Is just being outdoors enough?

A comparison of a one week outdoor adventure program (Malaysia Week) and a one semester natural history course (The WILD Malaysia Semester Course) on middle school student attitudes toward the environment.

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ABSTRACT

This research compared the effectiveness of a one week outdoor adventure program (Malaysia Week) and a one semester natural history course (The WILD Malaysia Semester Course) in influencing student attitudes towards the environment. Data collected included student journals, student surveys, student interviews, teacher surveys, teacher interviews and a personal journal. Evidence showed that both Malaysia Week and The WILD Malaysia Semester Course had a positive impact on teachers and students attitudes towards the environment. Evidence also demonstrated a student desire for more hands-on, field based practical learning which influenced curriculum revisions of Malaysia Week and The WILD Malaysia Semester Course.

Table of Contents

INTRODUCTION

I have always loved playing outdoors. As far back as I can remember experiences roaming freely and wildly while, fishing, camping and exploring Nature have been a part of my life. My love for the outdoors coupled with a child's unquenchable curiosity to somehow unravel life's mysteries, especially Nature's secrets and inner workings, eventually evolved into a lifestyle of learning and teaching about the environment.

As a child I was fortunate to have the opportunity to wander around and explore my backyard and nearby woods. I am afraid that the love I developed for Nature early in my childhood is not cultivated in many children these days. As a byproduct of increased urbanization and development, the days when parents would tell their children 'get outside and play! I don't want to see you until dark!' are on an increasingly rapid path to extinction. I don't think the children have changed. I think they still need to get outdoors and run wild and experience what I was lucky enough to experience. I think that the world we live in has changed and children growing up in today's world are not provided the opportunity to go outside and simply play and explore.

When asking myself how I might influence my students and point them to path of discovery so they could catch a glimpse of what I had seen as a child, only one answer was obvious: I need to provide them an opportunity to wallow in the mysteries of Nature.

CONTEXT

If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of childhood are the time to prepare the soil.

Rachel Carson
The Sense of Wonder, 1965

I have been teaching since 1997. Before becoming a teacher (before and after graduating from University) I worked in several positions as a field biologist and lab technician at the University of Georgia Institute of Ecology and Oak Ridge National Laboratories Climate Change experiments through Emory University. My work ranged from limnological water quality studies, aquatic macroinvertebrate studies, forest ecology experiments and icthyological surveys. These experiences greatly influenced the direction I would later take as an educator.

I began my teaching career in a rural school in Georgia, USA as a grade nine biology teacher. Shortly thereafter I moved to California where I worked as a naturalist in the San Bernardino National Forest at a private outdoor science school. The next year, I

worked in the public school system in Riverside, California as a grade eight earth science teacher. After a year in the public schools in California, I moved back to Athens, Georgia to work as a naturalist at Sandy Creek Nature Center (SCNC). Two years later I found myself in Kuala Lumpur, Malaysia working in my first international posting at a private international school.

My serendipitous career and varied interests in outdoors and travel have taken me many places where I have always been lucky enough to secure positions at various educational facilities. Wherever I am working I always have a keen interest in local natural history and outdoor environmental education. No matter what school I am in I always initiate environmental clubs with an outdoor education focus. My experiences as a naturalist in both California and Georgia have opened my eyes to various forms of instruction and environmental education methodology and have provided me valuable experiences in informal learning.

As I look back I realize that I was never quite satisfied with any of the situations at the various places I worked. For example, very early in my teaching career I noticed that the classroom settings I worked in lacked a connection to Nature - both physically and mentally. The classrooms themselves lacked any 'organic' feel with an absence of plants and animals. The students were physically disconnected from the 'life' that biology and other sciences are supposed to teach them about. I was also very reluctant to teach biology from a text book that focused mostly on genetics, cell biology and biochemistry. I asked myself 'Where does Nature fit into all this?' and 'Can students see the connections between what they are learning, where it fits into the natural world and how it's relevant to their daily lives?'

I knew that if the connections to Nature were not obvious for me and they weren't explicitly taught or contained within the classrooms, curriculum and textbooks that my students certainly could not see any direct or indirect connection between the biology they were learning and the natural world. Likewise, my stints as a naturalist in both California and Georgia prompted concern relating to the amount of time students are exposed to environmental education. Even though students are immersed in Nature in those types of programs the duration is short and the frequency is irregular. For example, the outdoor science school I worked at in California provided a one week program in which students engaged solely in outdoor environmental education. I was convinced that one week exposure a year was not enough and that students needed more frequent contact with Nature if they were to truly come to appreciate being outdoors.

Similarly, my experiences at SCNC left me asking questions about how often students should engage in environmental education. The educational programs at SCNC were even briefer with students cycling in for lessons for a few hours and then returning to their respective schools and classrooms. Even though both places had excellent curriculums with a sharp focus on environmental education and did an outstanding job at alerting students to the wonder of Nature I was convinced that week long, day long and single lesson long programs were simply not enough.

As a result I made a conscious decision to return to the classroom where I would have my students for an entire school year and could hopefully have a greater impact on their learning and appreciation for the environment. This time, however, I would bring my expertise in natural history and outdoor environmental education and insert it into the classroom curriculum wherever and whenever I could. By the time I made this decision I was also reassessing myself as an educator. My work as a naturalist had given me many techniques for instruction, especially field instruction.

I had also greatly increased my own knowledge of the outdoors and the natural history of various places including the Mojave Desert, the scrub and chaparral of Southern California, montane ecosystems, and the Piedmont of Georgia. Combined with my jobs in aquatic and forest research and my experiences in classroom and field instruction I no longer saw myself as a teacher. I now saw myself as a naturalist.

Learning how Nature works, observing patterns in Nature and connecting with the flora and fauna wherever I happen to be has become a way of life for me. I take my interest in natural history on holidays and explore the outdoors during my free time. Considering myself as a naturalist seemed to be a more fitting description of my lifestyle than 'science teacher'. In her thesis *On My Way to Knowing: A Naturalists Journey,* Saylor (2005) reports her path to become a naturalist as a meandering journey. Reflecting back on my own path shows a similar indirect route to my current self perception and role as an educator.

This change in self perception has proven pivotal in how I approach my learning and teaching. I was no longer satisfied with teaching text book environmental education and ecology. I was compelled to get students outside and share with them the natural history of their surroundings. I want them to have more than an intellectual or academic connection to the environment. I want my students to have a sense of curiosity, wonder and awe for Nature and explore their surroundings while asking questions about how it works. I want my students to take personal action for the environment and to dedicate a part of their lives to personal environmental education and action. I would hope that they would truly become lifelong learners in the topic of environment. In short, I want my students to become naturalists.

Nowadays, I teach at the International School of Kuala Lumpur (ISKL) located in urban Kuala Lumpur, Malaysia. ISKL is a private school initially founded to teach the children of ambassadors and international business employees. In the 40 years since its inception ISKL has grown to over 1200 students with a K-12 international curriculum with influence from American, British and Australian educational systems.

Early in my international teaching career I began to notice striking differences in my predominantly Asian students and the students I was used to teaching in the United States. For example, the majority of my students at ISKL are very affluent, well traveled, and extremely focused on attaining academic excellence. Most have already lived in several countries by the time they reach middle school. The typical ISKL student is very focused on preparing for tertiary education and future careers.

With this in mind, and after several conversations with my students, I began to notice that many ISKL students spend very little time outdoors in natural areas engaged in recreational activities. For various reasons ISKL students seem to have very little opportunity to simply go outside and play. One possible reason they don't spend much time outdoors is perhaps related to fear since we frequently hear of purse snatchings and other crimes in Kuala Lumpur. Another explanation might be students' limited access to natural outdoor areas because Kuala Lumpur is an urban environment lacking easily accessible green spaces,

The school and student context in Kuala Lumpur is a striking difference from my personal history. Since I grew up in rural Georgia most of my free time was spent outdoors playing in creeks, climbing trees, investigating mysterious animal homes and building tree huts out of pine and oak limbs to play in. In fact, I believe that my childhood play time in nearby woods greatly influenced my later decision to major in biology at the University of Georgia. I know that an interest I developed as a child in creeks and streams predisposed me to decide to study aquatic insects, water quality and ichthyology. Because I had a strong connection with Nature I wanted to learn how it works. Without these connections, I doubt that I would have had such an intense interest in learning more about the environment.

With those childhood experiences influencing my worldview, I observed that most of my students had almost no time to connect with Nature. I began to wonder, is just being outdoors enough? Can students connect with Nature through play and exploration? Or do they need formal instruction from parents, friends and teachers if they are to grow to truly appreciate being outdoors?

I also began to think that since my ISKL students are affluent, well traveled and have parents in positions of power that they may also eventually end up in careers where they have the potential to influence community and business decisions. I reasoned that I could have a great impact on these students by introducing them to the natural world and instilling in them a sense to protect and preserve it. I was certainly in an ideal situation to do so since the Malaysian rainforest is among the most biodiverse regions in the world.

I also began to wonder how I might influence them to develop a deep connection with Nature. It is my hope that if they are someday in a position of power that requires them to make business or political decisions regarding the environment that they will have a strong connection with Nature and will be more likely to make informed decisions regarding issues that have potential environmental impact.

As these thoughts were building in my mind I began informal interviews and observations with the middle school students and noticed several patterns emerging. At first, a casual experiment was to ask students and teachers if they felt that the environment is something that is important to them. In this context I define the term environment as it relates to the flora and fauna found in outdoors in a relatively undisturbed place in Nature.

The overwhelming response was 'yes, of course!' Every student and teacher agreed that the environment was important to them. Even if they had a vague understanding of the term 'environment' and interchangeably used the terms 'environment' and 'environmental issues' it was irrelevant to them. Further discussions indicated that they had a sense that something about the environment was or should be important to them. However, when asked what actions they were taking most individuals were limited to recycling cans on campus, if that.

Even though students and teachers seem to be aware of environmental issues very few appeared to be actively engaged in projects or activities that promote immersion in the environment and environmental stewardship. In other words, my informal observations lead me to begin to think that very few teachers and students seem to have frequent direct experiences with Nature and even fewer are engaged in 'environmental' activities.

Because many students could rattle off the names of environmental issues such as ozone depletion, global warming and deforestation they seemed to be at least aware of the issues themselves. However, many reported in our conversations that they were not actually taking action beyond simple recycling on campus when it is convenient. I began to notice that there appeared to be a gap between student awareness of environmental issues and the action they take as individuals.

I wondered if this was related to the fact that they had revealed to me that they actually spend very little time outdoors immersed in the natural world appreciating Nature. I began to think of the correlation between how much time they actually spent outdoors, the amount of local environmental knowledge and natural history they had and the amount of time they take for personal environmental action. I was beginning to think that simple awareness of the environment and environmental issues is not enough. I wanted my students to have a deeper connection with Nature and was wondering how I might facilitate that connection.

These observations prompted me to ask myself if my perception that most students and teachers are environmentally aware, yet lack local environmental and natural history knowledge and are not engaging in environmental stewardship activities is true. As a result I developed several researchable questions that would become the basis for my Action Research (AR) Project.

FOCUS QUESTION

What can I do as an educator to involve and engage students and teachers in outdoor environmental activities that will most likely lead to a deeper connection with the environment?

In order to address the overall question I developed the following researchable sub-questions relating to the main focus question.

1. What is already in the ISKL curriculum that might expose students to environmental education?
2. How willing and prepared are teachers to engage in outdoor environmental education lessons during Malaysia Week?
3. How does the typical middle school student spend their time?
4. How effective is our Malaysia Week adventure program in changing student attitudes towards the environment?
5. How effective is the new middle school course The WILD Malaysia Semester Course in changing student attitudes towards the environment?

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Hands-on experience at the critical time, not systematic knowledge, is what counts in the making of a naturalist. Better to be an untutored savage for a while, not to know the names or anatomical detail. Better to spend long stretches of time just searching and dreaming.

E.O. Wilson
Naturalist

What is environmental education?

During my career as an educator I have witnessed many teachers in middle and high school focusing solely on text book ecology (food web diagrams, population curves etc.) and environmental issues (deforestation, ozone depletion etc.) as the totality of the curriculum they teach in environmental education courses. Witnessing that style of education led me to develop my own definition of what effective environmental education should encompass.

For purposes of my research I have defined environmental education in terms of three major factors. The first factor is environmental knowledge during which students gain intimate and hands on knowledge of local flora, fauna and ecological relationships in Nature, much like a naturalist. The second factor for my definition is for students to develop a personal connection and sense of belonging to Nature through outdoor activities immersed in Nature. Finally, personal empowerment and a commitment to engage in extra curricular environmentally related activities and action for the environment, which I refer to as stewardship or action for the environment, comprises the third factor of my definition of environmental education.

Researchers Tomera et al (1987) and Hungerford and Volk (1990) have reached similar conclusions regarding a definition of environmental education through their research including:

- Developing awareness and ecological knowledge is not enough to cause long lasting behavior changes

- Developing a personal connection with and knowledge of issues is critical to responsible environmental behavior

- Instruction that focuses on ownership and empowerment changes behavior

Though my definition may appear complex at first it may be simply stated as the fact that students must experience Nature first hand through outdoor hands-on activities in order to develop knowledge of and a personal relationship with Nature and they must be motivated to action by the insights they gain. The type of education that I have witnessed taking place in some classrooms where teachers analyze various graphs, charts and diagrams pertaining to Nature is not enough if teachers are to impart an effective environmental education to students.

Importance of Naturalist

Futuyma (1998) laments the disappearance of naturalists from the scientific and academic landscape. He reports that by 1950 the term 'naturalist' had fell into academic disrepute because it had become synonymous with 'Nature lover' and naturalists were perceived as lacking academic rigor. He also reports that some current graduate students perceive of naturalists as unsuccessful academic biologists or as someone who will be unable to get a job.

He then goes on to modify the definition of 'naturalist' with rigor and refers to them as 'scientific naturalists' as follows:

> I think of a scientific naturalist as a person with a deep and broad familiarity with one or more groups of organisms or ecological communities, who can draw on her knowledge of systematics, distribution, life histories, behavior, and perhaps physiology and morphology to inspire ideas, to evaluate hypotheses, to intelligently design research with an awareness of organisms' special peculiarities. Even more, perhaps, he is the person who is inexhaustibly fascinated by biological diversity, and who does not view organisms merely as models, or vehicles for theory but, rather, as the raison d'etre for biological investigation, as the *Ding an sich,* the thing in itself, that excites our admiration and our desire for knowledge, understanding, and preservation.
>
> Futuyma (1998)

Futyma (1998) explains that naturalists have made significant contributions to many scientific achievements. He postulates that modern theories of evolution would not have been possible without the input from naturalist. He cites the example of Mayr's intimate knowledge of birds as contributing to his theories of speciation and Macarthur and Wilson's knowledge as naturalist leading to their theory of island biogeography.

Without his general knowledge of several subjects including geography, ornithology, systematics, species distribution, economics and a naturalists curiosity to explore Nature and ask questions about its inner workings Darwin may never have devised the theory of evolution, considered by many as the 'backbone' of biology.

Krupa (2000) points out that many scientists such as Charles Darwin, Louis Agassiz, Thomas Henry Huxley, Alfred Russell Wallace, G. Evelyn Hutchinson, Robert MacArthur, Ernst Mayr, George Gaylord Simpson, Niko Tinbergen and Edward O. Wilson have made great contributions to our understanding of the natural world and are themselves considered naturalist thus reinforcing the importance of naturalists to the scientific community.

Krupa (2000) goes one step further and points out that naturalists are not only important to the scientific community but are also crucial to all humanity. He points out that global concerns over species extinction, habitat loss and declining biodiversity cannot be addressed without more biologists trained with a broad understanding of natural history. He claims that naturalists are crucial to the type of research needed to maintain biodiversity and conservation. He also says that a deficiency of naturalists could be detrimental in the efforts to maintain biodiversity. With respect to education, he states that two important tasks should be considered.

- First, more biologists need to be trained as naturalists so they are better prepared to deal with and discuss the issues in conservation biology.

- Second, students at all grade levels and interests need to be exposed to educational experiences, such as field trips, that develop their appreciation for Nature regardless of whether they plan on having careers in biology. This appreciation for Nature is essential if we hope to save Nature.

Krupa (2000) then goes on to say, "recent editorials and commentaries have attempted to alert biologists to the importance of naturalists. Noss (1996) and Futuyma (1998) express concern for the declining number of biologists that consider themselves naturalists. Noss is justly concerned that the coming generations of conservation biologists will lack an understanding of natural history. This deficiency could be detrimental in the efforts to maintain biodiversity. Noss foresees trouble for fields such as conservation biology and ecology as "naturalist" ecologists are replaced by "armchair" or "keyboard" ecologists."

In spite of the importance of naturalists to the scientific community, fewer students are being trained in natural history or subjects related to a generalist understanding of Nature. Many modern biology text books focus on genetics, biochemistry, and cell biology or what I refer to as 'human centered biology' with a focus on the importance of biology to benefit human medicine or genetics research. In fact, in my experience a teacher would be hard pressed to find a general biology text book that contained more than a smattering or brief mention of natural history, organismal biology, ornithology, entomology, zoology, botany or any of the various 'ologies' that pertain to the study of the natural

world. 'Nature centered biology' has all but disappeared from general biology text books and subsequently school curriculums and individual teacher lesson plans.

A recent conversation with a retired professor from University Malaya revealed some truth in the fact that students aren't learning about Nature when he stated "My students couldn't tell a goat from a chicken without a DNA sequence."

Sadly, the UM professor's words resonate with my teaching experience. Few of my students and colleagues are able to identify local plants and animals aside from popular mega-fauna seen on TV such as tigers, orangutans and elephants. Many of them cannot even identify the plants that they see on campus on a daily basis.

Life Paths to Environmental Education

I began to correlate my goal to influence my students to become naturalists with a path that would lead them towards lifelong environmental learning and action. I wondered how I might best achieve this given the fact that I am their teacher and have them for a limited amount of time. I wondered how I might most effectively use the short time that I have with them to guide them down the path to becoming curious about and connected to Nature.

Chawla (1999) points out that environmentalists in Kentucky and Norway attribute their commitment to environmental action to factors such as experiences of natural areas, family influences, organizations, negative experiences, and education. Her research shows environmentalists repeatedly attribute their environmental interests or action to a similar set of sources: extended time spent outdoors in natural areas, often in childhood; with parents or other family members; teachers or classes; involvement in environmental organizations; books; and the loss or degradation of a valued place.

This rings true with my personal history and strongly correlates to my own experiences. Knowing what factors are most likely to lead to environmental action in individuals raised questions of how, as a teacher, I might provide or facilitate experiences for my students that would lead them down a life path to environmental stewardship and action.

American Time Use Survey

I began to wonder 'Where are students learning about Nature? In classes at school? Outdoors with family and friends? Or some other place?'

I wondered if they spent their time outside exploring the outdoors or if they were perpetually indoors disconnected from Nature. These questions lead me to investigate how people use their time and inspired me to ask if my students exercised similar habits of time use. Knowing this information would give me clues to how much exposure my students have to Nature and outdoors and if they are learning with their parents which

Chawla (1999) reports is an important factor in the development of a life path to environmental education..

A review of the Bureau of Labor Statistic's Time Use Survey (2004) reports that on an average day 96% of participants surveyed engage in some sort of leisure activity such as watching TV or sports activity, socializing, or exercising.

In general, men spend more time doing leisure activities (5.4 hours) than women (4.8 hours) while watching TV is the leisure activity that occupies the most time, accounting for about half of leisure time on average for both men and women. Socializing, such as visiting with friends or attending or hosting social events, was the next most common leisure activity, accounting for about three-quarters of an hour per day for both sexes.

Enjoying Nature, learning about Nature or engaging in natural history pursuits are not mentioned at all.

Given the fact that the average American spends very little time enjoying Nature or engaging in recreational outdoor pursuits (except organized sports), I wonder if there is a connection between their lack of time spent outdoors in Nature and their environmental knowledge.

I asked myself if my predominantly Asian population of students and their daily habits were similar to those reported on the American Time Use Survey.

The Relationship Between Environmental Knowledge and Environmental Behavior

Part of my goal is to instill in my students a sense of environmental stewardship towards the environment. To enable me to attain that goal I wanted to know the relationship between environmental knowledge and behavior. Does increasing environmental knowledge necessarily increase environmentally responsible behavior?

A study conducted by the National Environmental Education & Training Foundation (NEETF) and reported by the Environmental Education and Training Partnership (EETAP) (1999) concludes that there is often a relationship between environmental knowledge and environmentally friendly behavior. The report shows that the likelihood that people perform environmentally friendly activities frequently increases proportionately with their self-reported environmental knowledge.

Similarly Bradley, Walicek, and Zajicek (1999) show a positive correlation between high school student's environmental knowledge and behavior. Likewise, Cullen and Volk (2000) demonstrate an increase in environmentally responsible behavior in grade 7 and 8 students when exposed to environmental issue investigation and action training while Hsu (2004) reports similar results in Taiwanese college students.

Those studies all indicate that increased environmental knowledge tends to lead to greater environmentally responsible behavior in middle school, high school and college students.

Knowing this confirmed for me that if I engage my students in learning more about the environment that I would have a greater likelihood of leading them towards a path of environmental action and stewardship.

Teacher Training

I also began to wonder how prepared ISKL teachers are to deliver environmental education curriculums, how experienced they are in science and natural history topics and if they were comfortable teaching outdoors.

Lane et al (1995) demonstrated that teachers in Wisconsin perceived competencies in, attitudes toward, and amount of class time devoted to EE was positively correlated to the EE training they received.

In the report *Pre-service Teacher Preparation in Environmental Education: A Current View* from the Environmental Education and Training Partnership (EETAP) reports that studies indicate many benefits to incorporating environmental education into teacher training. However, in a national survey McKeown-Ice (2000) surveyed 715 teachers and found only half to report pre-service training in environmental education

With the benefits of environmental education training for teachers in mind I kept asking myself 'Are ISKL teachers prepared to deliver environmental education? If not, how may I effectively spark their interest in receiving training?'

ACTION RESEARCH

The tool used to investigate my focus questions is action research. The following definition of action research was adapted from Saylor's (2005) thesis *On My Way to Knowing: A Naturalists Journey.* Saylor (2005) demonstrates a practical and useful approach to engaging in the action research process very similar to my own interests and style.

Mills (2003) defines action research as "any systematic inquiry conducted by teacher researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how their particular schools operate, how they teach, and how well their students learn." Also, in contrast to traditional educational research, a teacher's values are a vital part of the action research process. McNiff writes, "Action researchers make their own decisions about what is important and what they should do…They use their values as the basis for their action."(McNiff 2003)

Since action research is practitioner-based research and performed with students and colleagues it may bring us to new realizations about our own teaching, or new knowledge that might inform our teaching methodology.

There are five key concepts relating to action research (Mills 2003, McNiff 2003).

1) Action research revolves around me, my students and my educational practice.
2) Action research is systematic,
3) Action research is done *by* members of the profession *for* members of the profession.
4) Action research is reflective.
5) Action research can lead to personal improvements.

Action Researchers emphasize qualitative and quantitative data, using evidence such as interviews, surveys, and self-reflective writing to support claims to knowledge. In addition to lending a critical eye to their findings, Action Researchers utilize a team of critical colleagues, friends and mentors to validate and question their conclusions.

In my case engaging in the action research process would reveal information about my students attitudes towards the environment, how much time they spend outdoors and how prepared my colleagues are to deliver environmental education. Knowing this information would help me to make better use of my time with students that would most likely lead them to a personal connection and commitment to the environment.

METHODS

In order to begin to address the focus questions central to my Action Research project I determined it would be necessary to:

Goals

1) Analyze the ISKL curriculum in order to determine how much potential environmental education students were exposed to from grade K-8.
2) Conduct teacher surveys to determine their comfort level and training in teaching environmental education, especially outdoors.
3) Survey middle school students to determine how they use their time and if they are learning about Nature outside of school
4) Compare the effectiveness of the two main environmentally oriented programs at ISKL (Malaysia Week and The WILD Malaysia Semester Course) in influencing student attitudes towards the environment.

To obtain the necessary data to answer my focus question and sub-questions I decided that several methods of data collection were necessary.

Goal #1 - Review the ISKL curriculum in order to determine how much potential environmental education students were exposed to from grade K-8

To conduct the curriculum review I approached our curriculum coordinator and asked for access to the science curriculum documents for grades K-8. The documents were provided and a meeting was conducted between me and the elementary school science curriculum liaison. In order to interpret the documents and establish the context in which they were created during the meeting we discussed the K-5 teaching philosophy, future

additions to the curriculum in regards to environmental education and the possibility of future training for elementary school teachers in environmental knowledge and education techniques.

Curriculum Review

I wanted to know what grade levels already included environmental education in their curriculum, especially in the elementary and middle school since that would give me an idea of the student's background knowledge and prior experiences with environmental education. A review of the ISKL science curriculum was conducted by analyzing the curriculum documents and noting any environmental education that was already in place or could potentially be added to the existing curriculum.

I also wanted to know where additional environmental education could be incorporated into the curriculum if teachers were inclined. After looking for existing environmental education topics in the curriculum a second analysis was performed. The goal during the second analysis was to identify any pre-existing topics that might be enhanced or connected to environmental education with a creative approach, a change in mindset or an alteration of lesson plans on behalf of the teacher. The idea was to show teachers that infusing environmental education can be painless and seemingly effortless with little additional work on their part.

After the curriculum review was conducted a meeting with the elementary science advisors was arranged to discuss the results.

Survey Design

Following the curriculum review several surveys were designed to help answer my focus question and sub questions. Surveys were designed by adapting and modifying several different previously published surveys. Many questions that appear on the pre and post Malaysia Week student surveys and the WILD Malaysia Semester Course Survey were adapted and modified from the ISKL physical education Malaysia Week survey. The physical education survey is used by the Malaysia Week coordinator to ascertain student ability and comfort levels in the environment for Malaysia Week site assignments.

Questions for the pre and post Malaysia Week and The WILD Malaysia Semester Course survey were designed to gauge students self assessment of the degree of pleasure and happiness they feel when outdoors (affective realm), their comfort levels in various outdoor scenarios, their reported knowledge of local flora, fauna and ecological relationships as well as their environmental actions for the environment. The Selborne Project Evaluation (Hug, 2000) also inspired several questions and question types used in all student surveys appearing in this Action Research project.

The pre-Malaysia Week survey was administered one week prior to Malaysia Week in March. Post-Malaysia Week surveys were completed by students one week after they returned from Malaysia Week The WILD Malaysia Semester Course survey was

administered only once in April to students that had previously taken the WILD Malaysia Semester Course first semester and to students enrolled in the course second semester.

The American time use survey (2004) was referenced to design many questions for the Middle School student time use survey. Questions that appear on that survey were meant to determine how middle school students use their time on both a daily basis and throughout the year. Questions refer to both common daily activities that students might engage in during a typical day such as homework, chatting on MSN, surfing the Internet or household chores as well as Nature oriented activities such as learning about flora and fauna or engaging in recreational activities outdoors. The middle school student time use survey was administered once in April.

Many questions that appear on the Middle School Teachers survey were adapted from the The Selborne Project Evaluation (Hug, 2000) teacher survey. The teacher's survey was designed to obtain background information on teachers self reported knowledge and comfort levels with environmental education as well as their opinions on Malaysia Week.

Most questions for all surveys were adapted or changed from previously published survey's to suit my specific research needs and to answer my focus question. All surveys were administered online via a service known as 'survey monkey'. Notifications of the survey were sent by our technology coordinator directly to student and teacher e-mail accounts. Surveys were optional and anonymous but students and teachers were encouraged to complete the surveys by teachers and administration respectively.

Goal #2- Conduct teacher surveys to determine their comfort level and training in teaching environmental education, especially outdoors.

Middle school teachers were surveyed to determine their background and comfort levels with leading environmental education activities both in the classroom and outdoors. I also wanted to determine their opinions regarding the effectiveness of Malaysia Week in imparting environmental education lessons to students.

Teacher Survey (Appendix A)

A survey was conducted to determine teacher attitudes towards Malaysia Week. The survey also included questions to assess teacher training in environmental education, how often teachers incorporate environmental education into their lessons, teacher comfort levels in conducting environmental education and their experience and ability to lead lessons outdoors.

Goal #3 Survey middle school students to determine how they use their time and if they were learning about Nature outside of school

Middle school students were surveyed to determine how they use their free time. I wanted to determine if my suspicion that they generally spend little time in outdoors playing in natural areas was true.

Middle School Student Time Use Survey (Appendix B)

A survey was conducted to determine how ISKL middle school students spend their free time.

Goal #4 Compare the effectiveness of the two main environmental programs at ISKL (Malaysia Week and The WILD Malaysia Semester Course) in influencing student attitudes towards the environment.

Malaysia Week Surveys (Pre and Post) (Appendix C)

Every middle school student participates in Malaysia Week in March. Middle school students from three different Malaysia Week sites were surveyed before and after the trip to determine the impact of their experiences on their attitudes towards the environment.

About Malaysia Week

Malaysia Week is an outdoor adventure learning opportunity for middle school students. Every March the entire ISKL middle school closes its doors and embark on a four day adventure program in various locales throughout Malaysia.

During Malaysia Week students choose a location to visit based on their fitness levels (i.e. very challenging to easy) and ecosystem preference (i.e. mountain, beach, and river). During the week students engage in adventure activities like mountain biking, kayaking, climbing, snorkeling, fishing and hiking.

Currently Malaysia Week does not have an explicit environmental education focus but instead focuses on adventure, team building, expansion of personal comfort zones and developing self esteem. Third party guiding services are hired for safety, logistics and adventure activities. As a result, teachers serve to help the guides in such things as student discipline, complimenting activities and lessons 'on the trail' and consulting with guides to ensure a smooth and safe experience for students.

In cooperation with the Malaysia Week coordinator, three Malaysia Week sites were designated for comparison and data collection. Students were surveyed both Pre and Post Malaysia week to determine the impact of Malaysia Week on their attitudes towards the environment.

I introduced an environmental education component to my Malaysia Week site in order to take advantage of the opportunities presented by being immersed in the outdoors for over four days. By implementing both Pre and Post- Malaysia week surveys I determined the effectiveness of the environmental education component on changing students' attitudes towards the environment.

Malaysia Week Site #1 – Kelong (fishing site) – The Kelong is a 100m X 100m wooden platform located a few kilometers off the shore of Johor Baru, Malaysia in the South China Sea. During the 4-day excursion students would live, eat and fish from the Kelong. Two 4-hour trips were planned off-site to allow student to explore nearby islands and swim. Otherwise, all other activities were conducted on the Kelong.

This Malaysia Week site was chosen as part of my research because I was the site leader. I decided to deliberately incorporate several environmental education lessons into the week's activities in order to compare it to two other sites that incorporated no environmental education. This would serve as my treatment for comparison to determine if simply being outdoors is enough to influence attitudes towards the environment or if adding additional lessons and information specifically about the environment would serve to connect students to Nature in a more meaningful manner.

During the week I would engage students in several experiential, hands-on activities. All activities would take place on the Kelong during the hottest part of the day when fishing was limited. This would provide an opportunity for students to learn about the place in which they were living and catching fish as well as give them a break from the mid-day sun.

The activities I conducted were: fish identification (taxonomy) and anatomy, fish specimen dissection, design a fish, plankton study, marine ecology and conservation discussions.

1) Fish Identification
    - fish anatomy (external anatomy)
    - fish adaptation and habitat (benthic and pelagic)
    - feeding preferences of different fish species

Students would use a worksheet (Appendix D) to learn the external anatomy (various fins, gills, lateral line etc.) of fish so that they could successfully identify the fish they caught during the trip. They would compare specimens of previously caught fish and photos of fish displayed on the Kelong with the labeled worksheet until they could identify most external anatomical distinguishing characteristics.

A discussion of different adaptations (mouth shape, teeth, body shape etc.) would alert students to how different fish have adapted to different habitats and feeding styles. Students would also witness these adaptations in live fish that they would catch themselves during the trip.

2) Fish dissection (internal anatomy)

A hands-on fish dissection would take place to show students different internal anatomical structures (spine, kidney, swim bladder, stomach etc.) The stomach of different species of fish would also be dissected to analyze gut contents and feeding preferences.

3) Design a fish

Students would sketch a living specimen and label the external anatomy properly. After completing this task they would design a fish based on their new knowledge of anatomy, adaptation, habitat and feeding preference.

4) Plankton study (zooplankton and phytoplankton)

Students would use a plankton net to collect samples from the Kelong. They would then use a microscope to analyze and sketch plankton specimens in their journals.

5) Marine ecology (plankton as oxygen producers, marine food webs)

A discussion of various ecological concepts including marine food webs and the role of plankton in the marine environment would take place outside on the Kelong.

6) Marine Conservation Issues (pollution from oil spills, deforestation upstream increasing sedimentation, over fishing)

This site would serve as the experimental group since environmental education is not usually heavily taught during Malaysia Week.

Malaysia Week Site #2- Gopeng

Gopeng is a river habitat Malaysia Week site. Teamwork and cooperation are emphasized in the activities which include climbing, camping, river rescue, ropes course and kayaking. Students participating in the Gopeng site must have strong swimming skills and an ability to push their physical limits.

Environmental education is not explicitly included in the Gopeng site.

Malaysia Week Site #3-Pulau Sibu

Pulau Sibu is an island habitat site. Emphasis is placed on water activities including snorkeling and swimming. Students participating in the Sibu island site also complete a survival experience during which they must clean, gut and cook their own chicken.

Environmental education is not explicitly included in the Pulau Sibu site.

The WILD Malaysia Semester Course Survey

Students enrolled in the WILD Malaysia Semester Course were surveyed to determine the impact of the one semester course on their attitudes towards the environment. (Appendix E)

About The WILD Malaysia Semester Course

The WILD Malaysia Semester Course is a one semester elective course open to both grade seven and eight students. The WILD Malaysia Semester Course is a new course this year and its introduction was prompted due to my participation in my MSSE AR project, a need to offer more environmental education as stated in our school wide accreditation goals (Appendix F) as well as the need to have extra classes to accommodate a growing population at ISKL.

Since The WILD Malaysia Semester Course is an elective course I have the freedom to choose the curriculum and methodology for teaching the course. Currently I cover three topics: the ten most common plants on campus, the ten most common birds on campus and insects on campus. I frequently use games such as *Food Chain Chase* (Henley and Peavy 2006) or experiential activities such as *The Web of Life* (Henley and Peavy 2006) to introduce topics or reinforce ideas. I deliberately take a non-academic approach to natural history and ecology and do not use a text book for the course.

During the first unit of the course students design and publish a field guide to the plants on campus and act as tour guides for teachers and fellow students as a final assessment for the plant unit.

Bird watching and bird identification serves as the second unit. A field trip is conducted to compliment this unit since the class meeting time varies throughout the week and the times during which birds visit campus is unpredictable. A lab practical in the field as well as identification of birds from slides serve as a final assessment for the unit.

Students also participate in an insect collection. Students are given the option to collect and pin insects or to choose to complete a digital collection using school cameras. They also design and create a booklet that includes information about the insect (a sketch of the insect, a description of the insect, insect order their specimen belongs to, and information about the collection site and habitat). As a final assessment students display their insect collection and accompanying booklets and act as museum guides in class for teachers and fellow students.

I designed the course to engage students in activities that would get them outdoors on campus and notice the flora and fauna around them. I reasoned that without at least a minimal introduction to local flora and fauna and some exposure to the natural world that the students would never be able to make a connection with the outdoors. I also felt that studying concepts such as global warming, deforestation, holes in the ozone and species extinction would be abstractions without the context of feeling a direct connection to Nature. As a result, I deliberately decided against studying environmental problems or conservation issues found in many environmental science courses.

My goal for The WILD Malaysia Semester Course was to get students outdoors on campus to recognize plants, birds and insects that usually go unnoticed. I decided on the those topics due to the likelihood of the flora and fauna being observed on a causal stroll

through campus or other parts of urban Kuala Lumpur and the hope that this recognition would more likely lead to a connection with Nature. I also hope that connection might serve as a foundation for Nature appreciation and later lead to an increased likelihood of environmental action and stewardship.

The WILD Malaysia Semester Course students were also surveyed to determine if their attitudes towards the environment were different from those students selected for Malaysia Week surveys. Malaysia Week is compulsory while the WILD Malaysia Semester Course is not. I reasoned that The WILD Malaysia Semester Course was an elective course and students willingly signed up for a specific course in environmental education. I thought that students who freely signed up for the course might already show some disposition towards learning more about the environment.

DATA AND ANALYSIS

Data was collected in several different formats including a review of ISKL curriculum documents, several surveys designed to gain insight into both student and teacher attitudes towards environmental education as well as student and personal journals.

Student journals are a regular part of Malaysia Week. During the course of the Malaysia Week students are asked to reflect and write about their experiences. Journals were collected after Malaysia Week and analyzed for keywords pertaining to environmental education such as environment, conservation, various terms used to describe flora and fauna. Journals are also monitored to track student comfort levels and are used to report privately any inappropriate behavior to the teachers.

As a regular practice I also keep a personal journal for reflection and recording my experiences. My journals were also used when they supported research ideas ar gave insight into my teaching practices.

ISKL science curriculum review (elementary and middle school)

In order to understand middle school students background in environmental education a review of the elementary school science curriculum was conducted. The middle school science curriculum was also reviewed and analyzed to understand the potential environmental education that students would be exposed to while in ISKL grades six to eight.

A review of the elementary school science curriculum revealed that there is much potential for environmental education already existing in current standards.

The follow table summarizes areas where environmental education could be incorporated in the elementary school. (See table 1 below)

TABLE 1
International School of Kuala Lumpur
Elementary School Science Standards
2005-2006

Note: all standards highlighted in GREEN lend themselves to environmental education

Earth and Space Standard Standard 1: Students will understand atmospheric processes and the water cycle Standard 2: Students will understand Earth's composition and structure Standard 3: Students will understand the composition and structure of the universe and the Earth's place in it
Life Science Standard Standard 4: Students will understand the principles of heredity and related concepts Standard 5: Students will understand the structure and function of cells and organisms Standard 6: Students will understand relationships among organisms and their physical environment Standard 7: Students will understand biological evolution and the diversity of life
Physical Science Standard Standard 8: Students will understand the structure and properties of matter Standard 9: Students will Understand the sources and properties of energy Standard10: Students will understand forces and motion
Process Standards Standard 11:Students will Understand the nature of scientific knowledge Standard 12: Students will Understand the nature of scientific inquiry Standard 13: Students will Understand the scientific enterprise

Using my personal definition of environmental education as stated in the literature review any elementary science standard that might be used to incorporate hands-on environmental lessons and investigations in the classroom or taking students' outdoors to experience Nature first hand, investigate organisms, observe natural processes, identify ecological relationships or learn about flora and fauna was given a green label. Any standard that might also be used to help students develop a relationship with Nature through immersion in the environment or develop a sense of empowerment to take personal action for the environment was also give a green label.

With those criteria in mind, ten of the existing thirteen elementary science standards might be used to incorporate environmental education into classroom lessons. However, an informal meeting with the elementary school science liaison and the elementary science team revealed that while some teachers may incorporate environmental education into their lessons they do so infrequently.

A note from my journal entered in September 2006 reveals this fact:

> I met with some of the elementary school teachers today. We spoke about the elementary science curriculum. My perception is that some of them seemed somewhat non-receptive to me participating in their meeting (as an 'environmental education expert' suggesting how they might incorporate Env. Ed. into their lessons). They revealed that they feel overwhelmed with so many other standards and requirements that adding environmental education was 'just one more thing' piled on to an already busy schedule.

When asked if they ever went outside to incorporate environmental education into their daily lessons all teachers replied 'no' or 'rarely.' They stated that they didn't feel like they had the expertise, time or knowledge of local flora and fauna to effectively teach it to students. This was also supported by the elementary school science liaison who communicated that she was aware that science was often absent from daily lessons since elementary classroom teachers tend to focus on basic skills such as math, reading and writing. Additionally, conversations with the curriculum coordinator revealed that she is also aware that elementary teachers generally prioritize teaching reading and writing instead of science, especially environmental education.

A closer look at the topics taught to reach the standards in elementary school also revealed a great potential for adding environmental education into their lessons. (See table 2 below)

TABLE 2
International School of Kuala Lumpur
Elementary School Science Topics
2005-2006
Note: all topics highlighted in GREEN lend themselves to environmental education

Grade	Earth and Space Sciences	Life Sciences	Physical Sciences
Kindergarten		Characteristics and Needs of Living Things	Water
Grade 1	Weather	Organisms	Solids and liquids
Grade 2	Soils	Life cycle of the butterfly	Changes
Grade 3	Land and water	Plant growth	
Grade 4	Earth Structure		Motion and design
	Earth in Space		Electrical Circuits

Grade 5			

Using the same criteria used to identify possible environmentally oriented elementary science standards, science topics that might be used to incorporate environmental education into daily lessons were also identified. A close look at the topics taught in elementary science reveals that almost all of the elementary science topics lend themselves to potentially introducing environmental education in grades K -4.

Subsequently, a review of the middle school curriculum revealed less opportunity to incorporate environmental education into daily lessons than provided by the elementary school curriculum. (See table 3 below)

TABLE 3
International School of Kuala Lumpur
Middle School Science Curriculum
2005-2006

Grade 6 Standard 2: Understands Earth's composition and structure Standard 6: Understands relationships among organisms and their physical environments Standard: 8 – Understands the structure and properties of matter Standard: 9 - Students will understand the sources and properties of energy Standard: 12 - Understands the nature of scientific inquiry
Grade 7 Standard 3: Students will understand the composition and structure of the universe and the Earth's place in it. Standard 4: Students will understand the principles of heredity and related concepts Standard 8: Understands the structure and properties of matter Standard 10: Understands forces and motion Standard: 12 - Understands the nature of scientific inquiry
Grade 8 Standard 1: Understands atmospheric processes and the water cycle Standard 4: Students will understand the principles of heredity and related concepts Standard 5: Understands the structure and function of cells and organisms as it relates to: DNA/Genes/Chromosomes Standard 8: Understands the structure and properties of matter Standard 9: Understands the sources and properties of energy Standard: 12 - Understands the nature of scientific inquiry

Under the same criteria used to identify environmental education standards for elementary school an examination of the middle school standards shows only six of the

existing sixteen standards are suitable for incorporating environmental education into lessons.

A close look at the topics taught in middle school also reveals very little opportunity for teachers to incorporate environmental education into their daily lesson. Ironically, grade seven, the grade that I teach has no environmental education in the curriculum and very little opportunity to incorporate it into daily lesson. (See table 4 below)

TABLE 4
International School of Kuala Lumpur
Middle School Science Topics
2005-2006
Note: all topics highlighted in GREEN lend themselves to environmental education

Grade	Earth and Space Sciences	Life Sciences	Physical Sciences	Chemical Sciences
Grade 6	Landforms Weather and erosion	Rainforest explorers Sun Safety Parts of a cell	Energy, temperature and heat	States of Matter
Grade 7	Solar system Life of a star Space exploration	Human reproduction	Forces and motion	Solutions
Grade 8	Weather Water cycle	Genetics	Light and Sound	Atomic Structure

At science team meetings in the middle school grade six, seven and eight science teachers (4 teacher's total) have talked about the lack of environmental education in the curriculum. We lament its absence since we feel that middle school is an ideal time to excite students about life science, botany, entomology and other natural sciences.

A note from my journal entered in September 2006 gives the best insight into the history of the development of the ISKL middle school science curriculum:

> Today we discussed the history of the environmental science curriculum. Paul has been here for nine years and explained that when the curriculum for middle school science was being organized and written that it was driven, in part, by the fact that the high school teachers were predominantly chemists and physicists. It seems that the high school curriculum is driven by the IB (International Baccalaureate) syllabus which calls for more chemistry, physics, genetics and cell biology- with very little natural science. So, in order to prepare middles school students for the IB they would take in high

> school, the middle school followed suit by offering those sorts of topics in their curriculum.

Apparently there are several factors that have influenced the development of the ISKL middle school science curriculum including the interests and background of the teachers who developed it and the influence of the high school IB curriculum.

Teacher Survey- environmental education (Appendix A)

Following the curriculum review middle school teachers completed surveys to determine their personal definition of environmental education, comfort levels teaching environmental education in classrooms and outside during Malaysia Week, knowledge of local flora and fauna, what they'd like to learn more about in relation to environmental education, their personal educational actions for the environment and their opinions of the effectiveness of Malaysia Week as a tool to raise environmental awareness among students.

Since middle school teachers are required to participate in Malaysia Week I wanted to know how effective they might be in introducing environmental education topics into the Malaysia Week activities. Since I believe that effective environmental education cannot take place solely in a classroom and that students are more likely to develop a personal connection with Nature through hands-on activities while immersed in the outdoors, I reasoned that Malaysia Week was an ideal situation for teachers engage in environmental education since they were totally immersed in the local environment for over four days. Knowing teacher's opinions, comfort levels and confidence in incorporating environmental education into the Malaysia Week experience would also indicate their likelihood to use the Malaysia Week experience as an opportunity to teach students about and connect them to Nature.

An earlier informal interview with elementary school teachers, the elementary school science liaison and the curriculum coordinator had revealed that elementary classroom teachers infrequently taught their classes outdoors on campus. Elementary teachers had also communicated a desire to do more environmental education and admitted its value but had claimed that too many other curricular responsibilities and a lack of knowledge of local ecology, flora and fauna discouraged them from routinely incorporating environmental education into their lessons. Knowing this motivated me to survey the middle school teachers to determine their opinions about environmental education in the middle school. I wanted to know if middle school teachers shared the same sentiments about environmental education as the elementary school teachers.

The ISKL middle school has 38 teachers of which 26 responded to the survey.

Teachers were asked to define what environmental education is to them. The question was optional with 25 of 26 respondents choosing to reply. Results varied with a range of answers.

Responses were wide ranging with some teachers including the importance of conservation, a mention of natural history and relationships in Nature or factors such as industrialization and its impact on the environment. While those aspects are certainly important and should be included in aspects of environmental education, based on my definition of environmental education which says that awareness of the environment and environmental issues is not enough for effective environmental education, I was looking for teachers that responded with a message of personal action for the environment. However, only two of the twenty five respondents mention taking personal action for preservation of the environment or environmental stewardship.

The following are the responses from the two teachers that include a commitment to action in their definition of environmental education, which I believe best describes effective environmental education:

> To raise awareness about our planet and instill a commitment to action in students to preserve it. (Middle School Teachers Survey, 4/25/06, respondent 1)

> Since I heard your book talk, I think it means teaching students to know what environment is around them, instilling in them a sense of belonging to their environment - being a part of it, and finally, getting them to become stewards of their environment. It is important enough to them that they want to care for it. (Middle School Teachers Survey, 4/25/06, respondent 13)

While many teachers mentioned important topics that environmental education should encompass only two thought that personal action was part of their definition of environmental action. Teachers are used to imparting knowledge and teaching students' information on various subjects but environmental education, if it is to make a difference, in my opinion needs to go to the next level of taking action with the knowledge gained from lessons regarding the environment.

Middle School Teacher Survey- Comfort levels with Environmental Education

Teachers were asked to report their confidence level in various aspects of environmental education.

The following questions were also assigned a four point Likert scale with responses ranging from never to always.

A numerical value was assigned to each response as follows:

Never =1, Sometimes = 2, Often = 3, Always = 4

All percentages are rounded up to the nearest one percent.

Please rate yourself

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I am confident teaching environmental education	2(8%)	9(35%)	**13(50%)**	**2(8%)**	2.58
I am able to incorporate environmental education into my lessons	1(4%)	7(30%)	**14(54%)**	**4(15%)**	2.81
I am able to teach environmental ed. lessons outdoors	5(19%)	7(27%)	**12(46%)**	**2(8%)**	2.42
I am comfortable teaching environmental topics	1(4%)	5(19%)	**15(58%)**	**5(19%)**	2.92
I have adequate knowledge to teach environmental education	**1(4%)**	**13(50%)**	11(42%)	1(4%)	2.46
I have adequate training to incorporate environmental education into my lessons	**1(4%)**	**18(69%)**	6(23%)	1(4%)	2.27
I have enough time to incorporate environmental education into my lessons	4(15%)	9(35%)	**13(50%)**	0	2.35

When surveyed, fifty-eight percent (15 of 26 respondents) of middle school teachers feel confident teaching environmental education while sixty-nine percent (18 of 26 respondents) feel they are able to incorporate environmental education into their lessons.

Fifty-four percent (14 of 26 respondents) report that they are able to teach environmental education outdoors and seventy-seven percent (20 of 26 respondents) claim that they are comfortable teaching environmental topics.

Conversely, fifty-four percent (14 of 26 respondents) felt that they lacked adequate knowledge and seventy-three percent (19 of 26 respondents) felt they lacked training to do so effectively. Half (13 of 26 respondents) of middle school teachers also feel like they lack enough time to integrate environmental education into their lessons while the other half feels that they do have enough time.

Middle School Teacher Survey- Knowledge of local flora and fauna

Teachers were asked to report their knowledge of local flora and fauna.

All percentages are rounded up to the nearest one percent.

What is your knowledge?

	0	1- 5	6-10	More than 10
How many different types of birds can you identify in Malaysia?	**1(4%)**	**17(65%)**	6(23%)	2(8%)
How many different types of plants can you identify in Malaysia?	0	**14(54%)**	7(30%)	5(19%)
How many different types of insects can you	0	**15(58%)**	8(31%)	3(12%)

identify in Malaysia? How many other different species of animals can you identify in Malaysia?	0	6(23%)	**10(38%)**	**10(38%)**

Many teachers report that they know very few species of plants and animals in Malaysia. This lack of knowledge might be a factor for teachers that might be reluctant to incorporate environmental education into their lessons.

Most teachers report that they know few local birds, plants and insects. Sixty-nine percent (18 of 26 respondents) of teachers know less than six local species of bird. Fifty-four percent (14 of 26 respondents) know fewer than six species of plant. Fifty-eight percent (15 of 26 respondents) know less than six species of insect.

Middle School Teacher Survey- What would you like to learn?

Teachers were asked to report what they would like to learn in regard to environmental education.

What would you like to learn?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I would like to learn more about local plants and animals	0	4(15%)	**12(46%)**	**10(38%)**	3.23
I would like to learn more env. ed. techniques	0	2(8%)	**15(58%)**	**9(35%)**	3.27
I would like to learn more about local environmental issues	0	2(8%)	**13(50%)**	**11(42%)**	3.35
I would like to learn more about local conservation	0	3(12%)	**13(50%)**	**10(38%)**	3.27
I would like to learn about local resources for env. ed.	0	3(12%)	**16(62%)**	**7(27%)**	3.15

Though many teachers feel that they lack the knowledge, training or time to incorporate environmental education into their lessons the majority express a desire to learn more local flora and fauna, environmental education techniques, local conservation issues and resources to compliment their lessons.

Eighty-five percent (22 of 26 respondents) either agree or strongly agree that they would like to learn about local flora and fauna. Ninety-two percent (24 of 26 respondents) either agree or strongly agree that they would like to learn more environmental education techniques. Ninety-two percent (24 of 26 respondents) either agree or strongly agree that they would like to learn more about local environmental issues. Eighty-eight (23 of 26 respondents) either agree or strongly agree that they would like to learn more about local conservation. Eighty-eight (23 of 26 respondents) either agree or strongly agree that they would like to learn more about local resources for environmental education.

Malaysia Week- Teacher Responses

As part of the teacher survey middle school teachers were asked to give their perceptions on Malaysia Week as a learning opportunity for students and themselves. They were also asked to report their opinions of the local guides and their own effectiveness in incorporating environmental education activities into Malaysia Week.

A four point Likert scale was assigned to possible responses. A numerical value was assigned to each response as follows:

Strongly Disagree =1, Disagree = 2, Agree = 3, Strongly Agree = 4

How do you feel about Malaysia Week?

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**Response Average**
Malaysia Week is an excellent opportunity for students to learn about the environment	0	1(4%)	**8(31%)**	**17(65%)**	3.62
Malaysia Week is a valuable experience for students	0	0	**6(23%)**	**20(77%)**	3.77
Malaysia Week is a valuable experience for me	0	2(8%)	**5(19%)**	**19(73%)**	3.65
I would like more training/workshops so I can conduct env. ed. activities during Malaysia Week	0	4(15%)	**11(42%)**	**11(42%)**	3.27
The local guides on Malaysia Week do an excellent job of incorporating env. ed. into the activities	**2(8%)**	**14(54%)**	6(23%)	4(15%)	2.46
I do an excellent job of incorporating env. ed. into Malaysia Week	**1(4%)**	**16(62%)**	8(31%)	1(4%)	2.35

Almost all (25 of 26) responding teachers agree that Malaysia Week is an excellent opportunity for students to learn about the environment and all teachers (26 of 26 respondents) agree that Malaysia Week is a valuable experience for students. Almost all (24 of 26 respondents) agree that Malaysia Week is a valuable experience for them. A majority (22 of 26 respondents) would like training and workshops so that they can conduct environmental education during Malaysia Week.

Most teachers feel that they themselves (17 of 26 respondents) and local guides (16 of 26 respondents) do not do an excellent job of incorporating environmental education in the Malaysia Week.

One teacher felt strongly enough about a lack of an environmental message during Malaysia Week that he wrote an e-mail to me, the Malaysia Week coordinator and the middle school principal to express his opinion and concern about the a lack of hired guides sharing their environmental knowledge with students.

Hi you all,

> I just wanted to share a couple thoughts that I've had over the years as I have participated in Malaysia Week. Over those four trips to Pulau Besar, Perhentian, Redang and Lang Tengah I have found some similarities in the programming that I think can be altered/adjusted to make things more educationally sound for students. Though the beach sites (since that is my experience, I cannot speak for other sites) are very good in terms of snorkeling and water-based activities, and they do a very good job in bonding students and building a sense of community, from an environmental standpoint they seem to be less than optimal. I have been particularly unimpressed by the information shared by the leaders of the companies that we have worked with (the notable exception to that being Aaron at Scuba Zone). I have found that though they often know the information they rarely actually share it in an organized manner. This year, at Lang Tengah, we asked our guide (Raja) to join me in an informational session about marine life and the kids were riveted, and it hit me... why is it that these contracted leaders don't usually take the time to actually tell the kids what they are about to see... perhaps focus on certain elements of the ecosystem (like movement or shelter or defense) and then discuss the various ways in which this can be done supported by what we find while snorkeling or hiking? From the standpoint of an environmental coordinator I can't help but think that, though putting kids in these kinds of environments certainly helps, we are not maximizing the amount of environmental education that the locations lend themselves to. The jungle treks that I have done in all four locations have rarely been anything more than a walk through the trees to the other side. Discussion was limited, if existent at all. Again, this could be something to focus on further.
>
> Laurence Myers (2006)

Clearly, teachers indicate that they feel Malaysia Week is an excellent opportunity for themselves and students to experience and learn about the environment. However, most teachers indicate that both local guides and they themselves are not very effective in capitalizing on the environmental education opportunities presented by Malaysia Week. One teacher even felt strongly enough to express his concern via e-mail tome, the Malaysia Week coordinator and the middles school principal. I suspect his sentiments are shared by more teachers who have not voiced their opinions.

Even though teachers indicate that they do not do good jobs of incorporating environmental education into their Malaysia Week sites most teachers show a desire for more training and workshops to enhance their own skills and knowledge of environmental education. Knowing this is crucial since it will allow me to plan and coordinate workshops for ISKL teachers with our curriculum coordinator.

Middle School Time Use survey (appendix B)

Students were surveyed to determine how they used their time outside of school. After analyzing the results of the American Time Use Survey I wanted to know if my students

exhibited similar behaviors in the respect that they spend very little time outdoors unless engaged in organized sports. Since my definition of environmental education includes time spent outdoors as a necessary component of connecting to the environment I wanted to know how much opportunity my students had to develop a relationship with Nature by being immersed in Nature. Knowing this would also provide some insight into how the typical ISKL middle school student spends their time and the likelihood of them being interested in learning about local flora and fauna. I reasoned that if they have very little exposure to being outdoors and learning about the environment then they are less likely to have already developed a relationship with Nature. If that is the case then Malaysia Week and the WILD Malaysia Semester Course may be one of the few opportunities for ISKL students to experience Nature first hand.

Two hundred and three of the three hundred and forty three middle school students responded to the survey.

Middle School Student Time Use Survey (appendix B)

Fifty-six percent (114 of 203 respondents) of students reported that they spend no time on a daily basis engaged in an environmentally related activity. While thirty-four percent (70 of 203 respondents) report an average of two hours or less spent engaged in an environmentally related activity six percent (13 of 203 respondents) report two to three hours and one percent (3 of 203 respondents) reports three to four hours. Interestingly, one student's reports that they spend more than 5 hours a day engaged in environmentally related activities.

It appears that most time is spent on homework (93 respondents report 1-2 hours daily), sports (93 respondents report 1-2 hours daily), chatting on MSN (78 respondents report 1-2 hours daily), using the Internet (86 respondents report 1-2 hours daily), watching DVD's (109 respondents report 1-2 hours daily)and housework chores (100 respondents report 1-2 hours daily)

Surprisingly, many students (85 of 203 respondents) report they spend 1 to 2 hours daily playing outdoors in Nature. Data for that question is suspect since the Malaysia Week coordinator (who is also a PE teacher) informed me that students were counting playing sports on the field during PE as playing outdoors in Nature when responding to the survey.

Middle School Student Time Use Survey- Time Spent with Family or Friends Outdoors (appendix B)

Students were asked to report how much time they spend with parents, friends and other family members engaged in outdoor activities. I wanted to know if students were possibly learning and being exposed to environmental education and outdoor experiences at home or if school might be the only place where such education takes place. As Chawla (1999) reports, this is a crucial aspect of leading students towards a lifelong path of environmental education since many included in her study revealed that experiences in

early childhood with family and friend greatly influenced their later life choices to become involved in environmental action.

Survey results reveal that most students rarely engage in outdoor learning with family or friends and Malaysia Week serves as one of the few recreational and educational opportunities for them to learn about and experience Nature.

Further questioning revealed that many students never go camping (89 of the 203 respondents), hiking (75 of the 203 respondents), fishing (121 of the 203 respondents), gardening (141 of the 203 respondents), visit family farms (141 of the 203 respondents), learn about local birds (145 of the 203 respondents), plants (141 of the 203 respondents) and insects (143 of the 203 respondents) or picnic outdoors (82 of the 203 respondents).

Few students (46 of the 203 respondents) report that they play outdoors in Nature on a weekly basis while a majority of students (147 of the 203 respondents) report that they visit a mall weekly. The main outdoor activity that students are engaged in are camping and hiking which occurs either a few times a year or on a yearly basis for many students.

Based on survey results it appears that the typical ISKL middle school student spends very little time on a daily basis outdoors. They also spend little time on a yearly basis engaging in outdoor activities with family or friends. This is crucial information which illustrates to me that a typical ISKL middle school student has very little opportunity to connect with Nature. As a teacher researcher, knowing this information will greatly influence the emphasis I place on outdoor opportunities for my students in the future.

Malaysia Week Pre and Post Survey (appendix C)

Students from three Malaysia Week sites (Kelong, Pulau Sibu, Gopeng) were surveyed both pre and post Malaysia Week to determine the impact of the experience on their attitudes towards the environment, The Kelong site included explicit environmental education activities while the Pulau Sibu and Gopeng sites did not.

A total of eighty-four students were surveyed with only forty-five completing both pre and post surveys. Seventeen Kelong participants responded while thirteen Gopeng participants responded and fifteen Pulau Sibu participants responded.

PRE and POST- MW Survey results

Affective Questions- Malaysia Week (appendix C)

Students were asked about their feelings when they are outdoors in Nature as well as what they enjoy learning about in the environment. Most students agree that they love being outdoors and it makes them feel happy and peaceful to be outside. Most students also agree that they enjoy learning about various flora and fauna and how Nature works.

A four point Likert scale was assigned to possible responses. A numerical value was assigned to each response as follows:

Strongly Disagree =1, Disagree = 2, Agree = 3, Strongly Agree = 4

How do you rate yourself?	**PRE-MW Kelong**	**POST-MW Kelong**	**PRE-MW Gopeng**	**POST-MW Gopeng**	**PRE-MW Pulau Sibu**	**POST-MW Pulau Sibu**
I really love being outside in nature	3.2	2.9	3.5	3.0	3.3	3.3
When I'm outside I feel peaceful	3.1	2.8	3.5	3.0	3.3	3.2
Being outdoors makes me happy	3.1	2.9	3.5	3.0	3.4	3.1
I enjoy playing in nature	3.2	3.0	3.5	3.0	3.4	3.1
I enjoy learning about nature	2.8	2.6	3.1	2.8	3.0	2.9
I enjoy learning about plants	2.6	2.4	2.8	2.7	2.7	2.9
I enjoy learning about insects	2.7	2.5	2.7	2.8	2.2	2.3
I enjoy learning about birds	2.9	2.8	3.1	2.8	2.9	2.9
I enjoy learning about reptiles	3.0	2.9	3.5	3.0	3.0	2.9
I enjoy learning about mammals	3.1	2.8	3.6	3.2	3.3	3.1
I enjoy learning how nature works	3.1	2.6	2.8	3.0	3.3	3.0
Learning about the environment makes me happy	2.8	2.6	3.4	2.8	2.9	3.0
I felt really connected to my Malaysia Week site	N/A	3.2	N/A	3.0	N/A	3.7
I would enjoy visiting my Malaysia Week site again	N/A	3.2	N/A	3.2	N/A	3.8
I felt happy at my Malaysia Week site	N/A	3.4	N/A	3.2	N/A	3.8
I felt peaceful at my Malaysia Week site	N/A	3.2	N/A	3.0	N/A	3.5

Response averages are reported and drop slightly for almost all affective questions on all sites from pre to post survey indicating that Malaysia Week has little effect on changing

any emotional attachment they have to being in Nature or learning about Nature during the four day Malaysia Week experience.

On the other hand, the post-Malaysia survey reveals that they feel very connected to their Malaysia Week site with an average of 3.0 or higher for all sites. They also report that they felt connected to their sites with an average response of 3.2 or higher for all sites. They were also very happy at their sites with a range of 3.2 (Gopeng) to 3.8 (Pulau Sibu) for all three sites.

Malaysia Week Student's Environmental knowledge, Ecological Knowledge and What They'd Like to Learn (appendix C)

When asked to self assess their knowledge of local flora and fauna, their ecological knowledge and report what they'd like to learn about the environment students responses showed very little difference in pre and post survey results in these three categories. This is also true in the Kelong site where environmental education was explicit in the agenda.

For all surveys in this section a four point Likert scale was assigned to possible responses. A numerical value was assigned to each response as follows:

Strongly Disagree =1, Disagree = 2, Agree = 3, Strongly Agree = 4

Response averages are reported.

Environmental Knowledge

What is your knowledge?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
How many different types of birds can you identify in Malaysia?	2.4	2.3	2.0	1.8	1.8	1.9
How many different types of plants can you identify in Malaysia?	2.4	2.1	2.0	1.9	2.0	1.9
How many different types of insects can you identify in Malaysia?	2.7	2.4	1.8	2.0	1.9	1.8
How many other different species of animals can you identify in Malaysia?	3.1	2.5	2.2	2.1	2.6	2.5

Ecological Knowledge

How much do you know about the following?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I can identify a food chain in nature	1.9	1.9	1.8	1.8	1.8	1.8
I can identify the water cycle in nature	1.9	1.8	1.9	1.7	1.7	1.7
I can identify a food web in nature	1.7	1.8	1.6	1.8	1.8	1.7
I understand the importance of nature to me	1.9	1.9	2.0	1.8	1.9	2.0
When I am in nature I wonder how nature works	1.5	1.6	1.6	1.8	1.7	1.8

What students would like to learn

What would you like to learn?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I would like to learn more about birds	3.0	2.8	2.8	3.0	2.9	2.9
I would like to learn more about plants	2.8	2.5	2.8	2.8	2.6	2.7
I would like to learn more about insects	2.9	2.6	2.8	2.7	2.3	2.5
I would like to learn more about fish	3.4	3.1	3.1	2.9	2.7	3.1
I would like to learn more about mammals	3.3	3.1	3.4	3.2	3.1	3.1
I would like to learn more about reptiles	3.1	3.1	3.3	3.1	2.9	3.0
I would like to learn more about amphibians	3.2	3.1	3.1	3.1	2.9	2.9

Except for the Kelong site where environmental education was taught daily it is not surprising that the pre and post survey results vary little since Malaysia Week has an emphasis on team building and group cooperation. For many students the Malaysia Week experience is their first time away from home. A large degree of learning responsible behavior and personal limits take place for students during this time. This may also account for the lack of a greater influence of the environmental education

lessons taking place on the Kelong since the students are very self-absorbed and learning too many lessons about being away from home to focus on being excited by environmental education.

The following Kelong student journal entries were chosen since they exemplify the fact that that some students are learning a great deal about themselves and responsibility during Malaysia Week:

> Over the past 5 days that I was away from my family on Malaysia week, I learned many skills and grew in many ways. It was a new experience for me to be away from my mother and "Amah" (note: an Amah is a house maid). I found that I had to learn to be more independent and self-aware. I acquired many more responsibilities that I had to remember, such as safety and cleanliness of my surroundings. It was really different to not have anyone to tell what was right and what was wrong. I learned how to make better and efficient decisions that would not just benefit me, but the whole group. I also thought that my experiences from this week would help my teamwork in group work at school. Overall, I felt that Malaysia week was a learning and growing experience that will benefit me in conventional schooling, and my life.
>
> (Student A, 27/3/06)

This student notes that not missing his family that much must be a sign of growing up.

> On Malaysia Week I grew up more. I learned to do things better, such as fishing, helping others and just taking care of myself. I got better at fishing because I learned new ways to fish and knowledge of how to catch them. I even almost caught a sting ray, but it snapped the line. I didn't actually miss my family that much which I'm sure is a sign of growing up. I also took care of my belongings, when usually I would lose half my things. I managed to keep everything clean too! Well, apart from the things I wore. I probably helped more people on the Kelong than did many other things. I helped people get their fish off the hook, get their line from being stuck on the Kelong, and told them good places to fish.
>
> (Student B, 27/3/06)

This student comments about he lessons he has learned about taking care of and keeping his belongings together.

> While on Malaysia Week I learned many new skills like coping with whatever I have. I don't usually live just off a suitcase even though I didn't really need all the clothes!!! I also learned to be responsible about folding and taking care of my own clothes. I also learned to be responsible about keeping my things together.
>
> (Student C, 27/3/06)

Even though students seemed to be focused on learning about themselves and personal responsibility we cannot underestimate the value of the impact that the environmental education they experiences while immersed in the outdoors has on their individual growth.

For example, these two student journal entries demonstrate the impact of being immersed in the environment and the hands on experiences they engaged in while on the Kelong.

This student writes about how she has learned about pollution of the ocean and how she must learn to keep it cleaner:

> I have been away from my home for 5 days. During that time, I have learned a lot of new things, which I didn't know before. Since I spent my days on the Kelong, I got to know how dirty the ocean was and I figured out that I should help to make a cleaner ocean. Before I went to Kelong, I didn't care about the ocean because it was none of my business, but I realized that I live on Earth, which is surrounded by the ocean.
>
> (Student D, 27/3/06)

Finally, this student says she will never forget the experience of catching an alligator gar on the Kelong:

> I feel that this fun fishing trip was a good experience and has really helped me grow as a person! I'll always remember those alligator gars ☺
>
> (Student E, 27/3/06)

Clearly, students are growing and learning in a multitude of ways during Malaysia Week. Many report that lessons learned about personal responsibility are important and others report that lessons learned about the environment are important.

Malaysia Week Student's Current and Future Environmental Actions (appendix C)

Students were asked about their current practices in regards to environmental action such as recycling their water bottles at school and at home, turning off lights and appliances when they leave a room, cleaning up their immediate environment and participating in an environmentally related club or activity. Questions were adjusted slightly for the Post-Malaysia Week survey to account for the fact that they had just been on a four day outdoor experience and students were asked to predict their future practices in regards to environmental action.

Pre and post Malaysia Week survey indicate a change in student's current environmental actions to their planned future environmental actions. Participating in Malaysia Week seems to raise student intention to increase individual environmental action since all responses to questions in this category increase from pre to post Malaysia Week survey.

The greatest change in planned action occurs in the category of participating in an environmental club or activity. Students on the Kelong site increase from an average response of 1. 6 to 2.9, students on the Gopeng site increase from an average of 2.1 to 3.2 and student responses on the Pulau Sibu increase from and average of 1.7 to 2.7. When students return from Malaysia Week their interest in getting involved in an environmentally oriented club or activity is high as post Malaysia Week results indicate.

Malaysia Week Student's Attitudes and Interests (appendix C)

Students were asked to report their feeling in regards to environmental careers, the importance of conservation and their ability to make a difference in conserving the environment. Very little change occurs in student responses in the attitudes and interest category both pre and post Malaysia Week.

How do you feel about the following?	**PRE-MW Kelong**	**POST-MW Kelong**	**PRE-MW Gopeng**	**POST-MW Gopeng**	**PRE-MW Pulau Sibu**	**POST-MW Pulau Sibu**
I am interested in a career related to the environment	2.5	2.5	2.7	2.8	2.3	2.5
Saving the natural environment is important to me	3.3	3.1	3.4	3.1	3.4	3.5
I feel that I can make a difference in conserving the environment	2.9	2.9	3.2	3.0	2.9	3.2

Malaysia Week does not emphasize environmental careers or conservation therefore students do not focus much attention to these areas of environmental education.

Malaysia Week Student Comfort Levels (appendix C)

A few weeks prior to Malaysia Week students are informed of their Malaysia Week site. After they are informed students become anxious of their ability to cope with new and different situations. They begin to anticipate worst case scenarios such as leeches attaching to their ankles, mosquitoes swarming at their face and one of the biggest fears that generates the most pre-trip questions revolves around toilets and hygiene.

With that in mind, students were asked to report their comfort levels outdoors immersed in the environment in various situations such as dealing with leeches, insects and going to a crude toilet outdoors.

A four point Likert scale was assigned to possible responses. A numerical value was assigned to each response as follows:

Strongly Disagree =1, Disagree = 2, Agree = 3, Strongly Agree = 4

Response averages are reported.

What is your comfort level with the following?	PRE-MW Kelong	POST-MW Kelong	PRE- MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I prefer being outdoors more than indoors	2.7	2.9	3.2	3.2	2.8	3.3
I am comfortable in outdoor weather	2.9	3.0	3.5	3.4	3.0	3.5
Going to the toilet in the outdoors is not a problem for me	2.9	2.9	3.2	3.4	3.0	3.5
I am comfortable in dealing with insects	2.7	2.7	2.8	3.5	2.1	2.7
I am comfortable in dealing with leeches	2.4	2.4	2.8	3.3	2.3	2.7
I am comfortable in dealing with jellyfish	2.5	2.6	2.6	2.6	1.9	2.6
I feel comfortable in the rainforest	3.0	3.1	3.2	3.4	2.7	2.8
I feel comfortable in the ocean	3.3	3.2	3.5	3.5	3.3	3.7
I feel comfortable in a river	3.3	3.1	3.4	3.5	2.9	3.0
I feel comfortable in a cave	2.7	2.9	3.2	3.2	2.6	2.5
I am comfortable learning in outdoor settings	3.0	3.2	3.4	3.5	3.0	3.5

Student comfort levels outdoors in various situations such as their confidence in their ability to use a toilet outdoors, deal with leeches, jellyfish, and various outdoors environments like rainforests, cave and the ocean tend to increase during the Malaysia Week experience.

The greatest increases in confidence occurs at the Pulau Sibu site perhaps because survival and learning to cope with the immediate environment are emphasized as part of the activities students engage in. Since the middle school time use survey indicates that they typical ISKL middle school student spends very little time outdoors Malaysia Week may be the first and one of the few opportunities for students to become familiar with their own comfort levels outdoors. Since Pulau Sibu emphasizes survival and expanding personal limits participants on this site show a greater shift in feeling more comfortable in various outdoors situations.

Expanding comfort zones in the environment is crucial for students if they are to develop a personal connection and sense of belong to Nature. If students do not feel comfortable being immersed in the outdoors then I think they are less likely to be interested in learning about and taking personal action for the environment.

Malaysia Week – How could teachers best help you learn more about the environment?

Students were asked how teachers could best help them learn more about Nature.

Results were analyzed to find any common occurring theme. The overwhelming response reported by most students (31 of 45 respondents) was that they wanted more field trips. The middle school time use survey indicates that most students spend little time outdoors during the regular school week and very few have frequent trips with family or friends to natural areas. As a result, the most exposure that the majority of students get to outdoor recreation or learning is Malaysia Week and the WILD Malaysia Semester Course. Their responses indicate a strong desire more for opportunities to be outside.

The WILD Malaysia Semester Course Survey (appendix D)

Students participating in the WILD Malaysia Semester Course were surveyed to determine the impact of taking a semester long natural history course on their attitudes towards the environment.

The survey was issued to forty students with twenty-seven respondents completing the survey.

The WILD Malaysia Semester Course Survey Results

Why did you choose to take WILD MALAYSIA? (appendix D)

Students were asked why they had chosen to take the WILD Malaysia Semester Course to determine if they had any predisposition towards learning about the environment. Forty-eight percent (13 of 27 respondents) report that they didn't choose The WILD Malaysia Semester Course but were either scheduled in by the counselor, another teacher or had a scheduling conflict with other courses. Thirty-seven percent (10 of the 27 respondents) report that they signed up for The WILD Malaysia Semester Course to learn more about the environment, because they had an interest in some aspect of the outdoors or because they thought it would be fun.

Originally, I had erroneously assumed that students would sign up for The WILD Malaysia Semester Course because of some predisposition towards learning about Nature. Survey results indicate that almost half do not sign up voluntarily but are assigned the course for various reasons. Since many students did not choose the course, knowing this will influence how I approach the various topics and outdoor experiences since I cannot assume any predisposition or interests had they willingly chosen to sign up.

What was your favorite topic during WILD MALAYSIA? (plants, birds or insects) (appendix D)

Nineteen-percent (5 of 27 respondents) reported that plants was their favorite topic, forty percent (11 of 27 students) reported that birds were their favorite topic and thirty three percent (9 of 27 students) reported that insects were their favorite topic.

This information was used to write a successful PTA grant for the purchase of a class set of binoculars since students reported that birds were their favorite topic.

What do The WILD Malaysia Semester Course student's like about the course?

Students were asked to report what they like about the WILD Malaysia Semester Course. The WILD Malaysia Semester Course emphasizes a hands-on approach to teaching environmental education. As an elective course I have the freedom to teach whatever topics and in whatever manner I choose. I deliberately designed The WILD Malaysia Semester Course to be experiential in orientation in an attempt to get students outdoors more often so that they may have opportunities to develop a personal relationships with Nature that might lead to a commitment to action and stewardship for the environment.

What do you like about WILD MALAYSIA?

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**Response Average**
I enjoy the topics we learn about in WILD MALAYSIA	1(3%)	3(11%)	**19(70%)**	**4(15%)**	2.96
I like the way WILD MALASYIA is taught	1(3%)	5(19%)	**15(56%)**	**6(22%)**	2.96
I like the fact that WILD MALAYSIA SEMESTER doesn't have a text book	1(3%)	3(11%)	**8(30%)**	**15(56%)**	3.37
I enjoy learning about local plants and animals	1(3%)	2(7%)	**16(59%)**	**8(30%)**	3.15
WILD MALAYSIA has taught me a lot about Nature	1(3%)	5(19%)	**10(37%)**	**11(41%)**	3.15
I enjoy the activities in WILD MALAYSIA	2(7%)	5(19%)	**15(56%)**	**5**(19%)	2.85
WILD MALAYSIA has changed my opinions about Nature	2(7%)	5(19%)	**11(41%)**	**9(33%)**	3
WILD MALAYSIA S has helped me see Nature differently	2(7%)	8(30%)	**9(33%)**	**8(30%)**	2.85

Clearly students enjoy the topics and the approach to teaching the WILD Malaysia Semester Course which will hopefully lead to an enjoyable and memorable experience for students and begin the process of directing them towards a life path of environmental learning and action.

Affective Questions- The WILD Malaysia Semester Course Students

Students were asked about their feelings when they are outdoors in Nature as well as what they enjoy learning about in the environment.

Even though almost half of the WILD Malaysia Semester Course students didn't choose to take the course, a majority feel very happy and peaceful when outdoors and most enjoy learning about various types of flora, fauna and how Nature works.

How do you feel about the following?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I really love being outside in nature	2(7%)	5(19%)	**14(52%)**	**6(22%)**	2.89
When I'm outside I feel peaceful	2(7%)	2(7%)	**18(69%)**	**5(19%)**	2.96
Being outdoors makes me happy	1(3%)	3(11%)	**16(59%)**	**7(26%)**	3.07
I enjoy playing in nature	1(3%)	6(22%)	**14(52%)**	**6(22%)**	2.93
I enjoy learning about nature	3(11%)	2(7%)	**17(65%)**	**5(19%)**	2.89
I enjoy learning about plants	1(3%)	8(30%)	**14(52%)**	**4(15%)**	2.78
I enjoy learning about insects	4(15%)	7(26%)	**7(26%)**	**9(33%)**	2.78
I enjoy learning about birds	1(3%)	2(7%)	**18(69%)**	**6(22%)**	3.07
I enjoy learning how nature works	2(7%)	4(15%)	**16(59%)**	**5(19%)**	2.89
Learning about the environment makes me happy	1(3%)	8(30%)	**13(48%)**	**5(19%)**	2.81

A majority of The WILD Malaysia Semester Course students either agree or strongly agree that being outdoors makes them happy and peaceful. Overall, they also enjoy learning about Nature including local flora and fauna and general ecological concepts. Since they also reported that they enjoy they way The WILD Malaysia Semester Course is taught, I suspect that the approach to providing a hands-on experience observing Nature on campus is a factor in influencing their happiness and enjoyment.

What is The WILD Malaysia Semester Course Student's Environmental knowledge?

Students were asked to self assess their knowledge of local flora and fauna.

What is your knowledge?

	0 (none)	1-5	6-10	More than 10	Response Average
How many different types of birds can you identify in Malaysia?	2(7%)	13(48%)	**10(37%)**	**2(7%)**	2.44
How many different types of plants can you identify in Malaysia?	1(3%)	12(44%)	**11(41%)**	**3(11%)**	2.59
How many different types of insects can you identify in Malaysia?	1(3%)	11(41%)	**8(30%)**	**7(26%)**	2.78

Fifty-five percent of The WILD Malaysia Semester Course students (15 of 27 respondents) report that they know less than six species of bird while forty-four percent (12 of 27 respondents) know more than six species.

Forty-eight percent of the WILD Malaysia Semester Course students (13 of 27 respondents) report that they know less than six species of plant while fifty-two percent (14 of 27 respondents) know more than six species.

Forty-four percent of the WILD Malaysia Semester Course students (12 of 27 respondents) report that they know less than six species insect while fifty-two percent (15 of 27 respondents) know more than six species.

Learning about local flora and fauna is a step towards developing an awareness of the immediate environment. Without recognition and connection to their immediate environment students may never stop to ask themselves the importance of Nature or take the time to develop a sense of belonging to their surroundings. While this is the first step it is also an important one for students to make if they are to go further and eventually take action for the environment and engage in stewardship activities.

What Would The WILD Malaysia Semester Course Students Like to Learn?

Students were asked to report what they would like to learn about local flora and fauna.

What would you like to learn?

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**Response Average**
I would like to learn more about birds	1(3%)	2(7%)	**22(81%)**	**2(7%)**	2.93
I would like to learn more about plants	1(3%)	5(19%)	**18(67%)**	**3(11%)**	2.85
I would like to learn more about insects	4(15%)	9(33%)	**10(37%)**	**4(15%)**	2.52
I would like to learn more about fish	1(3%)	7(26%)	**14(52%)**	**5(19%)**	2.85

Eighty-eight percent of The WILD Malaysia Semester Course students (24 of 27 respondents) report that they would like to learn more about birds. Seventy-seven percent of The WILD Malaysia Semester Course students (24 of 27 respondents) report that they know like to learn more about plants. Fifty-one percent of The WILD Malaysia Semester Course students (14 of 27 respondents) report that they know like to learn more about insects.

Students indicate that they would like to learn more about local flora and fauna with their favorite topic being birds. Since birds is a popular topic and students desire more field

trips, I will design fields trips to see more birds and connect students with local fauna while providing them an opportunity to experience Nature first hand.

The WILD Malaysia Semester Course Student's Ecological knowledge

How much do you know about the following?

	No	Yes	Response Average
I can identify a food chain in nature	3(11%)	**24(89%)**	1.89
I can identify the water cycle in nature	7(26%)	**20(74%)**	1.74
I can identify a food web in nature	6(22%)	**21(78%)**	1.78
I understand the importance of nature to me	3(11%)	**24(89%)**	1.89
When I am in nature I wonder how nature works	9(33%)	**18(67%)**	1.67

Students were asked to self assess their ecological knowledge. The survey asked them to report if they could identify simple ecological relationships outdoors in Nature. Eighty-eight percent of The WILD Malaysia Semester Course student's (24 of 27 respondents) report that they can identify a food chain in Nature. Seventy-four percent of The WILD Malaysia Semester Course student's (20 of 27 respondents) report that they can identify a water cycle in Nature. Eighty-eight percent of The WILD Malaysia Semester Course student's (21 of 27 respondents) report that they can identify a food web in Nature. Eighty-eight percent of The WILD Malaysia Semester Course student's (24 of 27 respondents) report that they understand the importance of Nature.

These results indicate that most students can identify ecological relationships and are curios of how Nature works.

The WILD Malaysia Semester Course Student's Attitudes and Interests

Students were asked to report their feeling in regards to environmental careers, the importance of conservation and their ability to make a difference in conserving the environment.

How do you feel about the following?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I am interested in a career related to the environment	3(11%)	8(30%)	**14(52%)**	**2(7%)**	2.56
Saving the natural environment is important to me	1(3%)	7(26%)	**12(44%)**	**7(26%)**	2.93
I feel that I can make a difference in conserving the environment	2(7%)	3(11%)	**18(67%)**	**4(15%)**	2.89

Sixty percent (16 of 27 respondents) of the WILD Malaysia Semester Course student's report that they are interested in a career related to the environment while seventy percent (19 of 27 respondents) of the WILD Malaysia Semester Course student's report that saving the environment is important to them. Eighty-one percent (22 of 27 respondents) of the WILD Malaysia Semester Course student's report that feel they can make a difference in conserving the environment. These results may indicate that students are moving beyond a simple awareness of the environment and local flora and fauna and are beginning to take interest and recognize the importance of more in-depth learning.

The WILD Malaysia Semester Course Student's Future Environmental Actions

The WILD Malaysia Semester Course students were asked about their future practices in regards to environmental action

What are your FUTURE actions?

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**Response Average**
I plan to reuse my water bottle at school more	0	6(22%)	**13(48%)**	**8(30%)**	3.07
I plan to turn off the lights when I am the last one to leave a room	0	0	**17(26%)**	**10(37%)**	3.37
I plan to turn off the computer when I am the last one to leave a room more often	1(3%)	4(15%)	**14(52%)**	**8(30%)**	3.07
I plan to pick up trash around me more often (even if it is not mine).	0	9(33%)	**14(52%)**	**4(15%)**	2.81
I plan to not to waste paper food etc.	0	5(19%)	**16(59%)**	**6(22%)**	3.04
I will remind others not to waste	1(3%)	4(15%)	**15(56%)**	**7(26%)**	3.04
I plan to recycle both at school and at home	0	3(11%)	**18(67%)**	**6(22%)**	3.11
I plan to participate in an environmental club/activity	5(19%)	6(22%)	**13(48%)**	**3(11%)**	2.52

Seventy-eight percent (21 of 27 respondents) of the WILD Malaysia Semester Course students plan to reuse their water bottle at school more. All (27 of 27 respondents) of the WILD Malaysia Semester Course students plan to turn off the lights when they are the last one to leave the room. Eighty-one percent (22 of 27 respondents) of the WILD Malaysia Semester Course students plan to turn off the computer when they are the last one to leave the room. Sixty-seven percent (18 of 27 respondents) of the WILD Malaysia Semester Course students plan to pick up trash around them more often. Eighty-one percent (22 of 27 respondents) of the WILD Malaysia Semester Course students plan not to waste paper and food. Eighty-one percent (22 of 27 respondents) of the Semester Course students plan to remind others not to waste.

Eighty-one percent (22 of 27 respondents) of the WILD Malaysia Semester Course students plan not to waste paper and food. Eighty-nine percent (24 of 27 respondents) of the WILD Malaysia Semester Course students plan to recycle both at school and at home.

Fifty-nine percent (16 of 27 respondents) of the WILD Malaysia Semester Course students plan to participate in an environmental club or activity.

During the WILD Malaysia Semester Course students are exposed to a variety of environmental experiences. They gain knowledge of local flora and fauna through learning and observation that takes place on campus. They are also given many opportunities to go outdoors and experiences nature first hand which hopefully lead to a connection with Nature. However, there is no explicit conservation message in the WILD Malaysia Semester Course. Under my definition, action is the ultimate outcome of effective environmental education. Most the WILD Malaysia Semester Course Students report that they plan to take future personal action in regards to conservation of energy and cleaning up their immediate environment. Since I did not explicitly teach conservation or action during the WILD Malaysia Semester Course I believe that students arrive at their decision to take future action as a result of their frequent exposure to being outdoors and a broader knowledge of the environment through hands-on activities.

INTERPRETATION

Comparing Malaysia Week and The WILD Malaysia Semester Course

Malaysia Week and the WILD Malaysia Semester Course serve two very different yet equally important functions in the process of leading students to a path of becoming a naturalist with a lifelong commitment to environmental learning and action. While Malaysia Week is an excellent program for raising students' awareness of the environment and increasing their comfort levels of being immersed in the environment, the WILD Malaysia Semester Course increases student's knowledge of local flora, fauna and ecology. Malaysia Week and the WILD Malaysia Semester Course's different focus compliment each other as a total environmental education experience for ISKL students.

When Malaysia Week participants were asked to predict their future actions for the environment an increase in intended action over current action was reported. The increase in intended action indicates a higher level of awareness for the need to take personal responsibility for the environment with simple acts such as recycling, conserving energy by turning off lights and computers and joining more environmentally related activities and clubs. This raised awareness for many will hopefully lead to increased action for at least some.

On the other hand Malaysia Week participant's knowledge of flora, fauna and ecology does not increase from pre to post Malaysia Week survey. There is also no increase in student's attitudes or interests toward environmental careers or their self assessment of the importance of conservation or ability to make a difference for the environment. This indicates that even though students show an increase in awareness they have not been motivated to action beyond simple recycling and other personal responsibilities by the Malaysia Week experience. This is not surprising since Malaysia Week emphasizes team

building, cooperation and personal growth but does not have an explicit environmental focus or a strong explicit message of conservation.

Since The WILD Malaysia Semester Course students are engaged directly in natural history and identification of birds, insects and plants it is not surprising that they report a high level of knowledge of local flora, fauna and ecology. The favorite unit of most students is the study of birds. I was unaware that topic of birds would be as popular as it has become with students often returning to class with stories of bird observations and sighting at home and on campus.

The WILD Malaysia Semester Course survey also shows that some students also appreciate the opportunity to study insects. Several instances have occurred when a few students rush into class, insect in hand, and issue a plea to help identify their newfound critter. One particularly memorable occasion occurred when a Korean girl marched into class with a large rhinoceros beetle and asked for a display container so she could carry it around school. In an of itself that is not an exceptional event except when you consider that only a few weeks prior she had shrieked at the mere sight of any sort of insect. Her increased level of comfort in dealing with insects and curiosity to learn more epitomizes one of my goals for environmental education which is to increase student comfort and knowledge of their surroundings.

My definition of environmental education states that students must increase their knowledge of and comfort levels in the environment if they are to eventually take environmental action. In order for them to become environmentally active, or stewards for the environment, they must also develop a personal relationship with Nature that motivates them to action. For many ISKL students the Malaysia Week survey indicates that just being outdoors is enough to allow them to explore their personal levels of comfort in dealing with the environment. This is a crucial factor for them to further enjoy and develop a relationship with Nature.

However, the same survey indicates that knowledge is not increased by simply being outdoors. For knowledge to be increased a teacher can provide hands-on experiences of Nature. ISKL middle school teachers are willing to engage students in more environmental education as indicated by the teacher's survey if given training, knowledge and skills in environmental education. Teachers including more environmental education during their daily lessons and Malaysia Week would likely lead to an increase in environmental knowledge in students.

Increased knowledge often leads to higher levels of environmental action. An increase in environmental action is the hallmark of effective environmental education and is my ultimate goal as an educator.

Becoming a Naturalist and committing to lifelong learning and environmental action is not a direct path but is a meandering journey sometimes unintentionally or perhaps even unknowingly undertaken by an individual. The events that lead to that path are often unpredictable yet teachers can provide the framework for a greater likelihood of

discovering the path if they provide by recreational adventure and engaging environmental activities like those afforded by both Malaysia Week and the WILD Malaysia Semester Course.

Value of Engaging in the Action Research Process

The value of the engaging in the Action Research process simply cannot be overstated. There have been tremendous changes and remarkable progress made in the realm of environmental education at ISKL influenced both directly and indirectly by the process of engaging administration, faculty and students in a dialogue prompted by my research.

Unlike many Action Research projects that focus on individual teachers investigating and learning from their own teaching practices, my project had both an individual focus and a school wide focus. A pleasant byproduct of my AR research has been the initiation of a dialogue to begin the initial steps to instill an environmental education ethos amongst faculty, staff and students at ISKL. Administration and teachers have shown a great deal of interest in continuing to support more environmental education at ISKL. This is very promising and rewarding and even though we are just beginning the process it has been very exciting to be a part of this development.

For several years ISKL has had an explicit goal to integrate environmental education into the curriculum as stated in our school accreditation goals (appendix F). However, progress to realize that goal has been slow and initiated by only a few faculty. At the onset of this AR project I began to engage colleagues, administrations and students in a dialogue to at least begin the process of implementing more environmental education in the curriculum at all levels. To date there have been many direct and indirect results stemming from that initial action.

Benefits

The benefits have been both direct and indirect and are far reaching ranging from school wide initiatives to individual reflection and changes.

Direct Action— changes that are occurring or have already occurred as a direct result of this AR project.

- Reformatting of Earth Explorers middle school after school activity

  Earth Explorers is a new club to MS this year. I began the club once I realized how little environmental education middles school students were exposed to at ISKL.

  Initially Earth Explorers was an activity based club. We would meet every Monday to conduct a field study of some sort. Students had to sign up for the activity as a quarter long commitment. After reading about the value of recreational activities to the development of life paths to environmental education (Chawla 1999) and

realizing that our students had most of their time already pre-scheduled in sports, homework and other activities, I decide to switch to a recreational based activity that any student could show up for when they were free. This allowed more time for hiking and recreation (which the time use survey indicates that MS students have little exposure to) and eliminates the need to be an exclusive activity that students had to sign up for in advance.

- Adding conservation topics to The WILD Malaysia Semester Course

The WILD Malaysia Semester Course is also a new course to ISKL this year. It was added to the course options as an elective to allow students more options for their schedule.

Initially, I avoided environmental issues and conservation topics in the WILD Malaysia Semester Course since I felt they had a tendency to discourage students before they even had a chance to connect with Nature.

However, I will be adding conservation as a topic with an emphasis on personal and community action instead of global issues like deforestation and ozone depletion.

- Workshops this year, more workshops next year (EARCOS, Kuching, ISKL)

Once the dialogue about environmental education was initiated with the curriculum coordinator she became very excited for me to offer more environmental education workshops for teachers. She is also very enthusiastic for me to offer elementary teacher specific workshops next year. As of today I have 3 scheduled for next year. This was also prompted by the publication of my book *As if the Earth Matters* as a teacher training tool and its launch at the regional teacher's conference in Manila in March (see below).

- Addition of environmental topics added to grade 7 curriculum (w/ field trip)

After conversations with middle school science teachers during which we lamented the absence of environmental education from the curriculum it was decided that a unit on biodiversity would be added to the grade 7 curriculum. The unit will also be accompanied by field trips to local aquaria, bird parks, botanical gardens and zoos to maximize the exposure of students to different flora and fauna and usefulness of the unit. The publication of my book also prompted this decision since I am now seen as the local 'environmental expert' at ISKL.

- PTA grant for the WILD Malaysia Semester Course

I recently wrote and was awarded a grant for US$2000 from the Parent Teachers Association to purchase a classroom set of professional binoculars for students to use

during The WILD Malaysia Semester Course, Earth Explorers and during my workshops. Survey data about students reporting the study of birds as their favorite topic from my AR project was included in the grant proposal and most likely had an impact on its success.

- 7th grade Environmental Stewardship to be added to homegroup

As a result of conversations related to my research the entire grade 7 team (5 teachers) has become interested in how they might include more stewardship activities in their daily routines. We've decided that we will initiate a grade level project that will involve students in the process of growing and caring for a garden on campus. This activity will take place during the 15 minute homegroup sessions we have every morning at the beginning of school.

- New teacher orientation for EE

As an initial phase to begin the process of instilling an environmental ethos at ISKL it was decided by the Administrative Council that I will be involved in new teacher orientation. I will take new teachers on a hike during their orientation process. This will serve to underscore the importance of ISKL's desire to become a more environmentally friendly campus as well as inform new teachers of the incredible outdoor opportunities and biodiversity of Malaysia.

Indirect Action- actions that have taken place and are indirectly inspired by this AR project

- Publication and launch of *As if the Earth Matters*

In March I published a book on environmental education for educators, parents and anyone that wants to educate themselves or others about the environment. The book was launched at a regional teacher's conference in Manila and was well received by over 2000 participants.

Consequently, I was interviewed by a local Malaysian newspaper to promote the book and environmental education in Malaysia. The reporter informed me that the editor of the paper is very interested to get more people involved in environmental education and the article about my book will help accomplish that goal.

In summary, I can say that the impact of engaging in the Action Research process has been an impetus for both personal and professional growth. My knowledge and pedagogical practices have drastically changed due to the research I have engaged in. My understanding of environmental education has increased in both depth and breadth. I

am looking forward to implementing the many practices that I have discovered that will enhance my classroom and outdoor education methods.

The future will see me sharpening my skills as an educator of children and a workshop facilitator for colleagues. My curiosity has been peaked and my educational practiced have been informed and transformed. I will continue to explore my natural surrounding while adding to my own and my students knowledge of local natural history if Malaysia and SE Asia.

With that in mind, future research possibilities may involve the impact of naturalist training on adult Malaysians that would lead to a deeper appreciation for their natural heritage and greater environmental action in a developing nation. Future publications may also include more teachers' guides and local Natural history guides. I suspect that these will be well received in Malaysia where they are lacking and sorely needed.

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Appendix A

Middle School Teachers Survey

What is environmental education to you?

1. To raise awareness about our planet and instill a commitment to action in students to preserve it.
2. The study of the environment we live in. Earth, the natural world, biodiversity, conservation, environmental protection, and climate are just some of the issues that comprise environmental education-I believe.
3. It is raising students' awareness about the frailty of the environment. It is leading by example and doing simple things such as recycling.
4. Learning experiences that encourage appreciation for the earth and all that is a part of it. This includes education about what is damaging the earth, but is certainly not limited to that.
5. I teach kids to be conscience of the limited resources the school has, such as paper use, electricity and water. None of this is formally addressed in the curriculum, however. Also, 8th grade industrialization examines the impact that development can have on the environment.
6. Exposing and teaching people of all ages about the earth and how our actions affect and impact all of us.
7. Understanding the interdependent relationships in nature and our role, as humans, in it.
8. Recognizing the interconnection of various systems. Developing an awareness and concern about using the world's depleting resources wisely and realizing that the influence of the individual can be significant.
9. Environmental education has much to do with learning to live on the planet in sustainable ways. Humans will always have an impact on the natural world but environmental education teaches people about the finite natural resources, renewable energy sources, and the best ways to live with minimal impact.
10. A very important way to reconnect people to the nature and environment with the ultimate goal of making this planet a better place to live.
11. An important aspect of all school curriculum and life skills.
12. Teaching about preservation of the environment and the factors that are destroying the air, water and plants on Earth.
13. Since I heard your book talk, I think it means teaching students to know what environment is around them, instilling in them a sense of belonging to their

environment - being a part of it, and finally, getting them to become stewards of their environment. It is important enough to them that they want to care for it.

14. I have not taught Environmental education since leaving Scotland. When there it was a well developed part of the curriculum that incorporated Science and Geography. We taught issues that affect the world today, why they happen and the short and long term consequences.
15. Very important...the land its resources and how they are used the environment and its protection etc
16. Teaching others to recognize, appreciate, and learn to care for the environment
17. Learning about the environment: nature, flora, fauna. Learning about conservation. Learning about the effects of our actions on this planet. (eg. pollution & industrialization)
18. Important to me personally, but not so applicable in band.. however we do play various pieces that have an environmental theme Malaysia week is my environmental ed time
19. The acquiring of the knowledge in regards to the awareness of preserving what is left in the natural world which all earth-dwellings and living organisms heavily rely on to survive. Yay tree huggers.
20. Learning about the outdoor environment in which one lives. This includes plants, animals and insects. The education includes how to enjoy these and also how to protect them.
21. The appreciation of the environment.
22. Taking student out into the environment and

23. Important to include in my curriculum when it fits.
24. A whole approach not just to education but rather lifestyle
25. It is instilling reasonable environmental practices everyday, on an ongoing basis, at all times by teaching, showing, and modeling. Making students aware of their responsibilities, the impact of their behavior, and the measures they can take to improve their environmental practices. It is identifying and calling attention to areas of concern at any time, and discussing alternatives. It is empowering students to be responsible world citizens.

Please rate yourself

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
I am confident teaching environmental education				

I am able to incorporate environmental education into my lessons
I am able to teach environmental ed. lessons outdoors
I am comfortable teaching environmental topics
I have adequate knowledge to teach environmental education
I have adequate training to incorporate environmental education into my lessons
I have enough time to incorporate environmental education into my lessons

What is your knowledge?

	0 (none)	1-5	6-10	More than 10
How many different types of birds can you identify in Malaysia?				
How many different types of plants can you identify in Malaysia?				
How many different types of insects can you identify in Malaysia?				
How many other different species of animals can you identify in Malaysia?				

What would you like to learn?

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
I would like to learn more about local plants and animals				
I would like to learn more env. ed. techniques				
I would like to learn more about local environmental issues				
I would like to learn more about local conservation				
I would like to learn about local resources for env. ed.				

Please rate yourself

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
I integrate environmental education into my				

lessons effectively
I use environmental education to enhance my lessons
I talk about the environment in my classes as often as possible
Environmental education compliments the topics and subjects I teach
I could do more to include environmental education in my lessons and activities

What are your actions?

	Never	Sometimes	Very Often	Always
I reuse my water bottle at school				
I turn off the lights when I am the last one to leave a room				
I turn off the computer when I am the last one to leave a room				
I pick up trash around me (even if it is not mine).				
I try very hard not to waste paper food etc.				
I remind others not to waste				
I recycle both at school and at home				
I already participate in environmental activities (on my your own or with Malaysian Nature Society etc.)				

How do you feel about Malaysia Week

	Strongly Disagree	Disagree	Agree	Strongly Agree
Malaysia Week is an excellent opportunity for students to learn about the environment				
Malaysia Week is a valuable experience for students				
Malaysia Weekis a valuable experience for me				
I would like more training/workshops so I can conduct env. ed. activities during Malaysia Week				
The local guides on Malaysia Week do an excellent job of incorporating env. ed. into the activities				
I do an excellent job of incorporating env. ed. into Malaysia Week				

Malaysia Week - Teacher Survey

Any other comments or questions?

1. Let’s get more involved as a school in learning about our environment and its protection.

2. I hope that we can do more for the environment with the kids. I especially would like to see the wastage (food water paper) diminish. As the adage says "When the water runs out, try to drink your money and see if you like it." There is the real one (American Indian) but I forgot the exact wording- I just remember feeling stung by its message.
3. I believe environmental education can be improved by keeping the focus year round instead of just during Earth Week.
4. Bringing environmental issues into math problems is a challenge. When possible, I bring in problems dealing with oil and gas with which I am familiar.
5. Although I don't work regularly in the middle school, I think that it is important to create culture where reducing and reusing are second nature, even before recycling. That kids realize that their impact on the environment is significant through their daily activities. Do they buy in fancy packaging? Do they use rechargeable batteries? Do they use the air-con where it is not necessary? Do they know the origin of commonly used items and their environmental cost in relative terms? Use products that deplete resources when alternatives are available? Understand the difference between renewable and nonrenewable resources.
6. I feel that the focus on Malaysia week trips I have attended has been on character building and reinforcing of social relationships among the students. The environmental education aspect of the experience seems incidental. The students hardly remember the names or even the geographic location of their sites!
7. I love being outdoors and love being active, but I'm not really one who loves naming insects, birds and plants. Sorry. Promise to recycle and do my part to conserve!
8. If this will help get us more environ ed workshops etc... Excellent plan! More Malaysia week!
9. I am already committed in other areas.
10. I spend a lot of my time reading books on teaching writing, reading and planning my lessons... I have worked at an outdoor center and loved teaching there but that was my job then. Right now I am aghast at how little time I have to teach writing, reading and social studies so I don't have time to add anything else...
11. I know that I have been lucky with my guides so far, others have not been so lucky. I also think that we need to make Malaysia week less of a "sports" theme, and more of a nature/culture theme. I think we have gotten away from that too much.

Appendix B

Middle School Student Time Use Survey

How many hours PER DAY (on average) do you spend doing the following?

	0	1-2	2-3	3-4	4-5	more than 5	Response Average
Homework	2	**93**	68	30	5	5	2.79
Sports	13	**93**	60	22	10	3	2.66
Playing outdoors in Nature	**85**	**85**	25	4	1	2	1.8
Chatting on MSN	63	**78**	33	13	7	7	2.22
Using the Internet	6	**86**	57	27	11	15	2.98
Watching DVD VCD or other videos	49	**109**	29	9	4	1	2.07
Talking on the phone	**106**	80	12	2	0	2	1.59
House work (chores)	76	**100**	20	2	2	1	1.79
Participate in an environmentally related activity	**114**	70	13	3	0	1	1.55

How much time do you spend with parents, friends or other family members doing the following?

	Not at all	Daily (once a day)	Weekly (once a week)	Montly (once a month)	A few times a year	Yearly (once a year)	Response Average
Camping	**89**	1	4	7	39	63	3.47
Hiking	**75**	4	13	16	53	42	3.46
Playing outdoors in Nature	39	25	**46**	31	47	15	3.33
Fishing	**121**	5	1	10	36	30	2.63
Working on homework	18	**123**	36	14	10	2	2.41
Gardening	**141**	5	18	15	16	8	1.94
Sports	11	**113**	47	14	13	5	2.61
Visiting family farms	**141**	3	3	4	21	31	2.28
Learning about local birds	**145**	5	3	11	23	16	2.06

Learning about local plants	**141**	4	4	13	19	22	2.17
Learning about local insects	**143**	5	2	14	19	20	2.12
Watching TV	5	**135**	55	4	2	2	2.35
Visiting a park	49	14	30	**58**	39	13	3.31
Having a picnic outdoors	**82**	3	11	32	41	34	3.24
Going to a mall	4	16	**137**	37	7	2	3.16

Appendix C

Pre and Post Malaysia Week Survey

How do you rate yourself?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I really love being outside in nature	3.2	2.9	3.5	3.0	3.3	3.3
When I'm outside I feel peaceful	3.1	2.8	3.5	3.0	3.3	3.2
Being outdoors makes me happy	3.1	2.9	3.5	3.0	3.4	3.1
I enjoy playing in nature	3.2	3.0	3.5	3.0	3.4	3.1
I enjoy learning about nature	2.8	2.6	3.1	2.8	3.0	2.9
I enjoy learning about plants	2.6	2.4	2.8	2.7	2.7	2.9
I enjoy learning about insects	2.7	2.5	2.7	2.8	2.2	2.3
I enjoy learning about birds	2.9	2.8	3.1	2.8	2.9	2.9
I enjoy learning about reptiles	3.0	2.9	3.5	3.0	3.0	2.9
I enjoy learning about mammals	3.1	2.8	3.6	3.2	3.3	3.1
I enjoy learning how nature works	3.1	2.6	2.8	3.0	3.3	3.0
Learning about the environment makes me happy	2.8	2.6	3.4	2.8	2.9	3.0
I felt really connected to my Malaysia Week site	N/A	3.2	N/A	3.0	N/A	3.7
I would enjoy visiting my Malaysia Week site again	N/A	3.2	N/A	3.2	N/A	3.8
I felt happy at my Malaysia Week site	N/A	3.4	N/A	3.2	N/A	3.8
I felt peaceful at my Malaysia Week site	N/A	3.2	N/A	3.0	N/A	3.5

How OFTEN do you do the following?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I go outside to observe nature	2.3	2.3	2.2	2.5	2.1	2.3
When I'm outdoors I notice plants	2.4	2.5	2.5	2.4	2.3	2.5
When I'm outdoors I notice birds	2.8	2.6	2.9	2.2	2.4	2.8
When I'm outdoors I notice insects	2.8	2.8	2.5	2.2	2.3	2.5
When I'm outdoors I notice my surroundings	2.9	2.9	3.2	2.7	2.8	3.1
When I'm outdoors I observe different sounds	2.9	2.7	2.6	2.6	2.9	2.8
When I'm outdoors I observe different smells	2.6	2.8	2.7	2.7	2.8	2.8
When I'm outdoors I observe the texture of different plants	2.1	2.3	2.4	2.4	2.1	2.1

What is your knowledge?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
How many different types of birds can you identify in Malaysia?	2.4	2.3	2.0	1.8	1.8	1.9
How many different types of plants can you identify in Malaysia?	2.4	2.1	2.0	1.9	2.0	1.9
How many different types of insects can you identify in Malaysia?	2.7	2.4	1.8	2.0	1.9	1.8
How many other different species of animals can you identify in Malaysia?	3.1	2.5	2.2	2.1	2.6	2.5

What are your actions?	PRE-MW Kelong	POST-MW Kelong	PRE-MW Gopeng	POST-MW Gopeng	PRE-MW Pulau Sibu	POST-MW Pulau Sibu
I reuse my water bottle at school	2.9	3.2	2.8	3.1	2.2	3.3

I turn off the lights when I am the last one to leave a room	2.9	3.3	2.9	3.2	2.8	3.5
I turn off the computer when I am the last one to leave a room	2.9	3.1	2.8	3.2	3.1	3.7
I pick up trash around me (even if it is not mine).	2.4	3.2	2.5	3.0	2.1	3.3
I try very hard not to waste paper food etc.	2.9	3.2	3.2	3.2	2.8	3.3
I remind others not to waste	2.4	3.2	2.6	3.1	2.4	3.3
I recycle both at school and at home	2.4	3.3	2.8	3.3	2.4	3.4
I already participate in an environmental club/activity	1.6	2.9	2.1	3.2	1.7	2.7

How do you feel about the following?	**PRE-MW Kelong**	**POST-MW Kelong**	**PRE-MW Gopeng**	**POST-MW Gopeng**	**PRE-MW Pulau Sibu**	**POST-MW Pulau Sibu**
I am interested in a career related to the environment	2.5	2.5	2.7	2.8	2.3	2.5
Saving the natural environment is important to me	3.3	3.1	3.4	3.1	3.4	3.5
I feel that I can make a difference in conserving the environment	2.9	2.9	3.2	3.0	2.9	3.2

What is your comfort level with the following?	**PRE-MW Kelong**	**POST-MW Kelong**	**PRE- MW Gopeng**	**POST-MW Gopeng**	**PRE-MW Pulau Sibu**	**POST-MW Pulau Sibu**
I prefer being outdoors more than indoors	2.7	2.9	3.2	3.2	2.8	3.3
I am comfortable in outdoor weather	2.9	3.0	3.5	3.4	3.0	3.5
Going to the toilet in the outdoors is not a problem for me	2.9	2.9	3.2	3.4	3.0	3.5
I am comfortable in dealing with insects	2.7	2.7	2.8	3.5	2.1	2.7
I am comfortable in	2.4	2.4	2.8	3.3	2.3	2.7

dealing with leeches						
I am comfortable in dealing with jellyfish	2.5	2.6	2.6	2.6	1.9	2.6
I feel comfortable in the rainforest	3.0	3.1	3.2	3.4	2.7	2.8
I feel comfortable in the ocean	3.3	3.2	3.5	3.5	3.3	3.7
I feel comfortable in a river	3.3	3.1	3.4	3.5	2.9	3.0
I feel comfortable in a cave	2.7	2.9	3.2	3.2	2.6	2.5
I am comfortable learning in outdoor settings	3.0	3.2	3.4	3.5	3.0	3.5

How could teacher's best help you learn more about nature? (Brainstorm ideas and give specific examples)

1. They could have more activities that test our physical strengths while being able to learn from experience
2. Additionally add nature in science class and have like a field trip and etc.
3. More field trips about nature
4. More classes field trips
5. I think we should have more field trip or have other weeks like Malaysia Week.
6. More field trips =D
7. Maybe more information about how we should save nature in class time
8. More field trips!
9. More field trips (gives us hands-on experiences of Nature...etc.)
10. Teach about nature (birds, plants, etc). More field trips to natural places. More students getting involved in The WILD Malaysia Semester Course class.
11. They could have a guide which is an expert on some kind of topic like bugs, plants and others.
12. More field trips about nature??
13. Maybe, give us more time in nature; field trips, camping, walks around the school
14. More field trips!!
15. * more field trips
16. During site meeting they could have a lesson about the environment you are going to stay in.

17. More field trips and letting us have at least one class a day outside {not counting P.E.}
18. More fieldtrips
19. I like field trips, more classes in school about nature,
20. I think more field trips and going outside to observe things
21. More field trips is about all, classes on the environment wouldn't help many people, but I don't think there needs to be more education on nature
22. More teaching about nature in science classes, making more classes like The WILD Malaysia Semester Course
23. More field trips to mountains, beaches, rivers... etc
24. Take a field trip to FRIM.
25. More classes in school on nature.
26. More field trips to learn about more animals.
27. More field trips such as MW
28. More field trips for extra credits such as bird watch last year.
29. More field trips
30. Go outdoors.
31. More field trips -labs
32. I help to nature because, this Malaysia week is take more water and also nature. I enjoyed this Malaysia week.
33. We should learn more about nature in science class. Also, they should provide us more time to learn about nature, such as being in nature and explore them. Or they could arrange field trip to jungles or river or anyplacec where we can learn nature.
34. Have more field trips into nature and talk about different plants and animals ect.
35. -MORE FIELD TRIPS (my old school (JIS) had at least 5 a year per grade) -Also, we could pay more in depth attention to the types of fish we caught.
36. More field trips
37. We should not be in hurry and do the best to learn about nature
38. Teach us more about nature and show us too
39. More field trips and bring examples to class.
40. about more Malaysia weeks like twice a quarter
41. More field trips and more class units

42. More Fishing

43. More field trips ;)

Pre- Malaysia Week

My best experiences in nature have been...

*** Note: Gunung Tahan, Merapoh, Belum, Taman Negara, Endau Rompin, Tioman and Ulu Perak are Malaysia Week sites.**

1. To Gunung Tahan last year during Malaysia Week. I've never experienced such a good thing!
2. When I am outside playing wid ma dogs!!!
3. Fishing in Malaysia
4. Spending the night on a boat in a lake with my grandfather, we were fishing.
5. Merapoh (Taman Negara)
6. With my friends, my favorite was when we went camping in a park and we stayed up all night and then in the morning we played around at a lake. Those were some of my best days...
7. When I got to learn how to survive in the outdoors using different techniques.
8. Last Malaysia week when I went to Belum
9. When I went to a nature hike and saw SO SO SO many animals.!!
10. Fishing hiking Canoeing
11. Taman Negara, Endau Rompin.
12. Hiking a mountain every sunday with my family. Rafting(?!) in the river.
13. When I learn a new species of mammal, I like to look it up on the internet and learn more about it (sometimes, if the mammal interests me)
14. I don't remember a lot but it was when I went fishing with my dad and my brother 30min speed boat ride away from the main land. Which I only remember.....
15. Trekking in Taman Negara
16. Camping in such places as: The Grande- , -Zion, -Brice- Canyon(s), places along the Rocky Mountains, camping amoung sand dunes, forest camping, desert camping, back packing in a rain forest, etc. Caving in batu caves and a few caves around a palm oil plantation. Kayaking and Fishing along a river
17. Watching plants I've never seen before

18. Camping in the outdoors
19. When I was in Tioman, I had to go to toilet which is located outside, and also i had to set
20. River rafting
21. When I rode my horse through the rainforest on a trial ride with my friends.
22. The Firefly watch
23. Ulu Perak was the best experience for me.
24. Rafting in rivers and snorkeling in the ocean
25. Going hiking in Joshua Park and Red Wood Forest in California
26. My best experiences in nature have been mainly in Malaysia week because during Malaysia week, I’m hardly indoors for a whole week, so I have a chance to explore the outdoors :P
27. When I went to Genting Highlands on the camping trip with the 5th grade.
28. Camping with family/friends in the states
29. -Climbing volcanoes in indonesia -Mountain Biking in australia -Going forest trekking (many places) -Going for walks in the forest (Netherlands -MW '05 Sungai Perak -Going Diving in Perhentian -Snorkelling in the great barrier reef
30. Spotting a rare bird at a middle of no where hotel, when professionals came for weeks to see it but didn’t, and I was only there for 2 days
31. Snorkeling, swimming, and being in the ocean in general.
32. With a lot of my friends, we would go camping every weekend on a very beautiful mountain. We would spend about 5 hours hiking up and then setting up before just looking around for new things in the forest. I still do that when I go back every summer.
33. Hiking in Glacier National Park. It was beautiful - It was long and there were mountain goats, many types of plants and animals, and it was a very cool day. Not bad weather at all. It was amazing being able to hike at the "Crown of the Continent." or so it is called.
34. When I saw a bird snatching a fish out of a river when I was in Philippines.
35. Kayaking FISHING!!!!! Hiking Playing outside golfing and sports

Post Malaysia Week

My best experiences in nature have been...

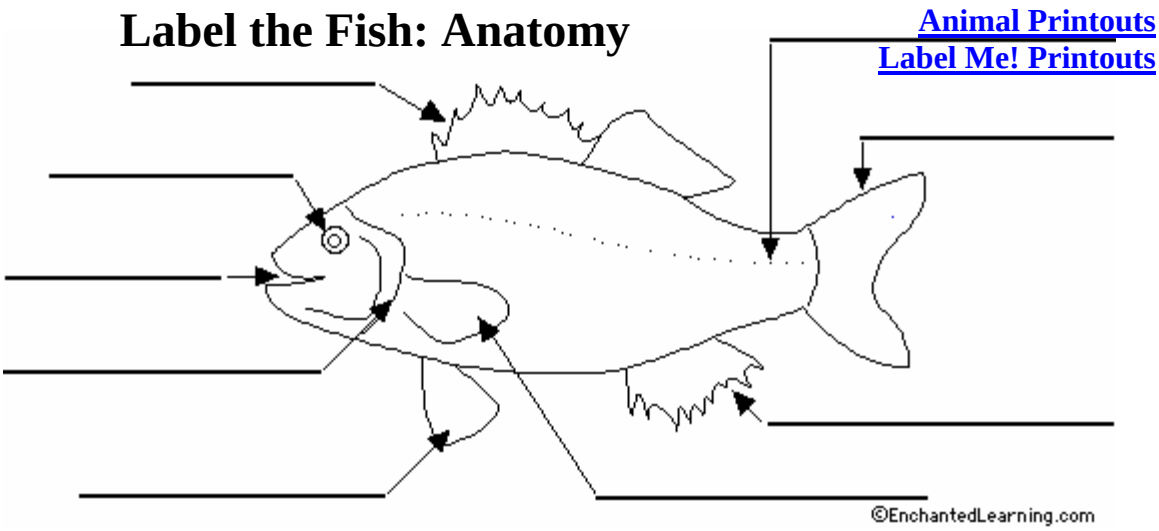
1. To go through water crossings in the river and witness a waterfall
2. Camping near the sea and close to the river! (Tioman)
3. With my friends camping out in the cold weather eating smores
4. Malaysia week
5. I don't have any experiences in nature; this M.W was my first time.
6. Camping with my family in American forests, trekking in Taman Negara and Malaysia weeks!
7. Malaysia week
8. In Tioman, we didn't have a toilet there so we had to dig a hole for it. It was pretty hard.
9. Malaysia week and the time I went camping with my family near a river in Korea
10. Merapoh
11. I went to rainforest.
12. Camping with my friends on my first Malaysia week
13. When I'm camping with my parents
14. Make a shelter
15. observing baby animals and their mothers
16. Camping, fishing and identify stuff
17. Sleeping in a tent swimming in the river hiking
18. Learning about new animals and explore different environments
19. Going to Taman Negara in Grade six (my last school).
20. Hiking in Glacier National Park.
21. taking long walks in the rainforests and outdoors its really relaxing
22. On the Kelong, because I love fishing
23. Trekking, rafting and surviving
24. to Gunung Tahan when I was in 6th grade.
25. hiking with my friends

26. Genting Highland.
27. Caught fish
28. Taman Negara
29. Fishing
30. Camping in the states with family and friends
31. Fishing
32. Camping, trekking, hiking, orienteering, snorkeling, swimming
33. Malaysia weeks & camping
34. Hiking with my family in Joshua Park, California and in Red Wood Tree
35. Endau Rompin, Taman Negara, and America somewhere with cousins.
36. When I saw a predator bird snatching up a fish out of lake
37. When I've learned outside. (Outside of a classroom)
38. -Diving -Camping -caving -climbing -jungle trekking
39. Fishing, Hiking, trekking and snorkeling.
40. Camping with my brother in Texas!!! :D
41. Playing and living with nature
42. In the Ocean. eg. Fishing, Swimming, Snorkelling
43. Fishing
44. Camping

Appendix D

ample Worksheet used on the Kelong during Malaysia Week

FISH ANATOMY



Read the definitions, then label the fish diagram below. (Note: not all fish have all of the fins defined below.)

anal fin - the fin on the lower side of the body near the tail **caudal fin** - the tail fin **dorsal fin** - the fin on the upper side of the body **eye** - sight organs located on the head **gills** - fleshy organs that are used for breathing - they are located on the side of the head	**lateral line** - a series of sensory pores (small openings) that are located along the sides of fish - they sense vibrations in the water **mouth** - the part of the body which the fish uses to catch food - it is located at the front of the body **pectoral fin** - each of the paired fins on either side of the body, near the head **pelvic fin** - each of the paired fins on the lower side of the body, near the head

Appendix E

The WILD Malaysia Semester Course Survey

Why did you choose to take the THE WILD MALAYSIA SEMESTER COURSE course?

1. Because I wanted to learn the plant, bird, etc.
2. It is good.
3. I thought it was fun.
4. I thought it was fun.
5. It sounded interesting and I wanted to learn more about Malaysia
6. I can learn more about natural environment and the ecology of Malaysia.
7. I didn't really have many choices, and The WILD Malaysia Semester Course was more appealing to me than the other classes I could take.
8. I am very interested in nature and wanted to learn more!
9. Because I love learning about nature and being in it!
10. Because it was very interesting when I heard the Topic*
11. I didn't get to choose
12. Because, MS office decide this class.
13. Because I wanted to know what this class is.
14. No, I didn't choose this own. Teacher said move.
15. I chose this because drama is bad.
16. I don't know.
17. I chose to take the THE WILD MALAYSIA SEMESTER COURSE course because Mr. Peavy advertised it as a breathtaking course to take for any middle schooler.
18. Because the teacher chose it.
19. I was just put in to it
20. Well, to be honest I chose it because I didn't like drama, so I changed to The WILD Malaysia Semester Course.
21. I was transferred into The WILD Malaysia Semester Course class from dance, as I took dance already.
22. I didn’t choose to take The WILD Malaysia Semester Course. I was just put into

the class.
23. Because of school put on the The WILD Malaysia Semester Course class
24. I didn’t chose I was put in the class....
25. First, I didn’t talk The WILD Malaysia Semester Course and second I didn’t to talk The WILD Malaysia Semester Course but, The WILD Malaysia Semester Course was in my schedule
26. I actually didn’t and if I did I don’t know why.
27. I like animals!

What was your favorite topic during THE WILD MALAYSIA SEMESTER COURSE? (plants, birds, or insects)

1. my favorite topic was plant
2. Plants.
3. Insects.
4. Insect collection
5. Birds.
6. Insects
7. Insects
8. Insects definitely, I love creepy crawlies!
9. Probably plants... =)
10. I liked hunting bugs*
11. Insects
12. About bird.
13. My favorite topic is plants.
14. I think birds, because birds were cool
15. Birds.
16. My favorite thing was about the birds.
17. My favorite topic during THE WILD MALAYSIA SEMESTER COURSE was insects.
18. My favorite topic during The WILD Malaysia Semester Course is insects.
19. Plants

20. Birds, because I learned a lot from the bird poster, and the movies we watched.
21. My favorite topic during The WILD Malaysia Semester Course is the upcoming topic, insects. They are very interesting and researching interesting facts about them is fun.
22. My favorite topic in The WILD Malaysia Semester Course was birds.
23. Birds were my favorite topic during My The WILD Malaysia Semester Course class.
24. My favorite subject was birds
25. My favorite topic during The WILD Malaysia Semester Course is plants and birds because I taked fun time and I don’t like insect.
26. Birds.
27. Insects

What do you like about THE WILD MALAYSIA SEMESTER COURSE?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I enjoy the topics we learn about in THE WILD MALAYSIA SEMESTER COURSE	1	3	**19**	**4**	2.96
I like the way WILD MALASYIA is taught	1	5	**15**	**6**	2.96
I like the fact that THE WILD MALAYSIA SEMESTER COURSE doesn't have a text book	1	3	**8**	**15**	3.37
I enjoy learning about local plants and animals	1	2	**16**	**8**	3.15
THE WILD MALAYSIA SEMESTER COURSE has taught me a lot about Nature	1	5	**10**	**11**	3.15
I enjoy the activities in THE WILD MALAYSIA SEMESTER COURSE	2	5	**15**	**5**	2.85
THE WILD MALAYSIA SEMESTER COURSE has changed my opinions about Nature	2	5	**11**	**9**	3
THE WILD MALAYSIA SEMESTER COURSE has helped me see Nature differently	2	8	**9**	**8**	2.85

How do you feel about the following?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I really love being outside in nature	2	5	**14**	**6**	2.89
When I'm outside I feel peaceful	2	2	**18**	**5**	2.96
Being outdoors makes me happy	1	3	**16**	**7**	3.07
I enjoy playing in nature	1	6	**14**	**6**	2.93
I enjoy learning about nature	3	2	**17**	**5**	2.89
I enjoy learning about plants	1	8	**14**	**4**	2.78
I enjoy learning about insects	4	7	**7**	**9**	2.78
I enjoy learning about birds	1	2	**18**	**6**	3.07
I enjoy learning how nature works	2	4	**16**	**5**	2.89
Learning about the environment makes me happy	1	8	**13**	**5**	2.81

What would you like to learn?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I would like to learn more about birds	1	2	**22**	**2**	2.93
I would like to learn more about plants	1	5	**18**	**3**	2.85
I would like to learn more about insects	4	9	**10**	**4**	2.52
I would like to learn more about fish	1	7	**14**	**5**	2.85

How much do you know about the following?

	No	Yes	Response Average
I can identify a food chain in nature	3	**24**	1.89
I can identify the water cycle in nature	7	**20**	1.74
I can identify a food web in nature	6	**21**	1.78
I understand the importance of nature to me	3	**24**	1.89
When I am in nature I wonder how nature works	9	**18**	1.67

How do you feel about the following?

	Strongly	Disagree	Agree	Strongly	Response

	Disagree			Agree	Average
I am interested in a career related to the environment	3	8	**14**	**2**	2.56
Saving the natural environment is important to me	1	7	**12**	**7**	2.93
I feel that I can make a difference in conserving the environment	2	3	**18**	**4**	2.89

What are your actions?

	Never	Sometimes	Very Often	Always	Response Average
I reuse my water bottle at school	**3**	**12**	4	8	2.63
I turn off the lights when I am the last one to leave a room	1	8	**9**	**9**	2.96
I turn off the computer when I am the last one to leave a room	1	9	**10**	**7**	2.85
I pick up trash around me (even if it is not mine).	**2**	**16**	6	3	2.37
I try very hard not to waste paper food etc.	0	**14**	8	5	2.67
I remind others not to waste	**4**	**11**	7	5	2.48
I recycle both at school and at home	**1**	**13**	8	5	2.63
I already participate in an environmental club/activity	**9**	**9**	6	3	2.11

What are your FUTURE actions?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Average
I plan to reuse my water bottle at school more	0	6	**13**	**8**	3.07
I plan to turn off the lights when I am the last one to leave a room	0	0	**17**	**10**	3.37
I plan to turn off the computer when I am the last one to leave a room more often	1	4	**14**	**8**	3.07
I plan to pick up trash around me more often (even if it is not mine).	0	9	**14**	**4**	2.81
I plan to not to waste paper food etc.	0	5	**16**	**6**	3.04
I will remind others not to waste	1	4	**15**	**7**	3.04
I plan to recycle both at school and at home	0	3	**18**	**6**	3.11
I plan to participate in an environmental club/activity	5	6	**13**	**3**	2.52

What is your knowledge?

	0 (none)	1-5	6-10	More than 10
How many different types of birds can you identify in Malaysia?	2 (8%)	13(50%)	**10(38%)**	**2(8%)**

How many different types of plants can you identify in Malaysia?	1(4%)	12(46%)	**11(42%)**	**3(12%)**
How many different types of insects can you identify in Malaysia?	1(4%)	11(42%)	**8(31%)**	**7(27%)**

Appendix F

ISKL Accreditation Goal- Environmental Education

As part of self assessment for accreditation from the Western Association of Schools and Colleges (WASC) ISKL identified several goals in order to improve and enhance the school curriculum and services offered to students. The following is Goal #10 and related to environmental education.

ISKL WASC Strategic Plan goal #10

10. Explore, develop and implement strategies to integrate environmental education into the ISKL curriculum across all content areas at all grade levels with an emphasis on expected School Wide Learning Results.