing is a Lot Like Life, Isn't It?

EA Unit Two: Land Navigation

EA Unit Three: Nature Interpretation

EA Unit Four: Survival Skills

EA Unit Five: Countdown. Four Weeks Until the 24-Hour Wilderness Experience.

EA Unit Six: The 24-Hour Wilderness Experience

Aside from the Rock Climbing Unit, all of the subsequent units build on the skills required for The 24-Hour Wilderness Experience. Of course, teachers and their students may attempt individual lessons. However, the lessons were clearly designed with an end goal, surviving twenty-four hours in Michigan's Upper Peninsula backcountry. The units reflect hundreds of hours of writing, piloting, rewriting and honing. The EA units and lessons herein are shared openly and are offered for peer review.

EA Unit One: Rock Climbing is a Lot Like Life, Isn't It?

Our first unit starts by asking students to compare the activity of rock climbing to life. At first, few students see any connection. Students are briefed that an initial salient assignment to write about the comparison of rock climbing and life is in the near future. The looming assignment stimulates communication. Students ask questions about just

how this activity may resemble life, or resemble one's life. The seminal issue, from the onset: Are students asking themselves questions?

Knots and harnesses. Students learn by doing. The students practice the "figure-eight-follow-through knot". The knot is the only knot recognized worldwide as a tie-in knot that reliably supports a human for Fifth Class Climbing or, "Technical Rock Climbing". Of course, we make knot-learning fun. We make goofy racecar sounds as the rope-end "zooms" around the speedway, eventually completing its course. The figure-eight-follow-through knot is easily recognizable and foolproof, yet is easily untied when that is the intention. Next, students don harnesses and ask others to double-check the harness buckles for safety. Each harness style has an approved triple-pass belt buckle that prevents slippage. A "wardrobe malfunction" while climbing is to be prevented. The check, double-check, triple-check with the instructor system instills confidence and manifests trust among the students.

The safety system. The students are introduced to the vertical safety system by first having them practice horizontally. We assemble all the components: the anchor (a stout tree), the one-inch tubular webbing that attaches to the tree (and could support the weight of a mid-sized car), carabiners (metal snap-links), and the multi-stranded climbing rope. Yes, the equipment is laid out, flat on the playground. This technique raises the level of confidence for many students. The safety system for rock climbing is not a mystery or trick, the safety system is a set of procedures.

Belaying the climber. Next, we duplicate the entire horizontal safety system and mount the system vertically in a familiar, sturdy tree near our school. Students learn to belay the climber. This component is essential for safe climbing. The meaning of "belay"

is literally “to stop”. So, the belayer is the person that stops the climber from hitting the ground. The belayer employs a device that applies friction to the rope. The friction is actually in three places, realizing the role of the specialized equipment allows the smallest person in the class to easily belay the largest climber (as long as the belayer is firmly secured to the ground, or a tree.) Belaying is not a mystery; a diminutive person’s ability to hold a person that is substantially larger is the result of applying a set of techniques in a thoughtful manner. Belaying relies on principles of of physics, not magic.

Tree climbing/rock climbing: Innate abilities. Climbing a tree, a rock or climbing stairs is fairly innate. As one student commented, “just go up.” Certainly a whole course could be devoted to the myriad of techniques on clever ways of ascending a rock face. “Finger-jamming, fist-jamming, toe-jamming, smearing, edging, stemming, mantling, etc.” are all worthy of a brief description but are not the point of the unit. The point is to connect on an existential level with moving vertically safely, the art of modern rock climbing, belaying and cooperating with classmates to manage fears and accomplish personal goals. The students are reminded that their grade assessment does not depend on getting to the top of the rock. Rather, they will be evaluated on their effort to learn techniques, to establish goals, build a trust network among classmates. Are these lofty objectives that step beyond content expectations? Do these objectives integrate several disciplines yet focus on the singular theme of challenge? Definitely.

Rock climbing trip. Musicians know that one builds “instrumental/muscle memory”. Belaying/muscle memory is similar and that memory comes with thoughtful repetition. The process, however, is not drudgery. On the contrary, the students are having a blast. With three ropes, three belayers, three climbers, and six students on-deck

for these positions, belaying and climbing is busy, joyful learning. After several class sessions in which students literally hang around in a tree, the belayers (each person in the class) are ready for the next challenge, real rock. Negaunee Middle School is about one mile from a natural rock outcrop known as “The Negaunee Slab”. The Slab is a ninety-foot, durable pink quartzite face that is tilted at a seventy-degree angle. The Negaunee Slab is well known to climbers in the Midwest and is frequented by local rock climbers seeking novice and/or moderate routes.

Since rock climbing is dependent on friction, a dry surface is imperative. Students are employed to consult the National Weather Service website for a forecast. Cold weather is not an issue, but moisture can postpone the event. The Negaunee Middle School principal has graciously allowed the class an all-day field experience for rock climbing. Permission slips are signed by parents for the day of off-campus learning. No need for motorized transportation, the students and their teacher walk to the site fully loaded with climbing gear: Backpacks with ropes, harnesses, carabiners, webbing and helmets. The students clearly enjoy wearing the regalia of rock climbers and parading down the main street of this quiet town. Aside from the exhibitionism, the students are carrying everything needed for the entire day, including their lunch. Inherent satisfaction and confidence comes from self-reliance. Upon arrival at Negaunee Slab, the students meet parent chaperones. The chaperones duties include assisting the teacher with student supervision and keeping track of equipment. The chaperones also have their vehicles at the site that may be used for transport in the case of an emergency. Former students that have attained at least college-age are also capable as chaperones. Several have

volunteered, and their expertise and knowledge of the goals of the program are invaluable.

Students are often in rapt awe as The Slab first comes into view. No need to ask the students questions at this point, their feelings just pour out, “Mr. Delpier, I see no way that any of us can climb the Slab.” and “Where are the handholds?” and “So, that is ninety vertical feet?” and “The Slab is awesome, way better than the tree.” After a few moments for self-expression, the students are reminded that writing about their experience is in the near future. Look for how rock climbing and the many aspects of rock climbing resemble life itself.

Orientation to a vertical world. Next is orientation to the environment that we are visiting: As a group we gaze up at the slab and note that the three principle routes, North, Middle and South. Coincidentally, the letters, N. M. S. also stand for Negaunee Middle School. Mnemonic devices help students learn and remember. As teachers, we are in the business of creating impressions, lasting memories. Students should feel free to choose any route as long as the route can be belayed safely. The entire day must be envisioned and the inevitable need for a bathroom may as well be broached at the onset. The out-of-site/away-from-the-stream cat-hole technique is accepted despite a few snickers from students. Students are also asked to pack out everything that was packed into the woods, including garbage from food wrappers, etc.

Setting up the safety system. Next, we climb to the top using a trail that ascends gradually. A student questions, that if we can reach the top on this easy trail, why even climb the steep rock? The air seems to thicken as other students respond in a scolding tone, that it is all about the challenge. At the top, we catch our breath and enjoy the view.

In the distance, students identify Negaunee Middle School, Negaunee High School, and houses from different neighborhoods. Of course, the waste rock pile from the Empire Mine is due south. Controversy in the community exists concerning this particular pile of rock. If the mine company, Cliffs Natural Resources, continues to stack waste rock atop this pile, the rock pile may become the highest point in Michigan. The students are asked to pose or "frame" a question and this theme emerges, "Do you want the highest point in our state to be a manmade place?" A discussion ensues about the mine and its place in our community. A parent adds that the land we are standing on is also owned by the mine company and has been set aside for recreation. A student asks the parent, "May I quote you in my paper?"

At ninety feet above the forest floor, students are reminded of the potential for danger. We must work to set up three routes, but work with respect of the edge and within a "Zone of Safety". These zones are clearly marked using lines in the soil, rocks, and shrubs. Chaperones help monitor three groups of students that set up the routes. First, students use lengths of webbing that have permanent loops at each end. Students use the loop-end webbing to tie a girth hitch on two sturdy trees for each route. Experienced climbers like to refer to anchors as either "bombproof" or not an anchor at all. Second, additional lengths of loop-end webbing are added until the two ends meet and they extend below any protrusions in the rock that could potentially sever the climbing rope. Next, a student must fasten a harness around their waist, wear a helmet and be secured to a robust tree. Once secured, this student moves to the edge and throws the rope down. The rope ends have been tied to short, but heavy logs designed to tumble down the slab and reach the bottom. This technique is necessary since this route (a slab) is not a perfect 90-degree

vertical drop. In many parts of the country, slabs are common and may constitute the majority of the climbable rock.

When all three routes are correctly fastened, checked, double-checked and triple-check by the teacher, the students are questioned: “We have set up three routes, are they safe? Do you feel confident in the routes from a safety standpoint?” Most students express confidence and are anxious to descend and begin belaying and climbing. The set-up consumed more than one hour. Every student was involved in hands-on and minds-on activities that were essential for the safe set-up of the routes.

The group descends on the “gradual trail” and makes final preparations for climbing and belaying. The expectation is to attempt each route several times. Each time one approaches a route; the route can be seen with fresh eyes. Challenging oneself to climb alternate routes (using a different “line in the rock”) is encouraged. Each student is also prompted to belay in each position as many times as possible and with various partner combinations. Students record each attempted climb and belay on a sheet of paper that is attached to a clipboard.

Climbing real rock. At least one chaperone monitors each belayer. The student belayers actually know more about belaying than most adults. The adults are present for encouragement and for verification of the student’s role of responsibility. Belaying and climbing commences. Students assume “coaching” roles and assume the duties of the “resident expert” immediately upon completing a route. Even climbers that do not climb as high as their intended goal assume duties as a coach. Climbers identify the “crux” or the most difficult section of each route. The crux may be the overhanging shelf on the North route or the long section without a handhold on the South route. Students mention

that life may have a crux also. Life sometimes has a “rough patch” that creates anxiety or requires special skills, new techniques, extra courage or even circumnavigation.

Take-down/clean up. When we start our take-down and clean-up procedures, first the ropes are pulled down. Next a team of students, chaperones and teacher ascend on the trail and remove the webbing anchors from the trees at the top. Another team is “policing” the area on the floor of the climb, packing equipment and patrolling for litter. Soon we were cleaned up, packed up and ready to walk back to school. The walk serves as an efficient debriefing session. The group arrives at school in time to unpack and put away gear. The school day ends and students are dismissed at the regular time with some reminders: Catch up on all the classes that were missed due to the field trip, and reflect on how rock climbing is like life. The writing assignment is due in three days. Tomorrow, the mechanics of the writing assignment will be discussed in class.

EA Unit Two: Land Navigation

In this unit, the goal is to put the tools of navigation into the hands of the students as soon as possible, which is day one. Students learn to use a magnetic compass through a series of activities:

Put “Red Fred in the shed.” Students learn the cardinal directions and the 360-degree dial by orienting their compass needle (Red Fred), the base of the compass dial (The Shed), their eyes and their entire bodies.

One technique to have students quickly learn the components of the compass and how the parts work. Students earn a nickel by placing the coin on a grassy field, dialing their compass to zero (due North), walking 20 paces and stopping. Next, add 120 degrees to the compass dial, walk another 20 paces, and stop again. Finally, add another 120

degrees (now the compass reads 240 degrees) walk another 20 paces and stop again. This time, with accuracy and some luck students will land on their nickel. Those students that need more of a challenge can try more paces: 30 paces are a bit more challenging. Another variation is to walk in a square. Start with zero, then 90, 180 and 270 degrees.

With compasses in hands, groups of students design simple polygon shapes and record the paces and the degrees at the "corners". Next, the students trade their data with other groups. The groups try to trace the polygons. At first, the skill is attempted on a grassy field. Students experience a high success rate in an open, grassy field or parking lot. The next challenge lies in hilly or wooded terrain or hilly, wooded terrain. Try it.

Introduction to topographic maps. An enlarged laminated section (not the whole thing) of a topographic map showing our school as a starting landmark, serves this activity well. Students can easily find lakes, major roads and other landmarks. With additional time and focus, students start picking out more subtle features such as the brown, concentric lines that represent elevation, also called contour lines. On the topographic maps, the students eventually locate Negaunee Slab. The contour lines at Negaunee Slab are very close together and the students recognize the map feature as a cliff, the "aha moment" resounds throughout the classroom.

Using a straightedge and a washable marker on the laminated section of the topographic map, students draw a line connecting our school icon with the icon for a popular, local restaurant, Beef-a-Roo. Next, the students lay their compass on the line and turn the dial so that the North sign points to the top of the map. (Conventional maps typically have North at the top). The bearing or degrees is shown on the index line. Admittedly, using a map and compass is old-fashioned. However understanding a map

and compass is quickly transferred to a handheld GPS, all the skills transfer very neatly, full assimilation.

After securing permission from the local police department, the students are led to the top of a hill near school. “The Bluff” provides the students with a 360-degree view of the local landscape. Using the same topographic map section, compass and straightedge, students seem to anticipate the logical next step. “We have the equipment, what shall we do here?” After a brief flurry of talking, as if choreographed, the students line up the North sign on their compass, the top of their map and square their shoulders just as the did on Day One with their compass. Two more skills to learn: “Shooting a Bearing” and “Transferring Bearings to a Topographic Map”.

Shooting a bearing. The Bluff offers a high vantage point, perfect for shooting a bearing or the sight and go technique. First, point the compass at a distant destination, put “Red Fred in the Shed”, and read (and remember) your bearing or degrees. Using this technique, one could walk a few hundred meters, or circumnavigate the planet, ending in the starting place.

Using the sight and go method, transcribe the data onto the map. All one needs to know is their starting point and the bearing. The North sign on the compass will always go with the top of the map. The students practice the skill, of course, by actually doing the procedure. Practicality is one of the problems faced. From a line of sight on the Bluff (and on the map) a straight line will take the students to Beef-A-Roo. If students could fly, a la Peter Pan, straight lines would be feasible. However, a myriad of houses and fences prevent walking straight lines in our small town. A student contributes, “In the backcountry we would need to walk around swamps, ponds, lakes. And cliffs, adds

another student, feigning a falling motion." The class laughs at the light-hearted humor and then off we go to "walk the straightest line possible" considering the urban topography. Mission accomplished: Arriving at Beef-A-Roo after no less than fourteen turns, we enjoy a cup of hot chocolate before returning to school using an alternative set of coordinates that a student devises. The student's alternate set of coordinates only required nine turns.

Handheld GPS units. Writing grants takes a bit of time and patience. After two years (and seven grants) the EA class had enough GPS units, and maps software to launch the next phase of our Land Navigation Unit. In the Environmental Adventures course, students learn to use a handheld GPS unit (Global Positioning System) that combines the age-old art of direction finding with modern satellite technology. Many careers important to the Michigan Upper Peninsula economy depend on a blend of techniques from traditional and modern disciplines. Careers that use GPS technology such as forestry, mining, wildlife management, road construction, urban planning and shipping on the Great Lakes are still mainstays of the Upper Peninsula economy. Putting this important tool in the hands of tomorrow's workforce makes sense. Admittedly, keeping some of the best and brightest students in the U.P. is a concern. Having the application on one's phone is not enough. Students need direct experience with this tool to gain comfort and confidence.

With help from students, the research concluded that the eTrex Garmin Venture HC was the best GPS for our situation. The cost of this unit has come down substantially. A comparable unit in 2006 retailed at $375. Around December 2011, an improved unit (the eTrex Garmin Venture HC) retailed for about $125. The following are some the

features that matter the most for the EA course participants: The GPS is handheld unit. The GPS is bright yellow (easy to see and find) and has a colorful screen with easy to identify icons. The “joystick” is a five-way button that allows easy access to “pages” and easy entry of coordinates and other data. This Garmin Venture HC GPS is sensitive even under the tree canopy in most U.P. forests. The unit is tough; however, we found it is not indestructible. This unit is lightweight and water resistant, too. Like most units, the Venture HC uses AA batteries that burn out quickly if the light is left on. Purchasing a class set of NiMH AA rechargeable batteries is a large initial investment, but is a good value in the long run.

Most teachers realize that if difficulty arises in class with a computer or compact disk player, teachers see no point calling in an adult specialist. Just ask, “Who understands this stuff?” and several student hands will go up. Young people are well acquainted with computers and technology. With the exposure to the handheld GPS units, students were soon teaching the adult leaders new techniques. The following activities were developed to introduce students to the host of applications using a handheld GPS

GPS PowerPoint. Using photos from field experiences and others, a PowerPoint presentation was developed called “GPS The Global Positioning System.” The presentation outlines the “Space Race” between the two superpowers, the United States and Russia. The Russians launched the first satellite, Sputnik, into space. Sputnik aroused tension and spurred the U.S. to launch a battery of rockets and satellites with varying degrees of success. The GPS unit that our EA class uses was not invented for marking and finding locations. The original use of the first GPS devices was to guide bombs and missiles by the U.S. Department of Defense with amazing sub-centimeter accuracy. EA

students learn a bit of modern history, the students realize that the U.S. Department of Defense was not eager to share this technology. Reluctantly, after scrambling the data a bit, the U.S. Department of Defense allowed private companies to utilize the technology and develop hundreds of products used for many things from navigation to fish-finding. The accuracy of a modern handheld GPS unit is not sub-centimeter, but rather within about ten meters. The U.S. Department of Defense shares the technology, yet protects the technology (through scrambling) to avoid the product being used by adversaries. Is this historical perspective critical for students to know? If not critical, it provides a springboard for new interests.

Students also learn about the existence of 24 functional satellites that orbit 11,000 miles above the Earth in a preset pattern. A signal is transmitted from a U.S. Department of Defense station on Earth (five stations worldwide). The signal is then transferred from the satellite to the receiver (the receiver is the handheld GPS unit). The handheld GPS unit uses the data received to measure the distance from at least three satellites. By measuring the time (in nanoseconds.) elapsed for the signals to travel from each of the satellites to the handheld receiver on Earth, the device determines our location and shows coordinates or our exact longitude and latitude on the planet. Should students know all about satellites, the inventions of the U.S. Department of Defense, etc.? Knowing the background information increases their confidence in the technology. Students are bombarded with “space fantasy terms” such as an alien spaceship’s “cloaking device” (which supposedly deems a space vessel invisible to invaders). More important are “Reality space terms”. These terms are critical to introduce technology that exists and ideas that are useful, leaving fantasy in Hollywood. The GPS PowerPoint provides an

overview of the many uses of GPS from marking and finding locations to tracking offenders on probation with anklets or subcutaneous chips that allow remote monitoring.

Start your GPS. Attempting to have a class of 20 students share 8 or 10 handheld GPS units was not practical. The level of understanding is greatly enhanced when each student in the class has a unit in their hands. Surely, one of the reasons for learning GPS skills is in the (unlikely) event of getting lost on our 24-Hour Wilderness trip while the partner holds the GPS unit.

The GPS units must be outdoors to "see the sky" to acquire satellites. However, starting in a classroom has many advantages. One asset of starting in the classroom is the ability to focus. Our Garmin Venture HC GPS units have dozens of features, but like all GPS units only a handful of features are useful to MARK a location and later FIND that location. It is advisable to adjust map, time and distance unit preferences as standard for the group. The time invested in the reference procedure will relieve many snags later. Going outdoors, turning on the GPS, and acquiring satellites for the first time is exciting, when students know about how and why this prodigious system operates.

Can we find a micro-cache? A micro-cache is something small. In this case, the micro-cache is a film canister filled with pennies. It is hidden in the cracks of an old retaining wall (on public property, a city sidewalk) only a few hundred feet from our starting area in the front of the school. After describing the goal, without describing its location, the EA class must settle one final account, how will the geocache be divided among participants? Eighth graders typically aspire to the adage, "I am proud that I found the geocache, the contents are not the actual goal".

Next, students are instructed to open the MARK page and enter the North and the West coordinates, and then save them. Next open the FIND page and press GO TO. The GPS is finally operational; however, there are more choices. Use the map for navigation or the electronic compass? At this stage, the students are chomping and delay is not an option. Help students surmise that the electronic compass, for this short jaunt, is the more efficient tool. (The map is useful in other situations.) The red arrow on the electronic compass will point toward the coordinates. (Recall that on a magnetic compass that the red arrow pointed north.) That is all the information the students need and the group is ready to blast off. Reminded that this first one is a whole-group activity, the 'thoroughbreds' break into a long-legged gait. "The arrow says to go over the church. I am not the Incredible Hulk." says a one young man. "I am." yells a tiny feminine voice from behind the main group. Everyone laughs. Now what? One girl notices that she has 368 feet to go. The group splits into two. Within moments the students are huddled around an imaginary point walking in circles. Soon the film canister is discovered, pennies are shared and addicted students demand another geocache.

Finding a geocache using the website: geocaching.com. Thousands of individuals, families and classes have joined geocaching.com. This free website organizes over one million geocaches worldwide. A geocache is a small treasure chest, typically well hidden in a public place and is open for any person to find. The idea is to publish the coordinates online and allow people to use their GPS and outdoor skills to find the treasure. To perpetuate the "treasure" participants are encouraged to add something if an item is taken. Some participants (often adults) simply add items to

encourage young people to participate in the activity. Toys and other small objects are the typical booty, but money, sometimes in large sums can (rarely) be found.

By typing in the zip code, our EA class found over 100 geocaches within 5 miles of our school. Maps and of course, coordinates are the key to actually locating the treasure. At school, limited by a 45 minute period, only three of the 100 geocaches were within walking distance (in both directions). After visiting those three, we wanted another challenge. Students suggested, “The most efficient form of transportation ever invented.” Yes, bicycles. Signed permission slips and helmets were required. Very few students actually had helmets that fit, but these were acquired through the local charity shops at a nominal fee. The bikes extended the range and two geocaches were nabbed in a single period. The students quickly developed the spirit of giving. That spirit set up our next challenge, placing our very own geocache.

Placing a geocache. Placing a geocache is about the spirit of giving, with no concern for receiving something in return. Ask students to look for small toys, inexpensive jewelry and other compact treasures to bring to school. Also needed is a plastic container such as a large, clean peanut butter jar. A couple of pens and a small notebook that serves as a logbook round out the supplies. The EA class makes stuffing the container a bit of a mock ceremony. The following is an excerpt from the ceremony: “I am parting with this tiny bouncy-ball, for many years, this bouncy-ball has been, well, like a bouncy-ball to me.” Next, find an interesting hiding place for the geocache. Generally, geocaches are placed on public land, thus avoiding issues with trespassing. Interestingly, many geocaches seem to be hidden in beautiful places, is this coincidental? Sometimes several geocachers that intend to place a cache are attracted to the same area.

To avoid confusion, the website, geocaching.com, will not publish caches that closer than 0.10 mile (or 161 meters) from another existing cache. The easiest way to avoid conflict is to look at a map of the area (a map with geocache icons on the geocaching.com website) and note if an existing cache is near the intended site. The map coordination is a good assignment for students and usually sparks a debate. In our case, we have placed so many caches (in the pretty places) near the school, we are forced to get more creative. Geocaches should be well hidden but not buried deep in the ground or require extraordinary means for extrication. When placing a cache, always consider the safety of those that may be retrieving that geocache. For example, one of the first EA classes that attempted to place a geocache at our school placed a cache near a train track in what seemed to be an ingenious spot. The placement of that geocache was initially accepted, but later was scrutinized and deleted due to the many complaints stemming from potential safety hazards. The geocache still exists but the coordinates are no longer published on the Internet.

Once a location has been researched, hide the cache and have several students MARK the location with their GPS unit. In this case, the coordinates will appear on the screen and students will simply need to name and save the coordinates. This technique, by the way, is the same procedure that students will later use to MARK our trail, our campsite and other landmarks on the “24-Hour Wilderness Experience”. Of course, once marked, the location can be found using a GPS unit. Students will notice that the coordinates among several students (standing in a group, or placing a geocache) are very similar but probably not exact. The next step is to average the numbers. Students may rightly proclaim, “Hey, this is suddenly math class.” Actually, only the last two or three

digits require averaging. The average for each coordinate is the number that is entered at the website. In addition, other information that the entire class can discuss and contribute to the web page prior to submission including:

1. Name of the Geocache
2. Averaged Coordinates
3. Difficulty Rating to Find the Cache
4. Terrain Difficulty Rating
5. Short Description of the Hiding Place
6. Longer, Detailed Description of the Hiding Place

The next job is to proofread and submit the information. The folks at geocaching.com review the data. Typically, in one or two days the webmasters at geocache.com approve our new geocache. Once approved, the information appears on the website and students are very proud to see it. If not approved, a reason is noted and guidelines for improvement are suggested. In the past the EA class has miscalculated distance and attempted to place a cache too close to another cache. Students were disappointed, but only few more steps were required for the class to change the location and try again for approval.

The GPS rescue activity. This activity is a life skills necessity in this age of cell phones, and a class favorite. The basic plot is outlined: The EA class sends a student "victim" outdoors with a cell phone and a GPS unit. The "victim" chooses a specific outdoor location near school and acquires satellites with their GPS and hunkers down on the ground. Next, the student uses a cell phone and calls our classroom and reports a broken leg, snakebite or other fake injury. (The most hilarious, to date, was "pregnancy". Imagine a tall, lanky boy in the class, "Hello, I want to report my coordinates and, by the way, I think I'm pregnant." After several minutes of laughter the EA class was able to note his coordinates.) In general, the "victim" reports their fake injury and reads their

coordinates aloud. The student responder, in the classroom, repeats the information aloud in short bursts, while a second responder writes the information on paper, or on the overhead projector for the entire class to observe. Using proper protocol, the responder does not hang up the phone until after the victim hangs up. Wasting no time, the students enter the coordinates into their handheld GPS unit; grab a medical "Fast Pack Kit" and hurry outdoors to acquire satellites. Next, press FIND and the search is on for the "unfortunate victim". Although the responders do not have training in first aide, the students are instructed to keep the patient calm and comfortable. All remaining group members, not directly tending the victim are coordinating a "human chain" that will help guide medical personnel to the victim.

Variations of the basic plot include sending teams of students as "victims", or requiring a designated hiding place, or having one or two responders attempt to find the whole class that has been injured in various ways in a bus/train accident. Actually, using the GPS technology to play "Hide and Seek" is another (less frightful) approach.

EA Unit Three: Nature Interpretation

The Nature Interpretation Unit is, admittedly, a plan to encourage students to appreciate nature and wildlife. The main objective is to realize that when students go out in the woods either alone, with our families or as a group, we are stepping into the "home turf "of animals. The animals are not too much different than humans. Animals seem to follow a definite plan for sleep and awake periods. Woodland animals have patterns of eating, movement, mating and giving birth. Some creatures are remarkable in their abilities. "Strategies" used by white-tailed deer to keep warm on a cold winter night, was one example that was used in EA class. Upper Peninsula students can often appreciate

cold and can revel at the fact that deer often survive more than 125 days and nights each winter that are often well below the freezing point. (Students on the January version of the "24-Hour Wilderness Experience" will have the distinct opportunity to appreciate the cold that a deer experiences.)

Hunting in Michigan. In the first semester, this unit begins just prior to the main hunting season. Both pro-hunting and anti-hunting rhetoric is presented via videos and written activities. Students need not "choose one or the other". The activities are an opportunity for students to realize that differing viewpoints exist, even within a small community. Exposure to each set of concepts is the tool. Websites and videos that are pro-hunting and anti-hunting are presented. Often the students engage in debate concerning the issues. One issue that is currently at the forefront is the presences of wolves in the Upper Peninsula. The numbers have increased from a few individuals to over 500 wolves in less than 20 years. EA student awareness of the ideas leads to application. Application with forethought leads to the Scholarship of Application. The EA students will eventually be voters and may be able to shape public policy applying what they have learned in EA class. Specifically, the EA student's knowledge of habitat and food requirements for wildlife is applicable in this situation.

Michigan mammals. Using a PowerPoint called "Michigan Mammals" which was developed from photos from a personal collection plus photos from the Internet, the goal for EA students is to learn the habitats and families of several Michigan mammals.

Tracks of mammals. Students use drawings and photos to identify tracks before venturing into the woods as a class. The assignment is to observe and interpret. We cannot be 100% sure of any track (unless the animal is also observed making that track)

deciphering as much as possible is important. Students are encouraged to hypothesize the animal and what the animal was doing or where the animal was at the time. Tracks are rarely random events. Typically, animals conduct “fairly orderly lives” within their habitat. Students have yet to see a zebra in the forests in the U.P.. Students use clues like size, gait pattern, the shape of the track, whether the claws are visible in the track, etc. to figure out tracks and then narrow down to specific families and species.

Rubber imprints are helpful tools. The EA class uses a set that features both the paw-like portion and the impression portion. First, table-tent signs on the lab stations show some major families such as Canine Family, Rodent Family, Weasel Family, etc. At random, students are handed a track and the students “shake hands” with that animal. A student cannot help but compare the size of their hand to the animal’s paw. Next, the students place the rubber track in the correct family group. The students may ask for help from classmates. Next, the entire group walks around and checks the contents of each animal family. Grouping by family is an activity that can be done once or several times.

The paw-like portion of the track makes a realistic indentation or imprint in wet mud, wet sand or snow. Use snow, if available, and placing the white stuff on large flat trays in the lab. The warmth of the room softens the snow and the imprints are very realistic. Invariably, students will demand to go out in the snow and place bear tracks near the door where the deviant students figure the sixth graders will exit. Not very nice, but we perform the dastardly deed anyway. Lots of giggling to be expected as EA students, lead by their teacher; conduct a practical joke on unsuspecting younger students.

By this point, students have pledged their allegiance to one animal or another. Ask students to choose a rubber impression that will be filled with plaster to produce a

plaster track that the students will bring home as a keepsake. The plaster cast project occurs December (during the First Semester) just prior to the giving season.

Preparation is the key to avoid lab problems. Put cold water in a deep bucket so that students can rinse their hands when plaster gets between their fingers. Keep plaster out of the sink. Cover the lab tables with newspaper for ease of cleanup. Next, place a large container of Plaster of Paris on one lab table and put a plastic cup inside to facilitate distribution. Each student then gets a plastic bag for mixing plaster. We found that clear, flexible, plastic bags provide less waste of plaster. Next, students select their track impression.

Students enjoy a historical science briefing on the composition of Plaster of Paris, which seems to be a mystery substance to many. In the 1700's, Paris was already the "capital of plaster" ("Plaster of Paris") since all the walls of wooden houses were covered with plaster, as a protection against fire. The King of France had enforced this rule after the London fire that nearly destroyed this city in 1666. Large gypsum deposits near Paris have been mined to manufacture "Plaster of Paris". Gypsum is a sedimentary rock, gained through the evaporation of seawater trapped in lagoons. Heating the gypsum rock, which removes all water, makes Plaster of Paris. When water is added to the Plaster of Paris powder the dry powder rehydrates (absorbs water) and quickly solidifies.

Plaster of Paris placed directly onto the skin can cause serious burns (the process would take several minutes) because of the heat produced. Avoid skin contact with plaster. If students get plaster on hands, dunk hands in the bucket of cold water, dry hands with a towel, then continue working on the project. Estimate the amount of plaster needed for the track impression by putting some dry plaster in the plastic bag. Now place

the whole bag in the track impression. If the dry plaster seems to fill the impression, it may be sufficient, but add a bit more because some wet plaster inevitably sticks to the bag. If needed, add or subtract dry powder. Next, the artsy move. Using cold water from a cup, add a bit of cold water to the plaster in your bag. If too much water is added, the mixture will look and feel like milk; quickly add more powder. If not enough water is added, the mixture will feel like pebbles, just add a bit more water. Use hands to vigorously squeeze the mixture. The "Goldilocks Moment" is when the mixture feels like pudding or soft-serve ice cream (without the coldness.) Continue squeezing until all the lumps are worked out. Immediately, using scissors cut a large hole in the bottom of the plastic bag and allow the plaster to flow into the track mold. Fill all the way to the brim. Students sometimes worry about the plaster overflowing onto the sides. Reassure students that the plaster will solidify and easily peel off.

Almost finished. To get the plaster down into the claws and into all the nooks and crannies of the mold, one must pick up the mold and slap the mold, with the wet plaster, down on the table a few times. Take care not to slap the mold too hard because the wet plaster will fly in many directions, including onto a nearby lab partner. Leave the mold with the wet plaster on the table or place the mold onto a tray and shelve the tray without disturbance overnight. If a necklace is desired, now is the time to slide a paperclip into the wet plaster creating an eyelet. A paperclip is also handy if a wall hanging is the intention. The less movement the better, at this point the plaster is already starting to solidify and heat is emanating.

The next day, students will find their track rock hard. The students should carefully peel the mold away from the solidified plaster. Have students clean the rubber

molds by chipping away the dry plaster, next dunking in warm water. The plaster will not dissolve but will come off easier. Have some sandpaper ready for students that want to sand the edges of their tracks. Colorful string is a nice touch for making necklaces. Students can finally take their track home. Some will spray-paint or brush-paint them. Many students will keep the track and the memory forever. Hopefully, the track brings about a discussion and positive attitudes about wildlife spill out.

Scat of mammals. Scat is a topic that several EA students do not enjoy. Other students are happy to finally be able to describe the animal that is responsible for a particular scat. Scat provides EA students with classification skills because describing, analyzing and placing in categories is required for successful identification. Animal scat is noticed in the woods much more often than tracks, the constant "stream" of scat helps students learn. Scat tells a lot about the contributor. EA students can often hypothesize on the species of animals in a given location. Students can estimate the population density and can imagine the territory boundaries of a predator such as a wolf. Interestingly, we often find wolf scat in prominent places, higher ground or easily noticed on a well-used trail. Sometimes we can figure out what a certain species is eating. All these data from observing scat, or using the more pleasant, affectionate term, poop. Poop can warn students too of theft cause by the red fox. If one finds fox poop at a campsite, do not leave a pack or boots unattended for a moment. Red foxes are thieves. "Sly as a fox" is a well-deserved adage.

Next, the "Scat" PowerPoint is shared with students. Two thirds of the photos are from the Internet and about one third is from a personal photo collection. The rarity of catching a glimpse of an animal in the woods cannot be overemphasized. Mammals

especially, are often secretive and deft. Finding the signs that animals leave behind such as racks, scat, and gnawed bark are much more likely than seeing the actual animal. Some animals in the cat family actually bury their scat, making their presence all but unknown. Scat, tracks and gnaw marks may be the only evidences that we see, especially when the EA class travels as a group and tend to make extra sounds in the woods. Animals are not accustomed to our voices. Although not intentional, human voices end up frightening many species.

Just when the gross-out factor with the Scat PowerPoint is at its zenith, now is the time to pull the rubber wolf scat out of a pants pocket. Putting the fake scat on the floor has good impact but the silhouette on overhead projector never fails to create the disgust that comes with the territory. Hypothesizing the "scat-maker" is challenging. "Scatology" is much more difficult than guessing tracks.

Twelve rubber scat replicas on the numbered lab stations comprise the Scat Lab. Based on the size and "texture" of the scat, students often guess correctly on many of them. The EA class will see some these along the trail for the 24-Hour Wilderness Experience. The scat may have even more impact when we are living among the refuse for 24-Hours.

Skulls of mammals. Thanks to a local dentist doing a study on mammalian dentition, the EA program was bequeathed a set of mammal skulls. Most of the skulls were actually road-killed animals in Alaska, which incidentally, has many of the same mammals as the Upper Peninsula of Michigan. In addition, students have contributed to the collection from road-killed animals, plus locally hunted and trapped species. The method of cleaning a skull may be a project for a student or small group of students. All

the soft tissue on the skull is a valuable food source for beetles worms and bacteria in the soil. Simply dig a shallow hole and place the skull in the hole covering the skull with soil. If in an area frequented by a dog, toss a few boards or old plywood over the top to discourage the dogs from digging. In spring or summer, about three months is the time required to see the end result, a skull that is picked clean. (A longer period is required if the skull is buried in the autumn. A warm period, when microbial activity peaks, is needed for tissue decomposition). Next, wash the skull with dish soap, water and a scrub brush. Next, dip the skull in 50% bleach and 50% water solution for 10 minutes and then rinse with fresh water. Allow the skull to dry thoroughly. The skull is then ready to use. Handle often. Learning happens every time. A lab activity was developed around this prized collection. The point is to get students to slow down and really look at the features. Focus on eye placement, “On the side for those that hide (peripheral vision). In the front for those who hunt (good depth perception).” The family resemblances of skulls such as the Canine Family (red fox, coyote and wolf) are striking. Also, have students focus on teeth. The Rodent Family members have those famous (beaver are in this group) incisors and molars or “cheek teeth”. The Deer Family members lack top incisors. Deer, elk and moose are forced to tear twigs off rather than clip the twigs cleanly. For a teacher just starting a collection and getting in the “bad” habit of burying things in the backyard, this lab activity could be done with just a few skulls and perhaps a few photos of skulls. In addition to tracks and scats, this lab really helps students see the relationships between families.

Earthwatch Expedition: Carpathian Wolves. Wolves in Michigan’s Upper Peninsula and those in Poland face some of the same pressures. The Upper Peninsula of

Michigan has 350-500 wolves in 2011. A PowerPoint, “Carpathian Wolves” is presented to students to help explain the focus of the author’s Earthwatch expedition. During the expedition, two main ideas were integral to the wolf study in Poland. Both ideas are explained in detail in the sections below: “Wolf Diet Study” and “Wolves Take the Easiest Prey”.

Wolf diet study. First, the researchers separated three small groups of wolves into three yards or pens. Each pen was fed a different diet. Pen One was fed fresh road-killed deer. Pen Two was fed just meat from fresh road-killed deer. Pen Three was fed hooves, antlers, bones, entrails and hides from fresh road-killed deer. The students are to hypothesize on the Pen(s) that were healthy near the end of the study. Most students choose Pens One and Two, figuring that hooves, antlers, bones, entrails and hides do not provide what wolves need. On the contrary, Pen One and Pen Three wolves were healthy. Wolves’ diets are not vastly different from humans. Wolves need to do what parents have told children for years, “Eat your vegetables.” The hooves, antlers, bones, entrails and hides are a bit like vegetables to a wolf. The non-meat portions serve as roughage, cleaning out the intestines of the wolf. Wolves on the pure meat diet suffered from vomiting, diarrhea and dehydration. The diet-restricted wolves were “rescued” near the end of the study with a diet that provided more than meat, a balanced diet. This study helps to show that although wolves do not always eat prey immediately, this top predator needs to eat the entire carcass eventually to avoid sickness. The evidence is strong that wolves do eat the entire carcass. In the Upper Peninsula we find that sometimes when wolves “raid a deer yard” the wolves take down several white-tailed deer. U.P. hunters often complain that the wolves are leaving the deer to waste. However, the wolves are

reluctant to “open the carcass” because once the carcass is opened, the scavengers, especially ravens, move to devour the available food. Wolves “manage” the food by leaving the carcass intact and returning when hungry. The situation is similar to putting leftovers in the refrigerator in that sealed container that parents often require. Students respond to examples in the reality of their own world.

Wolves take the easiest prey. Hunters in the Upper Peninsula may drool contemplating the habits of the red deer in Europe. Compared to the white-tailed deer, the red deer is a bit larger. Males and females segregate themselves into groups except during the rut. Seeing groups of 20-40 males in one group in the summer of 1992 was common. Imagine 30 or so deer all with enormous velvet antlers. Nice racks. Growing antlers is the summer project for the males. Large antlers are impressive to females in the fall and usually attract a fine harem. Large antlers also impress hunters that prefer a trophy to a spike-antlered male. Wolves follow the deer herds. Wolves do not have preference for a particular deer. Large antlered male deer are not trophies or status symbols for wolves. Wolves attack the easiest prey. The easiest is often the slowest. The slowest may be an old, weak or sick animal. In this case, the wolves “cut” the sickness from the herd. However, sometimes the slowest may be the largest, heaviest (and a very healthy) animal. These deer typically sport the trophy racks. The large antlers develop due to genetics and abundant and nutritious food that the deer have enjoyed in summer and early autumn.

The wolves do not conspire to kill and eat trophy bucks, but wolves do kill and eat the robust bucks because these males are huge, exhibiting a sluggish gait and are relatively easy to apprehend. Wolves take trophy bucks because they are slow, often at the back of a large herd and are easily stalked. One of the main points of the study is that

hunters (worldwide) must understand the complexities of the wolf/deer situation. Far fewer wolves are shot or poisoned by hunters now in southeastern Poland because the hunters realize that the wolves are doing their "instinctual duty" rather than mounting a conspiracy against hunters. Students, in regard to wolves, often raise these questions: What is the current situation in the Upper Peninsula? As predator hunts become more and more popular, are U.P. hunters being educated about the balance of predator and prey species?

Nature interpretation project. The Nature Interpretation Project is a homework project. Students have one week to find the time to do this project. The students have several objectives that are stated below. Parents verify the time and effort spent with a signature.

1. Humans do not always see the animals because many are secretive. The goal is to interpret, or figure out what animals live in a specific habitat by "Reading the Signs" that they often leave behind.
2. The homework assignment is to enter a forest or field. Or, you could walk along the bank of a stream, lake or pond. The walk could be near your home or far away from where you live. Be safe.
3. The goal is find evidence of animals and write down what you find.
4. Sometimes, just realizing an animal lives in the area gives us reason to respect that habitat, which is the animal's home.
5. If an animal is actually spotted, please do not disturb the animal from what they are doing (usually eating or looking for food).

6. Also, do not try to attract animals with food. Allow animals to eat the foods that nature provides, otherwise many animals get dependent on people for their food.

7. Feeding birds at a bird feeder may be an exception. If maintaining a feeder, be consistent, especially in winter.

8. Use the form below (or a similar one) to write down what you see:

*Date *Habitat *Weather *Tracks *Scats *Evidence of Wildlife *Animal Observed

*Students are expected to be outdoors for at least 60 minutes, walking and observing.

Predator and prey: Interactive video activity. Marty Stouffer is a renowned wildlife filmmaker. The actual name of this particular video is “Great Escapes”. Each vignette shows a predator chasing prey and missing. Invariably, at least in this video, the prey, by some means, escape death. Most prey species get away, escape, and are not captured. This is the way nature actually works. A predator must hunt several times, expending energy with each hunt, to catch a meal. About halfway through each vignette, the students jot down their hypothesis: Meal or No Meal? As the video progresses cheering squads develop for predators and prey species. Not one scene shows prey being taken. In the last stanza of the video, students finally say, “Hey, the predators need to eat, too.” Later, they are informed that they were tricked into learning what really happens in nature. The prey species are literally running for their lives. The predators are chasing a meal. If it the prey gets away, an easier situation may present itself for the predator. The point is that the students recognize a balance between predator and prey that is often not portrayed in videos.

Trees: What is their role in nature and for students on the 24-hour trip? The EA class depends on a grove of young eastern hemlocks for providing a windbreak for

our campsite. Paper birch bark is our fire starter and sugar maple branches for long burning warmth from the fire in the evening. The white cedar keeps the deer warm by holding the snow in the canopy and providing food. Without trees, the "24-Hour Wilderness Experience" would be very different. We appreciate trees. The "Trees" PowerPoint explains some uses of trees. During neighborhood outings, tree identification, uses and lore of our local trees is a focal point for the class.

EA Unit Four: Survival Skills

This unit is about attitude development, or to be specific, positive outdoor attitude development through skill building activities. Survival skills designated for wilderness, apparently have applications in urban careers, according to a former student and local financial adviser. "Survival skills that I acquired in EA class, improve my confidence in the financial world", says Matt Rayome, manager at Citi Financial in Marquette, Michigan. Perhaps Wall Street bankers could be invited as EA chaperones. While the EA curriculum may not benefit immediately from the bankers, the bankers may gain some "survival fortitude" from the EA program.

No word for luck. Students read the article, "No Word for Luck" by Paula Schiller. The author brings out two very important points. First, the Inuit people have so little use for luck that their language does not have a word that translates to "luck". The Inuit culture depends solely on preparation, not chance, an attitude that is fostered with students. Second, despite the climate, even with the long darkness in winter, Inuit people tend to be happy. That happiness may stem from their cultures' need for continuous problem solving. Solving problems gives us a psychological lift (Schiller, 1982). Students site examples of problem solving in their lives and make a list.

Survive activity. During a visualization session, students imagine a grant of $10,000 for a backpacking class trip along the Pacific Coast in the state of Washington. “Cool. Let’s go.” a young man shouts. Sorry, imaginary money means an imaginary trip. The story continues. We charter a plane that will fly from Negaunee, Michigan across the U.S. “What states will we fly over?” “Wisconsin-Minnesota-North Dakota-” “Oh, no.” the narrator continues. We are over northern Minnesota in mid-January and the plane is going down fast. (The remainder of the story usually goes as follows. The story was extracted and developed from the original story that was related at a conference dinner table discussion. The kernel of the activity appears on the following website (http://scoutingweb.com/scoutingweb/SubPages/SurvivalGame.htm).

“The crash came suddenly before the pilot had time to radio for help. Shortly before the crash, the pilot announced that the EA class was 80 miles northwest of a small town. The group is in a wilderness area made up of thick forest with many lakes and rivers. The snow is nearly waist deep. The last weather report indicated that the temperature would reach -10 F in the daytime and -20 F at night. Students are dressed in the winter clothing that you wore to school today: jeans, hooded sweatshirt, jacket, and tennis shoes. The pilot, copilot and your teacher are not alive. No one else is physically injured. While escaping from the wrecked airplane, your group salvaged the fifteen items listed. Your goal is to survive. Rank these fifteen items according to their importance to your survival. Think, and then take action on your priorities to survive.”

As the list is read, the items, one by one, are exposed from an old trunk: Magnetic compass, two ski poles, ball of steel wool, cigarette lighter (without fluid), loaded .45 caliber pistol (actually a starter’s pistol, but looks real), newspaper (one per person),

rolled gauze bandage, pocketknife, a sectional air map of Austin, Texas, thirty feet of nylon rope, a large size Hershey's chocolate bar (one per person), flashlight with batteries, quart of 85 proof whiskey (actually, water with a little cola for color), an extra shirt and pants for each survivor, and a can of Crisco shortening.

Next, students are invited to observe and handle the items. General questions are answered but no hints about the potential uses of the items. After a few minutes, students are provided with a sheet that lists the items in a column. Students are to work alone, at first, and rate the items 1-15 with number one being most important to survival. (Students work thoughtfully, as if contemplating this unfortunate situation.)

The students are asked to work in groups of 3-5 students. The instructions are the same but with this caveat. All in the group must agree to write the same number rating for each item. No groaning is perceived at the start. However, as the groups converse the intensity builds. Decision-making as a team may have its rewards, but group decision-making is difficult work. After many minutes, all groups reach consensus. Students are assured that specific priorities are important considerations and that a survival expert has established the correct answers for the activity. First priority is first aid to all survivors. The pilot, copilot and teacher are not alive and all others are unhurt. No other medical concerns exist. Certainly, some psychological anxiety is inherent for individuals dealing with the death of three people who were alive just minutes ago. The anxiety among survivors should not be ignored and for this reason the gun and the alcohol are of special concern.

The next priority is warmth in the extreme temperatures. Wisdom plus creativity are both critical in survival situations. The cigarette lighter, even without fluid, is capable

of a spark. The spark may be enough to ignite the steel wool. (Practice lighting the steel wool. Then light the steel wool as the students witness the event. The technique is dramatic and really works. Later, in this unit, the EA students start campfires in the snow using this technique). The extra shirt and pants (for each survivor) are also rated high because the clothes can be used for warmth. The newspaper's status is elevated considering the insulation value.

Conversely, walking 80 miles in deep snow in search of a town, although this plan seems courageous, it is not advised. So the map (an air map not of this region) and the compass are essentially useless. As mentioned, the alcohol is dangerous for someone trying to "drown sorrows". However, that is only part of the issue with the alcohol. The whiskey will not freeze at temperatures of -10 F and -20 F. It takes on the same temperature as the air. When one takes a sip, the whiskey will cause frostbite to the lips, tongue and esophagus. Once tissue freezes, the tissue dies or becomes necrotic. The necrotic tissue becomes infected. Untreated, the infection spreads. Gangrene is the common bacterial infection associated with frostbitten tissue.

Students often think that a pistol would be handy for shooting animals for food. The pistol, with its short barrel is useful for very short-range targets. An animal would need to be within a few meters to get a high percentage shot. Lacking Annie Oakley and with only six bullets in the gun, the pistol is not a realistic hunting tool. The gunshots could be used for signaling. (Three shots or three of anything is the universal signal for HELP.) The whiskey may be used as a fire starter I suppose, but overall the potential misuse of the gun and the whiskey gives each a low rating.

The other items have various uses. Interestingly, the Crisco can actually be eaten, and could keep the entire group alive for days. Share a teaspoonful with brave students. The students make entertaining faces. The key is to stay alive; survival can be distasteful. Students usually do not realize that a flight plan must be filed prior to takeoff of all aircraft. When the plane does not arrive at the destination on time, concern grows and soon a search is mounted. Staying alive and being seen or signaling a plane, provide greater significance when students are aware of these ideas. Heroics, such as walking out or big game hunting with a penknife, are dismissed by students once they understand the limitations of the plight.

This activity brings out leadership qualities in students. Some students sense the urgency of the situation. Other students are very concerned about details, students want to know more than the story tells, other students are typically happy to fabricate. In addition to the wilderness wisdom, use the Survive activity as a team builder and a reference point. Quantitative scores can be calculated for this activity. It is typical in most EA classes that the small groups score better (score closer to the expert) than do the individuals.

Goldenrod galls: Eat larva, be happy. The goldenrod is a plant, considered by most as a weed. Goldenrod grows mainly in disturbed areas over a wide region. This plant is the host to the goldenrod gall fly. The strategy is to inspire students with a tiny insect that survives the coldest days of winter. To avoid winter's harsh conditions, some insects burrow into the mud or soil. Eurosta solidagenis is the scientific name of the insect commonly called the goldenrod gall fly. Goldenrod galls are usually round or oval "bumps" on the stem of a goldenrod plant.

Students may want to know how the gall forms. In the summer, the adult female goldenrod gall fly inserts her egg into the stem. At the same time, she injects a chemical to "direct" the plant to grow tissue around the egg. Students that enjoy science-fiction often can relate to eggs being directed by external forces. Hollywood presented a flurry of these movies. Back to reality: The egg hatches inside the enlarged stem tissue, called a gall. The egg has hatched to become a larva and uses the plant tissue as food. By that time, it is autumn and the weather is getting cooler. Not a great time to emerge. So, the larva stays in the gall all winter. The larva develops a special type of internal fluid that will not freeze. The fluid is almost like anti-freeze for the infant insect. The larva (white or cream color and soft) later becomes a pupa (brown and crunchy) in the gall. In the spring, the pupa changes and emerges as an adult gall fly beginning the cycle again. Gall fly larvae, which are similar to most other insect larva, are protein–rich and edible by humans. Birds like the larva too.

As a class, the EA students go to a nearby field and search for goldenrod galls. The galls are a locally abundant enterprise. If a few are found it is likely that there are many more. No worries. Picking galls will not impact the species. When each student has found a few galls, pull out the set of knives and pieces of scrap wood (cutting boards) that you have cleverly hidden in your backpack. Demonstrate how to hold the gall between thumb and forefinger against the cutting board. Determine the "grain" or direction of growth of the stem. Cut with the grain, not perpendicular to the grain. Use a sawing motion until about one third of the way through, then gently twist the knife. The gall will open. The prize within is likely to be a white or cream-colored larva. Or, perhaps the

larva has been already been eaten by a bird. If the larva has changed to a pupa, the color will be brown and crunchy but still perfectly edible.

Students are mildly encouraged to eat a larva or two. Of course, observing their teacher ingest a larva verifies the wholesome goodness of this unusual food. Typically, students are enthusiastic. Even students that described this concept as “disgusting” moments ago are indulging just to have bragging rights. Other students want to know the class record and attempt a new one. The taste is described as “nothing” or “sweet” or “tastes like peaches”. The sweet aftertaste is actually the “natural antifreeze” that the larva makes to survive the winter. Rousing discussions will accompany this activity. “If this tiny creature can survive an entire winter, can we survive 24-Hours? What strategies does the gall fly use? What strategies do people use?”

To build a fire. This is a classic short story by Jack London, author of Call of the Wild and White Fang. Many of London’s works are set in the Arctic. “To Build a Fire” set in the 1890’s, is the story of a “cheechako”, or white man who comes to the Yukon with countless others to moil for gold. Many of these white men may have been skilled miners but few were ready for the cold winters. This story depicts a man and a dog walking on a very cold day from a “camp” to another cabin. Students read the story, typically as a homework assignment. Later, the EA class watches the video. The video is narrated by the haunting voice of Orson Welles. Students witness a reasonably savvy adult making errors in judgment that eventually leads to his demise. This man is capable of saving himself, if he would just stop and think. Students watch as he is slowly forced to capitulate. As you may guess from the title, the man is unable to build a fire (although

we are certain that he knows this skill from earlier scenes) at the critical time to save himself from the cold.

No-match fire building skills. The Scholarship of Discovery is exercised when groups of 2-4 students are outfitted with flint (a modern sparker), steel wool, cotton balls smeared with petroleum jelly, dryer lint, and birch bark. Students are challenged to keep trying despite what the man did in the story. Students are assured that unlike the single character in the story, “Being outdoors in winter with a group vastly increases the level of safety. Some group members can be very creative.” Precisely on the word “creative”, a creative instructor may reach between the buttons of a dress shirt and root around one’s belly button with a contorted face and an eventual smile. Next, produce a large stash of belly button lint. (The booty is dryer lint, of course, that was planted prior to the start of class.) Next, pull the flint and butter knife from a pocket and commence to direct a spark onto the lint, which obligingly ignites. Students are enthusiastic to try the procedure.

The “performance” in the classroom leaves students alive with excitement. Some are concerned about smoke alarms; one large group of students cannot wait until the opportunity to do the activity. The students receive all the equipment except the butter knife. Students are assured that the butter knife will be provided when their group is able to construct their pre-fire preparations. Building a fire in the snow is a very safe proposition, even for a novice. The students are “rewarded” with a knife once the scaffolding for their fire is complete. “A fire burns upwards, not down” a student reminds her group members. The chatter among groups is full of useful advice. No one is talking about the upcoming dance or basketball tryouts. The focus is on creating a fire, as if their

lives depended on this activity. Creating this intense feeling was the goal, to stir this fervor. The students will be ready for the 24-Hour Wilderness Experience very soon.

The fires are largely successful. Fuel is limited in this situation. Students accept the request that the ashes and half burned pieces be “snowed out” then placed in the recycle bin. (After drying, the pieces are actually very usable in a home woodstove. No waste.) The students have acquired a new skill, the students are reminded that the fire starting skills are to be used responsibly, under adult supervision. Fire starting is not a garage project, basement project or dry-forest project. If repeated at home, find a snowy area, then solicit a parent and teach parent the fire building skills.

Frostnip/frostbite/hypothermia PowerPoint. Photos in the Frostbite/Hypothermia PowerPoint presentation are not from a personal collection. All are from the Internet. The focus is to sort the three problems and debunk the fiction. In brief, frostnip is cold but not frozen tissue. Frostnip can sometimes render the skin sensitive to cold in a particular area. Frostbite is the actual freezing of tissue, a local problem. Hypothermia is the lowering of the core body temperature. Hypothermia takes over the entire body and can be lethal in days, or hours, or minutes if one is submerged in cold water. Frostbite is rarely fatal, but frozen tissue is subject to a bacterial infection that spreads called gangrene. Most (modern) frostbite victims receive medical attention before the gangrene is established. The frozen tissue is dead or necrotic and must be surgically removed. Students find this information interesting. To make the cold feel real without actual injury, the students dunk an arm into a bucket with snow (slush) and water for a few seconds. They are asked to remember this feeling and avoid the “bad ice” that occurs each spring on our local lakes.

Cast away. The middle section of this film is focused on survival. Many students have seen the entire movie and the likeable, recognizable Tom Hanks is the star. Although the setting is a tropical island, the survival theme is poignant. Promote the section from the start of the plane's decent to the adjustments of four years alone on the island, to the rescue by the freighter. The scenes always stimulate a good discussion. The students are asked to write about the problems that the man in the story faces. The other parts of the movie (start and end) are a touching love story. These sections are not shown in class because they do not focus on the topic of wilderness survival.

Bear Grylls' "Man vs. Wild" and Les Stroud's "Survivorman" These two guys have made wilderness survival a part of prime-time television. The students recognize both of these men and enjoy arguing about whether their episodes are real or contrived. One idea is to contrast their techniques to those that are learned in class. The lesson is introduced in this way, "We rarely jump out of planes in this class, however…". These gentlemen display regions of the world that are unfamiliar to the students and supply the "fantasy factor" for the Environmental Adventures course. Pieces of certain episodes are shown to encourage a bit of daydreaming about faraway places and adventures. A discussion follows the video and students are not shy about sharing their travel and adventure fantasies. At times, however, they need to be reminded about the genre, some students revert to Disney World or Las Vegas type attractions.

Survival kit. As a home assignment, students are asked to assemble a Survival Kit that would easily fit into a bread bag. They must gather at least one item from each category, preferably more. The ideal survival kit, of course, is one that you would want to

take with you wherever you may go. The categories are water, food, “PMA”, signaling, shelter, fire and first aid.

PMA stands for Positive Mental Attitude. This category often involves family photos or family pets. Some type of symbolic motivation that is lightweight yet inspirational. Students come up with an inventive variety of items. Ask students to bring the kits to class to share. Items from lip-gloss to toilet paper to magazine cutouts of Yoda (Yoda is of Star Wars fame) are shared. Each item requires an explanation, so the plan is to come prepared to defend thy thesis.

Survival is problem solving. Another homework assignment requires EA students to go for a “good walk” in a familiar area, one hour or more is suggested. Students may work alone but are encouraged to walk with a family member, classmate or a friend. Students are to bring a small backpack with at least an extra pair of socks, a snack and some water. Students are to walk at a fast pace and be aware of the heat that may be building up. Next, students may want to remove their hat for a few moments or adjust their coat to allow heat to escape. The main event is the simple activity of changing socks. Students are instructed to sit on a log and find a way to insulate their bodies from the snow using their jacket or their backpack. Often cold feet can be attributed to wet socks. Changing one’s socks, bringing a focus point of comfort rather than misery, can change one’s perspective on an outdoor experience.

Students have discussed and improvised several other challenges in connection with this activity. Some students have built a campfire (with parental supervision) and cooked a simple meal. Other students have changed tops, bottoms, and have urinated in a private place off trail. Toileting sometimes requires toilet paper. Some students have

devised other accoutrements to substitute for toilet paper including: smooth rocks, leaves from non-poisonous plants, and even packed snow. Students write a short description of where they went, the weather conditions and what, if any, special challenges they accepted. Challenges usually require more preparation and preparation builds confidence. Creative (but safe) new challenges are fully supported by the teacher. The rule of thumb, if parents find it acceptable, it will most likely be teacher-endorsed. Finally, students ask parents to provide their signature for verification.

Green project. Another homework assignment requires students to attend one "Green" presentation in the community every marking period. The idea is to realize that many people value environmental education. Presentations about nature interpretation, navigation and adventure are frequently presented and the quality is outstanding. The EA curriculum, by utilizing the Green Project is honoring the Scholarship of Teaching by a whole community of presenters. Environmental education is not just a classroom activity. Environmental education is a vision for the community. Often, the Green Project involves soliciting parents or older siblings for a ride to Marquette in the evening or on the weekend to attend a program.

Each month, activities are posted in the Marquette Monthly Magazine. With help from students, the EA class compiles a list of acceptable programs and presentations. The Green Project often proves to be an enlightening assignment. Just recently, students attended programs on: Beekeeping, The Life of Naturalist John Muir, Climbing at the Indoor Rock Climbing Facility at NMU, Cougars in the U.P., and Keeping Chickens Within the City Limits of Marquette. Many students have commented that the programs stimulated their interest in the subject area and the students may want to learn more.

EA Unit Five: Four Weeks Until the 24-Hour Wilderness Experience

Many important lessons are practiced in the classroom and outdoors during the final four weeks prior to the 24-Hour Wilderness Experience. Students prepare for the trip physically through daily exercise. The students also use packing lists to gather their resources. The most important aspect for EA students is to prepare for the trip by developing the confidence that one acquires with practicing the outdoor skills and being organized.

Fitness for adventure. One of the goals for each student is to be well prepared for the 24-Hour Wilderness Experience. This preparation includes fitness. Students should make it a goal to be able to focus and really enjoy the trip (not just barely survive the trip), students should be at their best personal fitness level. Good fitness begets confidence. The best way to train for walking in the woods with a backpack is to do exactly that. Walking on rough ground that requires one to adjust footing with each step (uneven trail, rocky terrain or snow) is beneficial. Walking up and down hills develops stamina and balance. Other good training techniques include walking in town, running, cross country skiing, snow shoeing, and any aerobic sport such as bicycling, basketball, hockey, etc. We are attempting to be the best that we can be. Although we are not trying to fashion Olympians, students should try to do something physical every day to prepare. A letter is sent to parents to encourage the students to motivate students toward daily exercise. Attached to the letter is a calendar to be used as a tool for parents to post on the refrigerator to help track progress.

Clothing and gear for the 24-hour wilderness experience. Many gear items such as lightweight backpacking tents, quality backpacks, handheld GPS units,

snowshoes, sleeping pads, and portable backpacking stoves have been purchased for the entire group with funding from several grants. Some of the grants were large (over $1,500) from national organizations. Most however, were $50-$500 local grants. Perseverance is the key to grant writing. With school budgets barely able to support existing core education programs, grant writing is an essential skill for outdoor educators in the United States. Grant writing is essentially begging with a tin cup and then emphasizing your appreciation for whatever is received. Grant writing is not glamorous and will consume many weekends. However, grant writing is like shooting a basketball. One does not sink every shot. However, one will not sink any shots if no attempts are made. Grant writing is one of the only (modern) ways to financially launch an environmental program. Now, the good news. Money is in the community and there are many "green" organizations that would like to identify with young people and the outdoors. If a teacher is just starting to write grants, go for local grants. The local grants may be small but the odds are better. Years ago, lured by a large grant, figuring that $10,000 would jumpstart the proposed program; a grant proposal was launched. Often, large grantors often like to see evidence of what has already been accomplished. After weeks of writing, the grant proposal was submitted. The thank you letter, with regrets, was three sentences in length on very fancy stationery. Note to self: Apply for local or regional grants, the odds of success are much better.

Ask parents and students to work as a team to gather appropriate clothing and gear for the trip. However, specify clearly that if a student does not have a specific item, parents should not run out and buy it. In an area that is popular for hunting and snowmobiling, borrowing gear from family members and friends is typically

accomplished with some effort. In addition, it is wise to have numerous items that are purchased for the students over the years. Pick up a few usable items each month at yard sales and thrift shops.

Aside from group camping gear that is derived from grants, students and parents must work together to find appropriate clothing. Invariably, the cotton coalition must be reeducated. Many young people in the U.S. have been brainwashed that cotton is "The Fabric of Your Life". Cotton is a fabric that is comfortable when dry. When cotton is wet, the fabric is very cold, uncomfortable and difficult to get dry on a campout. Simply holding wet cotton clothing over a fire is ineffective. Jeans, T-shirts, and cotton socks are not appropriate for winter campouts. The following checklist is for students and parents and is written with regard to winter campouts. Some items may or may not apply in other seasons.

Clothes and gear for the 24-Hour Wilderness Experience. Some important gear is essential:

1. Underwear is fun to wear. Have non-cotton underwear? Wear it.
2. Long underwear. Again, non-cotton is best. "Under Armor" is a great product because the polyester fibers allow moisture to escape. Under Armor brand is also pricey. Many similar brands that may cost less are now becoming widely available. The key is the fabric, look for 100% polyester.
3. Wool (not cotton) Socks. "Smart Wool" is guaranteed not to itch. Other products may cost less and are similar. The key is to look for 80%-100% wool (and no cotton).
4. Long or short sleeved "breathable" shirt (100% polyester)

5. Snow pants or nylon pants. Part of the time we are walking. At other times students are sitting, kneeling, or playing in the snow.
6. Nylon (windproof) jacket, even better if a hood is attached. Avoid cotton.
7. Insulated winter coat or parka.
8. A hat that covers the ears. Essential at all times of year in the U.P..
9. Mittens/gloves: Two, three or four pairs on winter campouts, at least one pair in the spring.
10. Hiking Boots or sturdy shoes. Insulated winter boots on winter trips.
11. Students should bring healthy food. Avoid junk food. Much more about topic this later.
12. Plates and containers: One way to save weight and space in a backpack is by eating straight from the pan.
13. Pots and pans: Get students to think out loud. Bring all? Only the essential ones? How do we know what is essential?
14. Forks and spoons: Bring metal only. What do you think happens to plastic in the cold?
15. Do not bring a knife because it is against the law for you to carry a knife in Michigan on a school outing. Students must realize that a knife would make sense in the woods, but to avoid trouble students should not bring a knife. A knife can be borrowed from a teacher and used as a tool with adult supervision.
16. Sleeping Bag: Must be “squish-able” into a compression stuff sack. (Again, avoid cotton.)

17. Compression stuff sack: These are used to stuff and compress a sleeping bag. Demonstrate by stuffing an enormous winter sleeping bag into a compression stuff sack and cinching the bag down into a relatively small space. Pretty cool learning. Fun for a “Holy cow!” moment.
18. Polyester pajamas or long johns or dry clothes that you plan to wake up and wear tomorrow. Encourage students to avoid sleeping in the clothes that were worn all day. Molecules of liquid sweat reside in any fabric. Certainly, a lesson that students may learn with experience, but considering the winter conditions, this is one lesson that is acceptable to forgo the inquiry process.
19. Flashlight: Put batteries in your pocket (keeps batteries warm) until you are ready to use the flashlight. Why do some people prefer headlamps on a camping trip?
20. Pillow is optional. What could be used instead of a pillow?
21. Toothbrush and small tube of toothpaste.
22. Water Bottles: Recycled plastic Gatorade bottles with a screw-on top work well. Bring three or four 20 oz. bottles for a 24-Hour Trip.
23. Bring medications. The dosage must be written. Mr. Delpier will hold medicines.
24. Teaching and Learning Supplies: Mr. Delpier will be responsible for organizing the gear for teaching and learning, plus first aid supplies for the entire group. Mr. Delpier will ask each Tent Group to carry a portion of this gear. Each student is to memorize the correct response when asked to carry gear: “Thanks Mr. Delpier, I would be happy to carry more.”

25. These items are optional: Camera, Plastic bags, Heat packs, Hand sanitizer, Dental Floss, Sunglasses, Ski Goggles, “Balaclava” (Usually, extra stuff is more of a problem than a help.)
26. The idea is to deliberately “seek wilderness” for 24-Hours of our lives, trying to reconnect with nature. One goal for EA students is to get along well and relate to each person in the EA class. Do not bring things that could distract yourself or the group from the natural environment or from the teaching and learning that is intended on this trip.
27. Do not bring: iPods, MP3, portable video games, cell phones, computers or other electronics. Also do not bring items that may cause injury or distraction. Do not bring weapons, fireworks, or knives. Do not bring jewelry or anything small/valuable that could get lost. Do not bring shampoo, soap or deodorant. Bears, raccoons and skunks are attracted to these smells and may attempt to find and eat these items. Do not bring toys. Do not bring tobacco (in any form). Do not bring alcohol. Do not bring illegal drugs. Thank you for your cooperation.

Food security: Bear ropes. Weasels, squirrels, cottontail rabbits, snowshoe hares, white-tailed deer, moose, red foxes, coyotes and wolves are active year around in Michigan. The activity that consumes most of their day (and night) is looking for food. Several familiar animals in the north woods are less active in the winter but are not true hibernators. Raccoons, opossums, skunks and the black bear have all been known to “go for a walk” typically on “nice” winter days. What are animals doing out for a walk? Some wildlife may be “shopping for food”, is the response that students often surmise. As a result, we use rope to hang our food in trees. We do not really make the conditions

impossible for an animal to get the food. We just attempt to make conditions difficult. Most animals will give up if the actual food is too difficult to grab. Getting food for people is often about spending money to purchase the food. For animals, acquiring food is about spending energy. Similar to humans, animals "shop" for value as they search for food. Animals try to get the most quality food for the least amount of effort. If food seems like too much effort, animals skip this "opportunity" and continue their search elsewhere.

The system that we use to hang food in trees is the two-rope method. Picture a length of rope with an end-loop that is tossed over a horizontal branch about 10 feet up in a tree. A second rope is passed through the end-loop of the first rope. The second rope is attached to a bag containing food and anything that smells like food including deodorant, soap, dirty pots and pans, kitchen cleanup rags, etc. When the food is hoisted aloft, the ropes are secured. Searching is arduous, yet critical to find a horizontal branch that is sturdy, and about ten (or a bit more) feet above the ground. We practice "bear ropes" in a woodlot near school prior to the trip. Just for fun, we have a competition that includes speed and style-points.

Keeping energy levels stable: Food is your friend. Food provides the familiar link with home that is needed when the wind is bitter and the snow is deep. The following are ideas that are discussed in class prior to the trip. Many of the ideas are practiced for reinforcement.

Food for the 24-Hour Wilderness Experience. Food is an essential component of a safe and fulfilling experience. Here are a few food rules.

1. Avoid junk food. Junk food does very little for sustained energy. One dessert per meal is certainly okay.
2. Foods that come in big boxes should be repackaged into smaller plastic bags if possible. The less packaging that you bring into the backcountry, the better. Remember: Pack it in, pack it out.
3. The EA class does not burn garbage because garbage (unlike wood smoke) often produces toxic fumes. Also, do not bury garbage because animals will eventually dig up the garbage and make a mess. All garbage is packed out and disposed properly outside of the woods. The EA class will do our part toward a national campaign called “Leave No Trace”. To accomplish “Leave No Trace” is not monumental. Each person brings a few plastic “Wal-Mart bags” and each person is then responsible to take their own garbage out of the woods and bring the garbage home for proper disposal. If some items can be recycled, this is even better.
4. No food or drinks in or around the tents. (Water is okay.)
5. Avoid canned food as it is usually too heavy and bulky for most backpacking trips.
6. Coolers are appropriate for picnics but are too bulky for backpacking. Do not bring one.
7. Students may eat whatever the foods they like. Some items are certainly easier to eat on a campout. Please do not show-off by bringing too much food and making yourself ill trying to consume all the food that was brought.
8. Most of the food that participants bring for the trip should be easy-to-eat.
9. Encourage students to start eating as soon as they get in the woods. As Americans, we typically eat about three meals per day. Other strategies may work better on the 24-

Hour trip. Rather than eating a big meal that leaves you full and a bit sleepy, eat a bit of food all day long. Yes, eat almost constantly. To keep your energy level up, students need fuel. A challenge that most students like: Never be hungry, never be thirsty, and never be too full.

10. We plan on cooking only one hot meal in the evening. It is wise to coordinate the hot meal with tent partners. Share the portable stove with your tent partners. The fire pit can be used for cooking hot dogs and/or foil wrapped items such as pasties in the hot coals, but the fire takes time to get hot. Many outdoor people are finding portable stoves to be quicker, cleaner and easier.
11. Bring the specific pots, pans and cooking utensils. Bring a fork and/or spoon too.
12. Remember: You may not bring a knife, not even a butter knife. For most campouts with your family a knife would be essential gear. Students may borrow a knife, if needed. It will be used with adult supervision. Return the knife as soon as you finish the job.

Water: Hydrate, hydrate, hydrate! Water is needed for drinking and cooking. EA students bring water from home or school to avoid the issues concerned with purification on the trail. Students are not planning to filter water on this trip. Each student will need 3 or 4 containers of water (at least 20 ounces each). Use old Gatorade or PowerAde containers because they are plastic with a fairly wide screw-on lid. In winter, a wide mouth on the container has less chance of freezing. In winter, plan to bring at least one container of water into your sleeping bag at night to prevent the water from freezing. Craving a drink of water in the morning is common. A conversation illustrates the point: A student left his water out and the water was frozen. The parched student offered his

friend five dollars for a sip of his water. Looking at the small amount the container, his answer was, “Ten dollars.” Without hesitation, the response was, “Sold.”

Water in one’s body will actually keep one cooler when hot and sweaty on the hiking trail. That same water keeps one’s body warm at night when in a sleeping bag. Why? Water changes temperature slowly. For example, Marquette is usually cooler than Negaunee in summer. Why? The big body of water (Lake Superior) is nearby. Marquette is usually a few degrees warmer than Negaunee in winter. Why? That same big body of water, Lake Superior. The water in the big lake does not change quickly and the slow change influences the nearby land area. Water works in a similar way in your body, balancing your temperature to avoid extremes of hot and cold.

How does one know if enough water is consumed? Observe urine. Urine should be clear or pale yellow. If urine is yellow or deep yellow this is a sign that more water is needed. Urinating in the backcountry is essential. Find a private place away from trails, campsites and away from water sources, pee or poop without polluting the water sources. Digging a “cat hole” is the technique used for depositing feces (poop) or depositing toilet paper. A cat hole is not needed if simply urinating. If the need arises to urinate in the middle of the night, leave a light on in the tent causing the tent to “glow” and be visible. Also, take a flashlight. One need not go very far from one’s tent, after all, everyone is sleeping. In the past, some students have attempted to “hold it.” In other words the students attempted to avoid peeing for the whole 24-Hour Wilderness Experience. Avoiding urination can be a problematic situation as shown by the information in Table 3 below. Students are encouraged to try urinating through the “Survival= Problem Solving” walk that they engage in prior to the 24-Hour Wilderness Experience.

Avoiding urination in the backcountry. We need to let our bodily functions work like they are supposed to. Avoiding urination can cause problems:

1. First, extremely uncomfortable. Imagine the discomfort, making it difficult to focus.
2. What if one tried to hold one's pee, and then "wet the bed" when asleep?
3. .Scientifically, humans are actually heaters. So, when urine is inside the bladder, the "job or duty" is to heat the urine to body temperature, 98.6 F. When your urine is released (pee) one now has less liquid inside the bladder body to heat. So the heat is used to warm up blood, fingers, feet and the whole body. True, urinating can make one warmer. It's not immediate like a video game, the overall warming will take a little time, but urinating will allow the body to distribute heat to areas that feel cold. In extreme cases, avoiding urination could cause urinary tract infections.
4. Water is important to keep things functioning. Drink water often. Pee often. Be happy.

The tent: Your home in the wilderness. One of the first grant purchases was for tents. The EA class is actually on the second batch of tents at this point. Much was learned from that first bunch. The EA class managed to sell (practically donate) the first collection of tents to a very needy scout group. On the 24-Hour Trip the EA class spends a minimal amount of time in tents, yet the time "indoors" is critically important. Our new tents are the best quality for a reasonable price. The "Kelty Gunnison Four" is a durable, lightweight (9.5 lbs.) backpacking tent capable of housing two to four students. The tent is a dome design with only two poles. The assembly is cinchy and students can set-up in less than 5 minutes. The ample mesh fabric in the tent promotes ventilation and the generous fly goes all the way to the ground. The longer fly is very unlike most tents in

this price range. The poles are sturdy anodized aluminum and we have replaced the shock cords on all of them, otherwise no issues. The stakes were the skinny thin types that are lost easily in the snow. We replaced the thin metal stakes with rather gaudy, neon yellow, plastic stakes that one simply cannot lose.

Allow the students to choose their tent partners, girls with girls, boys with boys in groups of 2-4 students. Overall, intervention to select an amicable tent group is rarely needed. By this point in the semester, the EA students have established some partnerships and some genuine friendships. Insist that adults such as teachers, parents and other chaperones form their own tent groups or tent on their own. This technique promotes the challenges that are part of camping. The good intentions of adults that want to "help" often tend to discourage the ideas and actions of young people. Rule of thumb: If students are engaged in a safe activity, leave the students to their own decisions and their own devices. On the 24-Hour trip, the outcome can translate to dozens of decisions. Some students are not accustomed to make decisions in their homes. Some young people are programmed and are told what to do and what not to do. Teens are sometimes evaluated as a "good kid" if "performing as directed". Being challenged and thinking through a problem is not part of the equation. Some students do not realize the intrinsic satisfaction of solving problems, they want to be told (by an adult) that they have done well.

The tent rules are condensed into the "Tent Commandments". Students like and remember these gimmicks. This tongue-in-cheek approach to conveying some ideas helps organize students and keep the tents in good condition. Of course, the Tent Commandments are presented with dramatic expression a-la epic cinema.

The "Tent" Commandments. Heed these and your tent will be your home.

I. Thou shalt not enter in the tent of another group. (This commandment promotes at least some woods-privacy and avoids a myriad of teenage problems.)

II. Thou shalt not fold thy tent. Instead, stuff thy tent. (Folding a piece of paper in front of the group, demonstrate how the fold tends to be in the same place each time. All of the students realize the weakening of the paper fibers and surmise that the tent fabric is also weakened.)

III. Thou shalt not eat food or drink liquids (except water) in or around a tent. Crumbs and liquids get in the fabric and do not come out. Animals are attracted to these scents. Avoid this problem.

IV. Thou shalt zip thy tent zippers before stuffing thy tent. (Setting up a tent with open zippers can be very confusing.)

V. Thou shalt spread thy tent to dry thoroughly back at school before long-term storage.

VI. Thou shalt avoid prepare thy tent area and remove sharp objects such as sticks and rocks.

VII. Thou shalt not drag thy tent from place to place.

VIII. Thou shalt not be rough in or around thy tent. (A tent is not the place to wrestle.)

IX. Thou shalt be gentle with all zippers. They are difficult and expensive to replace.

X. Thou shalt report all problems with tents to Mr. Delpier. Many issues such as small tears, missing parts or zipper problems can be fixed easier if Mr. Delpier knows right away.

The most important item is: Keep students out of other student's tents. Actually, the tents serve two purposes on this campout, changing clothes and sleeping. The tents are not a play zone. The EA students do all of the activities as a large group or a small group outside of the tents. We practice setting up tents at least two times prior to the campout. The first time is an inquiry-activity. The students simply figure the poles and holes out. For me, what a hoot. The second time, I ask students to use their acquired skills to set up the tent with efficiency, as if a storm is due to move in soon. The students' movements appear choreographed, like observing ballet with tent poles.

Backpacks: Designed specifically to avoid back strain. We have top-notch "Osprey" backpacks. The backpacks were another purchase that utilized grant funding. The Osprey Company, through our local DownWind Sports Shop offered the packs at a reduced price because the "cool color" that season was turquoise and these backpacks are black. Who cares? Functionally, the packs are perfect. If buying 20 or so backpacks, ask for a discount, most retailers expect that you will ask and are prepared to make an offer. Local retailers want your business. If not, call DownWind Sports in Marquette, Michigan and ask for Bill Thompson.

The backpacks are simple in their design but have good capacity potential. The weight that students typically carry is 30-45 lbs. The day packs in which students carry schoolbooks are nearly as heavy, but lack hip belts. Like all true backpacks, our backpacks feature a hip belt. When worn correctly, the hip belt transfers the weight of the pack to the buttocks and the legs, the largest muscle groups of the human body. We practice the correct technique to pick up a loaded pack, using a wide base and balancing the pack on the knee while poking arms through the shoulder straps. The students

theorize packing techniques and come to some reasonable conclusions through their discussions.

Typically, the items that are to be used on the trail such clothes that may go on and off, plus snacks and water go near the top of the pack. The idea is to increases the accessibility. Sleeping bag, tent, warm clothes for nighttime plus pots, pans and stove may be down deep in your pack. The lower the possibility of immediate use, the lower in the pack the item goes.

A few of the boys were rough-housing with (empty) backpacks on, probably because the packs seemed a bit like armor…and they are teenage boys. The boys were warned to use caution with loaded backpacks because we tend to attempt to pull ourselves upright when falling. This attempt is often successful in keeping one upright, but the twisting could strain the back muscles. “Better just to fall over”, one lad suggests. “Even better to cut the horseplay”, one added with a wink. The young men nodded in compliance with the request.

Compression stuff sack. An innovative item often used by backpackers to save space in their packs is the compression stuff sack. Place a large (winter) sleeping bag within a nylon storage sack alongside a backpack. The sleeping bag/container is actually taller than the backpack. “What is the strategy for fitting all of this into a backpack? Tent, clothes, and food are needed and the sleeping bag takes up all the space in the backpack.” The discussion ranges from “get a helper” to “don’t go in winter”. With the drama scene set, pull out a bright purple compression stuff sack. “Get intense to get the sleeping bag in the compression stuff sack. Turn up the intensity.” Remove the sleeping bag from its off-season container and start stuffing the huge bag into the relatively small compression

stuff sack. The task looks impossible at first, students are giggling. One handful at a time, stuff the huge sleeping bag deep into the tiny sack. Groaning, and dropping to knees, the struggle continues. The minuscule bag appears full and will hold no more but more than half of the derelict bag remains. The animated agony, coupled with an exaggerated moan, gets louder and students are hysterical with laughter now. Make a fist and pound the remaining portion in. Next, flip the sack over and start adjusting the straps. Little by little, the straps pull the fabric tighter, and tighter. What once was a tall container is now a reasonably small solid mass that will fit in the backpack with ease along with many other items. The students are anxious to practice this skill with their sleeping bags. The students quickly distribute the compression stuff sacks and commence. The previous moans were nothing in comparison to those of the students. If the principal had chosen this moment to visit, the student's wailing may have been incriminating for their teacher.

Adult leaders: Hats off to chaperones. Looking for chaperones for the "Rock Climbing Trip" and for the "24-Hour Wilderness Experience" is a continuous quest throughout the year. One technique is to mention the trips often while engaging in conversation with an adult that shows interest in the outdoors, and does not fear middle-school students. "Adult chaperones" are defined as parents, older siblings that are beyond high school, plus relatives and college students. Many adults have camped in summer but are wise not to venture into the wilderness alone in winter. Going with a group, especially in winter is safer and more fun. One way to lure the adults out; "No bugs in January, this is a promise." Some of the most insightful chaperones are former Environmental Adventures students. The former students often have fond memories of the class and the trips and contribute with enthusiasm. It is a good idea to meet with adult chaperones prior

to the trip, usually the morning of the trip, to steady the nerves a bit and reassure the chaperones that the students need the challenges. The role of the chaperone is “stand by” but not “take over” when students are facing a problem. Students will approach chaperones for help, so arm chaperones with these phrases: “This sounds like a problem that you could solve.” or “Give that a try.” or “You and your tent partners may want to talk about this problem as a team.” Below is an informational checklist that is provided for adults. It is preferable to put the information in the hands of chaperones several days prior to the trip.

The following are some ideas that may help prepare adult chaperones for the experience and make the experience more enriching for the students. First, please know that the students meet daily in this elective course and prepare for the field experiences in almost every detail. The field trips put all the components practiced into a realistic setting. As a trip leader, be aware of the expectations that are established for the students.

EA Unit Six: The 24-Hour Wilderness Experience

Each semester, Environmental Adventures students prepare for the “24-Hour Wilderness Experience.” This field trip sometimes changes students’ perspective on daily living, and on what the students appreciate. In all, over one thousand middle school students, dozens of parents and college students plus other community members and teachers have contributed and benefited from the 24-Hour Wilderness Experience, the culminating event of the Environmental Adventures Program.

The preparation for the “24-Hour Wilderness Experience” takes six weeks, or as one student pointed out: “It takes six weeks plus all the other moments that you ever learned something in your life.” The trip coincides with the end of each semester in

January and in May. This trip is a minimum impact backpacking/primitive camping experience providing students with real challenges in the north woods (not contrived challenges like on television). Challenges include dressing for the current weather and bringing functional clothing for the worst possible conditions, plus navigating using topographic maps, compasses and GPS Units. Groups of students are instructed to use the architecture of the forest to safely hang their food. The students also make swings (just for fun) with minimal materials such as webbing, carabiners and trees. The students are encouraged to use the forest without changing or harming the woods. Other challenges include: hiking (sometimes in deep snow), backcountry food preparation, eating effectively to maintain energy, maintaining proper hydration, and learning to protect the natural environment while having an enjoyable time. (The mid-January trip is especially challenging and some students actually petition to get into these sections to "enjoy" this personal test.) The 24-Hour Wilderness Experience is more than a field trip, perhaps a better description is a short course on green, sustainable, healthy living.

Students set up tents, pack and unpack backpacks, learn how to maximize space using low-tech (but highly effective) compression stuff sacks. Students electronically mark "waypoints" or landmarks along the trail using the GPS The waypoints provide a digital landmark that can be used to retrace our steps. In preparation for this culminating experience, the students practice nearly every aspect in and around our school building. Near the end of the semester, the day of the trip finally arrives. The following is a description of the actual 24-Hour Wilderness Experience. The asterisks * denote information that is added on these pages but not visible to the students. The students will learn this information, of course, through the experience.

The 24-hour wilderness experience itinerary.

1. Coordinator: Mr. Delpier (Chuck S. Delpier)

2. Location: Wetmore Bog/Hogsback Mountain Area

3. Welcome chaperones.

4. Mr. Delpier is looking for students' best effort.

5. Show-off by showing positive leadership skills.

6. Accept all Extra Gear that is offered. Practice saying: "Thank you, Mr. Delpier. I would be happy to carry even more."

Wednesday Morning And Afternoon

1. Eat a good breakfast at home. Drinks small sips of water all day. Eat all day. Eating keeps the energy constant. Be positive.

2. 7:55am Go to Homeroom. Smile because the EA classroom is the outdoors today. Challenging but fun. At 8:05am go to Science Lab after Homeroom.

3. Pack backpacks thoughtfully in the Science Lab. Do most of the work on the floor. *Students can do it. Students may notice that if a question is asked aimed at Mr. Delpier, or any adult, the adults will probably not give a direct answer today. The adults do care about the students. However, the challenge is for students and student groups.

4. Pre-trip Meeting. Be polite, be patient.

5. Positive and full participation throughout the day is essential.

6. When completely packed, change into "woods clothes".

*The goal is to enter the woods with dry clothes. Packing in the "overly warm" school building can be sweaty work.

7. Drive safely to “Wetmore Bog/ Hogback Mountain Trailhead”. Good manners in vehicles. Positive conversation.

8. Activity: “Hiking/Backpacking is a Physical Challenge.” Allow Mr. Delpier to lead. Leading makes him feel important and special. Keeping the group together is critical for success. *We travel at the rate of the person with the least ability. We intend to challenge the group physically yet leave no one behind. We post an adult chaperone at the tail end of the group for safety. All the students are in the middle between adults. Additional adults are posted in the middle.

9. The GPS unit can save a life if carried in a pocket, not left in a tent or a backpack. The unit is in one of two places: ON in hand or OFF in pocket. In the car, on the drive, put in these coordinates:

*Parking Lot/Trailhead (Near County Road 550): N 46 36380 W 087 28185

*Old Growth Forest Geocache: N 46 36314 W 087 28027

*Hemlock Home (campsite): N 46 36515 W 087 29040

10. First Activity along the trail: Geocaching. Old Growth Forest Geocache 100% Participation. Find this geocache. Clue: Hollow tree stump.

*The Old Growth Forest Geocache is not far from the trail and gets students in the habit of using our GPS unit immediately. From GPS work in and around school, the students know the protocol; so geocaching is a familiar activity in a novel and lovely setting. The old growth eastern hemlock surrounds us and one feels part of the deep north woods.

11. Arrive at Wetmore Pond/Bog Overlook.

*It is a wonderful feeling to arrive somewhere (anywhere) by one’s own power. This overlook allows students to feel as if they are hundreds of miles deep into the north

woods. (In reality, the group is six miles from the city of Marquette, which boasts a regional trauma care center.) From this rocky outcrop the students can see for miles on a clear day. In the foreground, the group sees Wetmore Pond/Bog, and a glimpse of the bog directly below, half-hidden by the cliff. In the distance, the summit of Hogsback Mountain is visible. We can also see the zone on the northern flank of the mountain, the campsite, “Hemlock Home” is in that area.

12. “Bog Activity” 100% Participation.

*A set of flashcards provide visual aides to the bog environment. The flashcards show key words such as sphagnum moss, pitcher plant and northern cranberry. Bogs are naturally low areas that hold water. The sphagnum moss produces acid and the pH level of the bog is significantly lower at about 4.5 to 5.0 on the pH scale. Plants and animals that die in the bog are actually preserved because the mildly acidic environment inhibits the growth of bacteria. As a result, the plants and animals do not decompose. In Europe, some bogs were used as a burial area for criminals. Students can find photos on the Internet that show the remains of mummified people from circa 1000 A.D. One photo displays a noose clearly around the criminal’s neck. The photos are on laminated cards so the photos are easy for students to pass around. Bogs may have a reputation for being scary places but this claim is unwarranted. In reality, bogs can be a lot of fun. Over the years, the sphagnum moss accumulates (it does not break down) and becomes a floating mat of vegetation. The bog “quakes” as the group walks on top in the spring; if the early winter is mild the bog retains some of this characteristic through January. Students enjoy jumping around and causing their classmates to bounce a bit. “Playing” in the wilderness is a new experience for many of the EA students. Dr. Richard Louv (2006) advocates

playing in the woods rather than restricting child's play to playgrounds and sports with adult coaches and referees.

*Pitcher plants and sundews are carnivorous plants of the bog. We find pitcher plants only in these acidic conditions. The plants will not devour you. Go ahead, poke a finger into the pitcher plants and feel the hair-like structures that point downward and prevent insects from escaping.

*Northern cranberries are another plant that thrives in acidic conditions. The plant produces the familiar bright red berry. Most students are familiar with cranberry sauce and cranberry juice. Most students do not realize that these products have a large amount of added sugar or corn syrup to sweeten the berries. Few students have tasted a real cranberry directly from the source. The bog environment opens a new area for teaching and learning. Whether one describes the cranberries as tart, bitter or sour, the flavor is certainly strong. Many students want to try the cranberries, and we are presented with a delightful face-photo opportunity.

13. Activity: Continue backpacking on the West Trail to "Hemlock Home" the "primitive" campsite. *The next section is the longest section of the trail. Be aware of each student's level of fitness, especially when the snow is more than a foot deep. The campsite location is a relatively level wooded area that is adjacent to a stand of young hemlocks that serve as a dandy windbreak. Sites are rotated each year and "Hemlock Home" is particularly well protected. Some students notice an ample supply of dead and down timber that we may collect for firewood. A nearby stream will serve for water for extinguishing the campfire in spring. In winter, we use snow to extinguish the fire. We will use our water that we brought from home for drinking and cooking. For a short (24-

Hour) trip this bring water from home is not only feasible, but safer overall. A nearby hill offers zip-line opportunities. There are plenty of mature trees to set up bear-ropes. The campsite is about 300 meters from the main trail, shielded by trees from hikers. Our EA group does not intend to cause visual impact and the students do not want to suffer from the effects of trail traffic. In short, “Hemlock Home” is an ideal location.

14. Set up tents. The tent is your private area. Keep away from tents that belong to other groups. Allow everyone to have privacy. *Students use the techniques that are learned to set up tents. The students are excited because site location today really makes a difference for their comfort and safety. “Don’t forget to look up”, a student tells his partners. The young man is referring to dead branches or entire dead trees commonly called “widow-makers”. The widow-makers are large tree limbs that may be attached by the slightest shred of bark, the next breeze may cause limbs to fall, or limbs may remain for 100 years or more. In any case, recognition is critical for safety.

15. Organize tent sand gear now while the woods are bright. Mr. Delpier’s prediction: “It will be very dark later.” (Thank you, Captain Obvious.) * During the January campout, darkness comes at 5:30pm. Darkness remains until 8:15am That is a lot of darkness. Students can manage darkness with encouragement and organization skills.

16. Set up “Food-Storage-Ropes” 100% Participation. Attributes required: brains, leadership and skill. Please show all three. *Due to the variety of trees near our campsite, students are much more efficient in these woods than in the woodlot near school where the skill was practiced.

17. Students may eat/drink as long as these activities do not distract teaching or learning. No eating or drinking in or around tents. *Students enjoy this opportunity (privilege) to eat when hungry. At our school the eating schedule is limited to lunchtime.

18. Challenge Activity: Work with partners to build a swing that is fun, safe to use, and uses the resources of the forest without damaging the forest. Each group will get two pieces of webbing and two carabiners. Please do not lose the carabiners in the snow. Clip the carabiners to something when not in use. Do not build a zip-line because the carabiners would destroy the webbing. The group will enjoy a zip-line later made from steel cable, not webbing. *This activity is retained as a surprise. The students find the activity fun and challenging. The activity helps the students realize that playing in the woods is fun. Sometimes, a very musical group is happy to entertain. Musical students are asked to incorporate a song when we come to visit “Grand Rounds” style. We respectfully clap and then move on to see each group’s architectural design. One memorable design utilized a large rock and a tree on a hillside. The “swinger” pushed off the rock, rounded the tree and then into thin air and then back to the rock. The “simple” swing was true genius. Activities like the swing project provide students with differing abilities to shine.

Wednesday Evening

1. Activity: Hike the Hog. Bring water, snacks, and essential clothes, etc. The summit is often windy and cooler. *The entire group hikes up the mountain with no backpacks and minimal gear. Students enjoy the chance to walk unencumbered and voice their appreciation.

2. At the summit, the views are spectacular if the weather is clear. The students use a map and compass to orientate position.

*Students may explore summit, all students groups must be with an adult leader as to explore. In winter, students can discover a few safe areas for sliding and “butt sledding”. The key is “feet first” on all sledding attempts.

3. Hike down the mountain to our campsite. Mr. Delpier leads. Please do not pass Mr. Delpier. *As we walk in winter, more butt-sledding opportunities may exist. Students are anxious to cook dinner and are motivated to walk fast on the downhill. Students turn on their GPS and navigate to the campsite. The activity slows the students down a bit (so that the adults can catch their breath.)

Encourage students to pick up dead and down branches in the last few hundred meters prior to reaching the campsite. Birch bark that is on the ground is an important fire starter. The oils in the birch bark burn hotter and more readily that paper.

4. Students instruct the leaders. “Primitive Fire Building Techniques with Modern Materials.” *Using flint, steel, steel wool, birch bark and tiny twigs students use the skills learned in class to start the campfire with tools other than matches or lighters.

5. Work with group members to prepare a hot meal utilizing the group’s stove and/or the campfire. Enjoy the hot meal and be sure to clean up. Plan to pack out all wrappers, containers and waste. No wrappers in the fire. 100% cleanup by every person is required. Use those Wal-Mart Bags. *Students are excited and confident to cook their own meals. Years ago, a U.S. Army officer that loved to cook for groups volunteered to cook on nearly every campout. His food was delicious. Captain Emerson is missed. He has been transferred to a new assignment. The change forced the EA class to use grant funding to

purchase portable stoves and encourage students to acquire this skill. The students responded favorably, watch out Julia Child.

6. Can students go without a flashlight for a while? When lights are used, point flashlights down at the ground. Avoid “zapping” others in the eyes. *Our pupils dilate if we can slowly adjust as when the sun goes down. It is amazing how much we can see at night despite being merely human.

7. Zip-Line Activity: 100% Participation *The Zip-Line is one of the newest activities. The zip-line was developed due to student interest. The first zip-lines were fashioned from climbing rope. The dynamic qualities of climbing rope cause the rope to stretch when weighted. Stretch is not the characteristic wanted for a zip-line. The current state of zip-line evolution: Use a 50’ steel cable stretched between two trees. One tree is slightly down slope. Two “come-a-longs” (cable-pullers) provide adequate torque on the cable. The adult leaders set up the cables. Students display some anxiety in anticipating the zip-line. The activity is safe, but the movement and lack of complete control is a visceral challenge for many students.

8. Pirate Activity: 100% Participation Expected. This activity is not a scary activity, but cool. *When very dark and close to bedtime the goal is to insert a quiet, but meaningful activity. The students walk in a quiet procession to area of thick woods only 100 meters from the campsite. While the students cleaned up from dinner, the students did not notice that a large pirate flag was being stretched between trees. The pirate flag area had a few downed logs forming a natural amphitheater. The students were asked to sit on the logs or stand quietly. With assistance from adult leaders, students are presented with a pirate patch and verbal description of how to place the patch over one eye so that light is

completely blocked from that eye. Addressing the group in a quiet voice, the students are assured that the Pirate Activity is not a scary activity. Students are asked to turn on, and then relinquish their flashlights and headlamps to the adult chaperones. The students are instructed to look at the lights occasionally with their uncovered eye. The chaperones are holding the lights while the story proceeds:

"We often get the idea that pirates were disorderly robbers that stole property using swords, cannons and savagery. Actually, science not savagery was the norm for pirates. Pirates were thieves, but were scientific and stealthy in their approach. Is it difficult to imagine a scientific band of pirates? Keep listening. You are wearing a patch to block light in one eye. Perhaps some pirates wore these because an eye was lost in a scuffle. Or, perhaps a 1760's pirate recently had laser surgery to correct their vision (a few laughs from the adults.) Many pirates knew that wearing the patch would cause the pupil in that eye to dilate. This dilation boosted their night vision in that eye. How could dilated pupils help a pirate? Students have 20 seconds to turn to a person nearby and whisper how the patch may have helped a pirate's "career". "Go." The students are following the story and know exactly how the patch is used. The students enjoy reaching the conclusion and actually saying the idea to their friends."

"Let us continue the story. Just a reminder, glance at a light now and then with your uncovered eye. See if this part of the story matches up with your ideas. Thoughtful, scientific, pirate thieves traveled in small groups of 4 to 6 people. (Yes, there were female pirates, too.) If you were a pirate would you rather split the loot with a small group or a band of thirty? The small group, with patches in place (for an hour or more) would approach a ship that the pirates suspected carrying goods or treasures. In those days,

that was the reason for most voyages. Quietly rowing a small boat or actually swimming was the key. The pirates would overcome the lone sentry. Next the pirates would sneak below deck where, often, the sailors were drinking rum, and playing cards by candlelight. Often the sailors outnumbered the pirates three to one. The first order of business was to snuff out the candles. Complete darkness was essential for the pirates to seize control."

"With the lights out, the sailors were unable to see and were quickly dispatched (throat slitting was the common technique. How did the pirates see? Correct. The pirates simply removed their patch. Their covered eye was accustomed to the dark. The pirates could see well enough in total darkness to mount an attack and barely receive a scratch. That is good science. Pirates were not all bloodthirsty savages. Many pirates were civilized, organized and used science in their approach as thieves." Did you know that there were many female pirates? Enter "female pirates" into Google and see for yourself. *At this point, ask the students to look at the pirate flag just a few meters from them. Explain these procedures to the students:

A. The adults will douse the lights.

B. When the lights go out, look at the flag.

C. Remove the patch and put it in a pocket.

D. Close one eye and then the other.

E. Determine, which eye can see the pirate flag.

F. Immediately, tell a classmate what you see.

G. Is everyone on board? Oops, that was a pirate pun! Ready? Go.

The students follow the procedure and are amazed at the clarity in their covered eye. The students are convinced that a group with a low-life reputation could be so clever

to use science to their benefit. Encourage the students to keep their pirate patch as a reminder of their experiences and friendships in this class. Students have accomplished and learned much this semester in the Environmental Adventures course.

9. “Dark Art” Activity: 100% Participation Expected. *This one is humorous when we get back at school. With the students still in the dark amphitheater, tell the students that their ability to see in the dark (like a pirate) is not nearly as keen as several animals that are active at night. Nocturnal animals develop adaptations that help the night creatures see food or hunt and/or avoid predators. The adults help distribute 4x6 note cards and a single crayon (or colored marker) to each student. The students are instructed to:

A. Print their name largely and neatly at the top.

B. Print the color of the crayon in their hands.

C. On the back of the note card, draw a picture that shows them participating in their favorite activity today.

A few chuckles as the students realize that the cards will be displayed for classmates to see back at school.

In the classroom, show the note cards one by one, using this technique: “here is Tyler’s card, Tyler is just learning his colors, he thinks that green is actually red. We should probably not allow Tyler to drive an automobile until he is sure about those colors. Tyler’s favorite activity looks like a tight-rope walker…oh no, that is a zip-liner. Nice job, Tyler.”

10. All Leaders and All Students: Share stories and outdoor experiences at the campfire. Keep the stories and jokes clean and non-offensive.

11. At 10:00pm, no more wood on the fire.

12. After Pirate Activity and Dark Art Activity students may go to bed. Remember, do not wear the clothes you have worn all day at bedtime. The fibers contain moisture. You will feel wet and cold. Wear a new set of clothes or pajamas or longjohns to sleep in.

13. At 11:00pm : Q.T.= Quiet Time in tents after a memorable day. (Tent-time is not a time to goof off.) You will find out that if you talk quietly in your tent, quiet talk may continue. If you fart, giggle or goof around, you will be asked to stop. Please avoid being corrected. *Most students are very tired and settling down takes only 15 minutes or so. I walk around but hear very little. Most lights are out. Today was a good day.

Thursday Morning

1. 7:00am Wake up. Enjoy Mr. Delpier's singing. Mr. Delpier is your alarm clock. He may sing your requests. If you know the songs, please join in.

2. Get up and get moving to warm up. No Whining. Movement will help you get warm. *Leaving that warm sleeping bag is a challenge in itself.

3. Take down tents. Organize and pack gear. Move. Move. Move. No campfire or stove use in the morning. No stoves in morning. No fire. *In the past we lit a fire in the morning. The idea was to come over, get warm and go back and continue packing. The students just wanted to stand around it indefinitely. Having a campfire in the morning was counterproductive. Our new plan is working much better. Not having a fire feels a bit Spartan but we must get up and accomplish all the jobs. People with civilized schedules are meeting us at the trailhead at 9:30am.

4. Pick up and pack out all trash. Look around for litter. When we get back to school, recycle whatever you can recycle.

5. Backpack to the trailhead. Goal: Arrive at trailhead at or before 9:30am.

6. Drive back to NMS. Good manners in vehicles. Positive conversation.

7. Everyone helps unpack and organize gear. Tents and other gear are spread out to dry.

8. Take home all your stuff when you go home at the end of the day. Leave all N.M.S. stuff in Science Lab or EA Lab to dry and air out.

9. Challenging yourself makes you glad to be alive. Will you do this type of activity again someday? Reminder: Students should attend the Post-Trip Meeting in the Science Lab. *The Post-Trip Meeting is congratulatory and outlines the remainder of the day. Students will put away as much gear as possible, allow other gear to dry, do some personal cleanup, eat lunch in the regular cafeteria with other 8th graders and tell your tales. The students typically get a bit of a reception from students that are inquisitive about the trip.

10. Many thanks to leaders. Congratulations to students.

11. Be ready to write about this experience as part of your self-evaluation. *The students will write a reflection paper on the 24-Hour Wilderness Experience. The focus of the paper will be what you learned about yourself. Did you feel challenged? Did you meet the challenge? Hypothesis: Does meeting a challenge as a student become useful as an adult?

Appendix E: Young Women in the Wilderness

In response to many questions that the females in EA classes were asking, the expertise of nurses that are well acquainted with the EA program and the outdoors was invaluable. A question and answer sheet was devised that was distributed to the young women in the class. The question and answer format may help the girls feel as if their concerns are legitimate. The following are some excerpts from the question and answer sheet:

Questions and Answers Regarding Young Women in the Wilderness

The following are questions that may be on your mind as a young woman. Be confidant, there are some challenges, but you can overcome them.

Question #1: Is "holding it" (not peeing) a bad idea?

Answer: Urination (commonly called "peeing") is an important bodily function. Do not risk a bladder infection by "holding it". Pee as often as needed. Mr. Delpier will schedule many rest stops for the group. Mr. Delpier purposely takes rest stops to give individuals an opportunity to go "to the bathroom" privately. One of the best things that one could do to increase confidence is to practice peeing outdoors prior to the trip. After a few times, "aim" will improve and one will find the whole situation rather amusing, not overwhelming. Just think of the stories that can be shared with grandchildren.

Question #2: "What if I am having my period or I think that I may have my period when I am in the woods? What should I bring when I go into the woods?"

Answer: Having your period in the woods is not a problem. The physical activity on the trip is usually a good distraction and often cramping may be diminished due to the exercise. Bring the same tampons or pads that you usually use. Also, bring several Wal-Mart or other plastic bags to discard the used pads or tampons. Double-bag them to prevent leaks.

Question #3: Is a bathroom or outhouse in the woods?

Answer: No bathroom, no outhouse. However, the backcountry offers many private places. You will notice places where the trees or bushes are thick. Sometimes we see large rocks and trees that have fallen over, etc. Do your best to be at least 200 feet away

from trails, streams, ponds and lakes. Squatting while holding on to a branch is a good technique for urinating or defecating (pooping).

Question #4: "When I need to pee, poop or change a pad or tampon, should I go alone?"

Answer: That is a personal decision. Usually, once comfortable with the woods, many girls find it is easier to go alone. Some girls bring a friend to act as a "lookout" to ensure privacy.

Question #5: Why do we need to tell Mr. Delpier when we go to the bathroom?

Answer: Mr. Delpier is responsible to know where students are at all times. He wants you to have your privacy. Mr. Delpier will be sure that others (especially boys) do not invade your privacy. He sometimes distracts the boys. He also knows where the boys are so that you do not "accidentally" cross paths. Let Mr. Delpier know when upon leaving and returning. If leaving the tent to pee during the night, when everyone is sleeping, skip the step of telling Mr. Delpier. Be sure to leave a light on in your tent. The tent will glow. A glowing tent is easy to find. You need not go far from your tent at night.

Question #6: "Where should I keep my tampons, pads and plastic bags?"

Answer: Keep handy in a pocket or near the top of your backpack. Know where your supplies are and make it a point to bring the supplies wherever you go.

Question #7: "What should I do with used pads or tampons?"

Answer: These items contain blood and other body fluids and may attract animals. Place in a Wal-Mart plastic bag. Next, put that bag inside another bag. Do not store these items in your tent. Hang the bag from a tree or store under the snow or leaves. Remember to pack *out when you leave the area.*

Question #8: "What if I have cramps and I need medication such as Tylenol, Ibuprofen,

Motrin, or Pamprin, etc.?"

Answer: Plan ahead and bring these medications. Turn all medications in to Mr. Delpier at the start of the trip.

More Questions? If you have any other questions before the trip, please write them and

give to Mr. Delpier and he will get the answers. Be confident. You know a lot about how

to stay safe and healthy. Have fun!

Appendix F: Transportation

Transportation procedures have changed completely from the initial years of the EA program. When the EA program first started, the school district was happy to provide a bus and a driver and the costs were absorbed as part of “doing business”. Several years ago the policy changed and the EA program (an others) were asked to contribute. Later, the EA program was asked to assume full financial responsibility. According to the calculations by our district business office, the costs for a bus and driver for our 24-Hour trip were in excess of $180. Parent drivers helped solve the problem while augmenting the program. Despite high fuel costs, parents have cheerfully responded to driving requests. Parents also add the “care factor”. Parents add bits of advice and cups of cocoa that really help soothe students that are overexcited on the road into the woods, or overtired on the way out of the woods.

Appendix G: Safety Checklist for Adult Leaders

Safety is our paramount concern in the backcountry. Preparation is the key. The students have been made aware of all of the following information. The Safety Checklist for Adult Leaders includes the following items:

- Due to calorie and hydration requirements, food and liquids (especially water) are encouraged throughout the day, once we arrive at the site.
- All other school rules apply.
- All medications (even Tylenol) should be labeled with dosages and given to Mr. Delpier prior to the trip for safe storage.
- Safety is an important issue. Students should practice safe procedures for all activities.
- Students should challenge themselves and use the skills learned. Creative use of the skills and procedures learned is an important part of the trip.
- Prior to the trip, students should turn in homework from other classes. Students should be aware of all missed assignments and complete the assignments according to the guidelines of the teachers.

Because of Michigan Law and codes for School Districts, some of the following outdoor practices may differ from an adult's personal experiences in the outdoors. Please read thoroughly. Most of these policies will be recognized as common sense considering the age and experience level of the students. Positive energy is a model for students.

Appendix H: Expectations for Adult Leaders On the EA 24-Hour

The adults are expected to set a positive example for the students and model behavior that shows respect for all the people involved plus respect for the environment. Expectations for adult leaders on the EA 24-Hour Wilderness Experience include the following items:

- Adult chaperones are asked to please refrain from tobacco, alcohol, drugs, or weapon use during the trip.
- If a specific use for knives or matches is justified, such as meal preparation, please supervise the use and collect and immediately. Store knives or matches/lighters safely.
- Please make every effort to be around the students and look for their positive behavior.
- Encourage the students to solve problems and think creatively within school rules and the procedures for the trip.
- Adults are expected to plan separate tent accommodations from the students.
- One goal is to encourage problem solving by students. If a problem is possible to solve by a student, allow them to solve it. This often takes longer the adult solving the problem. This is okay!
- Encourage positive conversations, positive language, and good-natured humor.
- Be proactive. Our goal is to establish clear guidelines that will prevent problems.
- Please report any unusual or suspicious student behaviors to Mr. Delpier.
- Participate fully in the activities and model the behavior that we expect of the students.
- Mr. Delpier must know where students are at all times. Students will let Mr. Delpier know when leaving the group to go to the bathroom and upon return.
- Aside from toileting, most other activities are in a large group setting. Students should not be alone. This plan is designed for the safety and the well being of all.
- We encourage students to observe animals and show respect for wildlife and their homes and habitats. Caution should be observed. While certain animals like frogs

may be captured (then released) for close observation, others like deer are only observed at a safe distance.

- As an environmental class, one of our goals is to practice minimum impact techniques. The EA class abides by the "Leave No Trace" guidelines established by N.O.L.S. (The National Outdoor Leadership School). Some of the guidelines include:
    - Pack out all waste.
    - Human excrement and toilet paper is buried in individual cat holes at least 200 feet from water sources, trails and campsites.
- We encourage students to observe and know about plants, fungi and trees. We avoid picking flowers and breaking trees that stand because dead trees (snags) provide homes for wildlife.
- If wild edible plants are abundant and clearly identified by a qualified adult, students may consume small samples if the student chooses to do so. Examples of trailside edibles, in the habitat that we are planning to visit include: wintergreen, watercress, and cranberries.

On behalf of The Environmental Adventures program and the students, allow me to extend our gratitude for your participation as a chaperone. It is our hope that you enjoyed yourself, the students and the experience.

Appendix I: EA Students Use the Terms of Outdoor/Environmental Education

The EA students were in grade eight and were 13-14 years of age at the time of writing. The student writing uses the vocabulary inherent to rock climbing, wilderness survival and land navigation. The reader will encounter the following terms:

o Belayer	The person that grasps the rope using a specialized technique and prevents the climber from falling (a long distance) while climbing.
o Webbing	Lightweight, one inch wide, tubular nylon often used for anchoring the climbing system. Webbing can easily support the weight of a human, and could support the weight of a mid-size automobile.
o Carabiners	Aluminum snap-links used in many applications in anchoring a safe climbing system.
o Crux	The most difficult part of the climbing route. It can be anywhere on the route.
o Swings	These are literally swings (a la playground swings or Tarzan-style) that the students construct in the forest using webbing, carabiners, dead and down material and sturdy trees for the purpose of exercising student creativity and engineering skills.