Re-engaging Students with Nature: 
Using Local Settings as a Context for Learning 

by 

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ABSTRACT

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The aim of this case study was to determine how place-based learning in a natural environment impacted disengaged students. Intermediate students at a large suburban high school were provided with an opportunity to engage in a field study that investigated a local creek. Participating students shared their knowledge with a class from a local elementary school and engaged in action that created a greater awareness of local environmental issues. The results of this study indicate that place-based learning in a local forest coupled with mentoring opportunities had a positive impact on student perceptions of school and learning. In addition, findings suggest that students developed more of an understanding of ecological principles and gained a greater awareness of local environmental issues.
ACKNOWLEDGEMENTS

I dedicate this work to my parents. Their help and efforts, in every way possible, have allowed me to pursue my studies in education and my professional development. Words cannot express the love and gratitude that I feel for them. They have always encouraged me to continue my education and for this, I am forever grateful.

I would like to thank the participants of this study for providing me with their insight and thoughts on place-based learning. I appreciate the time that they took to sit with me and share their thoughts. Thank you to the principal of Maplewood Secondary School—he has always been so supportive for projects that are ‘good for kids’.

Thank you to my committee members: Dr. Erminia Pedretti and Dr. Mark Evans. I appreciate your patience, guidance and supervision. Erminia’s courses in science education inspired me to make changes in my teaching practice.

To Susan – thank you for acting as a sounding board for all of my ideas and providing me with insight.

To Scott – your patience throughout my seemingly ‘never ending’ education is much appreciated. There will be more to come!

A special thank you goes out to my good friend Dr. John Y. Wang who sparked my curiosity and interest in the natural world. You gave me an opportunity of a lifetime when I followed you to Taiwan to help with your dolphin research. For that, I am ever grateful and that experience inspired me to pursue a career focusing on environmental education.
# TABLE OF CONTENTS

Abstract...........................................................................................................................................ii
Acknowledgements.........................................................................................................................iii
Table of Contents...........................................................................................................................iv
List of Tables.......................................................................................................................................viii
List of Figures.......................................................................................................................................ix
List of Appendices............................................................................................................................x

CHAPTER 1: INTRODUCTION.................................................................................................1
Setting the Context..............................................................................................................................1
Rationale of the Study..........................................................................................................................3
Background of the Researcher.............................................................................................................6
Research Questions.............................................................................................................................7
Thesis Overview.................................................................................................................................8

CHAPTER 2: LITERATURE REVIEW......................................................................................9
Getting to Know the Reluctant Learner.............................................................................................9
Meeting the Needs of Diverse Students..........................................................................................11
Student Engagement.........................................................................................................................12
Student Motivation............................................................................................................................14
Reasons for Disengagement..............................................................................................................15

  Teacher support..............................................................................................................................15
  Usefulness of work............................................................................................................................15
  Lack of interest or excitement........................................................................................................16

Engaging the Disengaged with Experiential Education.................................................................17
Defining Experiential Education.......................................................................................................17
Characteristics of Experiential Education........................................................................................18

  Experiential education involves active learning..........................................................................18
Conservation Authority and the Stream of Dreams Project

Methods

- Classroom observation
- Participant interviews
- Personal documents
- Field notes
- Photographs

Data Analysis

Ensuring Credibility

Ethical Considerations

Limitations of the Study

- How did my interactions with students affect the study?
- What exactly influenced environmental knowledge and attitudes?
- How might learning disabilities impact knowledge retention?
- How engaged were students in the field?
- How effective was the creek study in changing the perceptions, attitudes of the BRIDGE students?
- What are the long term effects of this study?

CHAPTER 4: SETTING THE CONTEXT

Student Participants

Teacher Participants

The Classroom Setting

A Typical Afternoon in the BRIDGE Program

Key Lessons in the Study

Under a Sky of Blue: A Day in the Woods

In-Class Tasks

Summary

CHAPTER 5: FINDINGS AND ANALYSES:
FACTORS ENHANCING STUDENTS’ VIEWS OF SCHOOL AND LEARNING

Telling Stories: Let My Voice Be Heard

Hands Down-These are the Best Learning Activities!
LIST OF TABLES

Table 1  Instructional Strategies that Meet the Needs of Diverse Learners………………12
Table 2  Objectives of Environmental Education………………………………………………24
Table 3  Four Goal Levels of Environmental Education………………………………………27
Table 4  Description of Student Participants……………………………………………………62
Table 5  Key Lessons in the Study ……………………………………………………………….67
Table 6  Comparing Living and Non-Living Things Around Maplewood-Pre………………92
Table 7  Comparing Living and Non-Living Things Around Maplewood-Post………………95
LIST OF FIGURES

Figure 1  Bruce’s Community Map.................................................................93
Figure 2  Frank’s Community Map..............................................................94
<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPENDIX A</td>
<td>Student Consent Form</td>
<td>132</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>Parent Consent Form</td>
<td>134</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>BRIDGE Program Referral Form</td>
<td>136</td>
</tr>
<tr>
<td>APPENDIX D</td>
<td>Interview Protocol (Pre and Post Study) for Students</td>
<td>138</td>
</tr>
<tr>
<td>APPENDIX E</td>
<td>Interview Protocol (Pre and Post Study) for Teachers</td>
<td>142</td>
</tr>
</tbody>
</table>
CHAPTER 1: INTRODUCTION

Why do we have to learn this? Let me show you what I saw on YouTube!

I'm a failure

I hate teachers and I hate school Suspended again! School sucks

(obscenity) I don't want to

Put your iPhone away please!

Quiet thump is heard as student's head hits the desk....eyes closed....completely disengaged

Setting the Context

Think back to your years in high school and recall some of your memories. Some of us have fond memories of school: friends, supportive teachers and family, academic success and involvement with extra-curricular activities. All of these aforementioned facets have helped many go on to graduate high school and either work, travel or pursue higher education. However, others may cringe at the thought of their days at school. Academic struggles, lack of support, transition difficulties, boredom and low self-esteem have led many children to develop negative views about school and learning. Such views can eventually allow students to become disengaged from school and at risk of dropping out.

Students who have difficulty keeping up with academic expectations often become disengaged from school. Such students usually struggle academically, often do not seem to care about completing work, are not motivated by grades and may not show much emotion towards the material presented to them in class. Many disengaged students do not buy into the messages or curriculum that educators are trying to deliver (Tomlinson, 1998).

One solution is to think about differentiating instructional strategies in classrooms to keep students engaged in learning (Erikson, 2002; Tomlinson, 1998). In a world that is ever changing, educators must ensure that the curriculum is current, relevant and accessible to all students. Over the years different policies and strategies have been developed in an attempt to
re-engage the dis-engaged. Of particular significance to this study, is the recommendation cited by high school dropouts that experiential learning and real world experience are the number one actions that would improve their chances of graduating (Azzam, 2007). For this study, I investigate the potential of experiential learning through place-based education (more will be said about this later) as a way to engage students.

For some students, the courses outlined in the Ontario curriculum documents (2009) will not meet their educational needs. In response, some schools have regional programs in place that offer *locally developed courses* (LDC) in subject areas such as science. The intent of LDC is to provide flexibility and remedial opportunities for students (OME, 2004). They are courses with modified content, expectations and timelines that have been created to suit the needs of struggling learners. Programs such as these provide students with the opportunities for support and success that will help keep them in school.

Maplewood Secondary School offers the BRIDGE\(^1\) program for grade 8 students, which was developed through the LDC program. In this specialized program, students come to high school and gain three credits throughout the school year. According to the Maplewood program description, BRIDGE is appropriate for students who feel disengaged in a traditional classroom setting, experience frustration tied to learning challenges, have academic gaps in knowledge (particularly numeracy and literacy), and experience difficulties with learning skills and social interactions. The goal of the program is to re-engage students in school by providing experiential and project-based learning opportunities that meet the needs of all learners.

Locally developed curriculum prepares students academically and socially for the workplace and everyday life. Students who have challenges with academics may exhibit negative behaviours that manifest from those difficulties. Thus, the goal of any locally

\(^{1}\) The school and program names have been renamed to protect the identity of the participants.
developed programing is to develop knowledge and skills for the workplace. Additionally, educators encourage students to take risks, respect others, take responsibility for their actions, and be accountable for their own learning. This is a tough task, especially when students are not necessarily interested in the content that is being presented to them in class.

Sustaining student interest is a challenge for any educator. Dewey (1916) posited that education and schooling should be child-centred. Educators should focus on the interests and abilities of the child in order for the child to achieve the most success. This approach involves experience, and discovery, and uses an integrated or interdisciplinary approach. Learning should be active and must challenge students to think for themselves rather than memorize facts (Hodson, 1998). Miller (2007) describes a holistic approach to education that places emphasis on personal and social issues and ensures that student interests and unique learning styles are met. An outdoor setting is one example of a differentiated learning environment that can provide students with hands-on social learning experiences that are relevant and meaningful in their daily lives.

Rationale of the Study

One approach that creates an engaging and authentic context for learning is place-based education (Smith, 2002a). In place-based education, students are provided with an opportunity to relate to their immediate settings, learn about their local environment and take action within their community (Smith, 2002b). Not only is this topic relevant to student’s daily lives, but it can be taught in an outdoor setting that allows students to experience multiple ways of learning.

Research shows that using environmental place-based education can influence student achievement and provide students with a sense of empowerment: they develop positive feelings towards themselves and their local surroundings (Lieberman & Hoody, 1998; Powers, 2004).
Consequently, this may impact not only self-confidence but their attitudes and awareness of environmental issues. The purpose of my research project was to investigate how environmental place-based education was used in a locally developed (vocational) program to engage students in learning. Over a four week period, students engaged in the following activities: a creek study, nature scavenger hunt, invasive species pull, community clean up and educational campaign with local elementary students. Student reactions to such activities were documented and analyzed. Furthermore, this study examined the potential impact of these activities on student knowledge, attitudes and awareness towards their understanding of environmental issues.

Many students entering a locally developed program will enter the workplace upon graduation. Place-based education can provide students with opportunities to develop the social and employability skills that are imperative for the future success in the workforce: teamwork, responsibility, leadership, and communication (Smith & Sobel, 2010). It also develops a more positive sense of self and greater awareness towards the natural environment, encouraging youth to engage in active citizenship and to become stewards for their environment (Yamauchi & Purcell, 2009).

Environmental education is essential since all living organisms, especially humans, interact and have an impact on their natural surroundings. In his book, David Orr (2004) highlights some of the crises that face our environment. For example, industrial growth has caused increased emissions of carbon dioxide, sulfur and nitrous oxides resulting in global warming and acid rain. Rainforests are being cleared to make way for destructive agricultural practices and rampant erosion is smothering coral reef polyps thereby decreasing the amount of diversity in this fragile ecosystem.

Such 'doom and gloom' scenarios are commonly portrayed in schools (Sanera & Shaw,
In a critique of contemporary environmental education, Sanera and Shaw (1999) describe classroom scenarios across Canada where students learn about “air pollution that makes allergies and breathing problems worse and harms plants”, “ecological devastation caused by hydroelectric dams” in British Columbia, and “acid rain eating away at our buildings” in Southern Ontario. Often students, particularly in elementary school, are left feeling helpless and disconnected from global environmental issues and taught that “things are getting worse” (Sanera & Shaw, 1999). In a world that is facing increasingly complex socio-environmental issues, we must ensure that graduating students are aware of such issues, but not left feeling helpless and hopeless. Students need to gain an understanding of ecological principles (Capra, 1996) and must be able to draw upon their own knowledge and perspectives in order to understand their natural environmental (Orr, 2004). Consequently, they will be better informed to make decisions regarding the actions that they and society take towards our natural surroundings (OME, 2009).

Furthermore, children are spending less time outside and are suffering from what Louv (2005) calls nature-deficit disorder. Reasons for this disconnect from nature include rapid urbanization (Pyle, 2002) and increased exposure to technology (Louv, 2005). According to Louv (2005), “nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (p.34). Pyle (2002) highlights the negative repercussions that nature deprivation has on children's emotional, intellectual, moral and physical well-being. Furthermore, research supports the positive psychological and physical effects of being outside with regards to mental health, attention difficulties, physical health and cognitive functioning (Kaplan, 1995; Kuo & Faber Taylor, 2004; Sobel, 2005; Taylor, Kuo & Sullivan, 2002; Wells &
Evans, 2003).

Such revelations only strengthen the need to implement environmental place-based education (education that uses the local environment as a context for learning) in Ontario schools. With cuts to outdoors, environmental, and physical education programs, we must now more than ever provide students with the opportunities to reconnect with the natural world. Furthermore, place-based education carries the potential to re-engage the dis-engaged student with opportunities to learn beyond the classroom walls.

**Background of the Researcher**

With a background in earth and environmental sciences, I have always been enthusiastic about outdoor learning. Some of my best childhood memories were spent building forts alongside the brook near my house. In those days, we came home from school and went straight outside, only to come inside for dinner. In my later years, course work took me to the East coast counting periwinkles in the intertidal zone of the Bay of Fundy, and surveying bottle nose dolphin populations in the South China Sea off the coast of Taiwan.

However, children do not have to be in Nova Scotia or Taiwan to experience nature. There are many other opportunities closer to home, specifically near school, that students can engage in. For the past 12 years, I have worked as a science teacher in a large suburban high school. A couple of years ago, I taught science and math in a unique program that accommodates disengaged learners. I took a group of students for a walk to a local creek with hip waders, buckets and nets. We were only supposed to be out there for one period of the day, but the students were so engaged, they did not want to go back to class. Impulsive students were wading carefully through the water in search of invertebrates, shouting out proudly when they found one.
Past conversations with teachers always cited class management as a hindrance for taking students outside. But here, I had a group of seemingly reluctant students become more motivated and engaged in the outdoors. It prompted me to think about this specialized program and how we could implement more nature-based experiential learning for some of their core subject areas. Although the outdoor activity only lasted about two days, I wondered how this group of students would have responded to more frequent outdoor learning opportunities. These collective experiences informed the direction of this research and my desire to work with reluctant learners within a context of place-based education.

**Research Questions**

The purpose of this case study was to collaborate with two high school teachers in order to provide disengaged students with an opportunity to learn about the natural environment outside of the classroom. The aim was to examine to what extent a series of environmental place-based lessons would have on disengaged intermediate students’ perceptions of school and learning and how such an activity may impact their views of the natural environment.

The following research questions guided the study.

1. What factors enhance students’ views of schooling and learning while participating in place-based education?

2. How does place-based education impact students’ views of the natural environment?
Thesis Overview

This thesis summarizes the findings of my research. Chapter 2 provides an overview of the relevant literature that relates to students at-risk and student engagement. I highlight the characteristics of such learners, provide reasons for disengagement in school and then suggest pedagogical strategies that have been shown to help increase student motivation. Furthermore, I make the connection between disengaged students, the use of natural environments as a context for learning, and the effect of such outdoor spaces on student knowledge, attitudes and awareness. I address the importance of experiential learning and highlight how environmental place-based education can affect student learning. In Chapter 3, I summarize the methodology and methods that I used to carry out this research. I begin by providing an overview of qualitative methodology, specifically focusing on case study research. With reference to my research design, I explain how I collected and analysed my data and discuss ethical considerations. Furthermore, I address the limitations of my study. In chapter 4, I provide a thick rich description that sets the context for my study. Using my field notes, I introduce the participants and describe how a typical day in the BRIDGE program unfolds. In Chapter 5, I address the question “What factors enhance students’ views of school and learning while participating in place-based education?” It is here that I analyse and relate my findings to relevant literature. Likewise, in chapter 6, I address the question “How does place-based education impact students’ views about the natural environment?” Results in this section are analysed with respect to research on environmental literacy. In Chapter 7, I explore the implications of the study outcomes and the impact of outdoor learning on teachers and students. I conclude by highlighting the significance of my study and its place in educational research.
CHAPTER 2: LITERATURE REVIEW

In this chapter, I review the literature citing the impact that environment place-based learning has on disengaged students, specifically those considered ‘at-risk’. First, I provide the reader with an overview that characterizes disengaged learners. Second, I define student engagement and highlight the reasons that students may experience the lack of motivation to learn. Furthermore, I address how pedagogical strategies such as experiential education, specifically place-based education can be used to re-engage students. Thirdly, I examine several studies that show how environmental place-based education impacts student learning and views about the natural environment.

Getting to Know the Disengaged Learner

Transition to high school is a challenge for any student. It is an awkward time for many—balancing home life, extra-curricular activities, homework, and a social life. It is a time where everyone tries to find their own identity yet ‘fitting in’ is the social norm. As such, educators have a demanding but important job. Parents depend on educators to understand and help their children succeed. Children depend on educators for guidance, feedback, inspiration and an opportunity to learn new and exciting things. However, this is a challenging task when confronted with a class full of diverse learners—all with different backgrounds, learning styles and interests. Add to this, the fact that some of those students may come to school with a variety of learning, social, emotional and behavioural needs. For such students, school poses an even greater challenge because they lack the skills to deal with the struggles they may encounter in their daily lives (Greene, 2008). As such, they may be considered ‘at-risk’ (Tilleczek & Ferguson, 2007) since such barriers and/or limitations may hinder their chances of graduation.

Students at risk have difficulties meeting academic expectations, may experience mental
health issues and/or may not have been exposed to an adequate and supportive home, or community environment (Parr, Richardson & Scott, 2008). ‘At-risk’ behaviour may also include low self-esteem, suspension from school, absenteeism, poor academic achievement, reluctance to learn, resistance to authority, and a negative attitude towards school (Tice, 1995). Such behaviours may prompt students to become disengaged from school and become at risk of dropping out.

Often, such students will exhibit behaviours that manifest from insecurities surrounding lack of skills that would allow them to deal with challenges in everyday life. According to Greene (2008), students that have behavioural, social and emotional challenges often lack important thinking and problem solving skills. Such skills are imperative for school engagement and academic success. Students at risk may find difficulty in the following tasks:

- handling transitions-moving from one task to another
- completing tasks that are perceived as difficult or require effort
- reflecting on multiple thoughts or ideas at the same time
- maintaining focus
- consideration for consequences of their actions
- communicating their thoughts or needs in words
- interpreting social cues
- connecting with others in group situations
- managing emotional response to frustration (i.e., that stems from not understanding how to complete a task) (taken from Greene, 2008)

Teachers may or may not have prior knowledge of challenges that a student may bring to their classroom. Talking with other teachers, checking academic history and reading individual education plans are ways in which teachers can assess the needs of challenging students (Cooley, 2007). Such knowledge is imperative in creating an effective program that accommodates for their needs and facilitates learning. For example, changes in instructional strategies may allow

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2 Not exhaustive: the tasks on the list have been selected to characterize the participants of the study
students to respond in a different way thereby increasing their level of engagement in the classroom. Recommendations for accommodations are found in student individual education plans (IEPs). According to the Ontario Ministry of Education, over 300,000 students were receiving special education support and services in the 2010/2011 school year (OME, 2013). All participants of this study had an IEP that allowed teachers to accommodate for their specific needs.

**Meeting the Needs of Diverse Students**

All students are unique. They each come to school with different background experiences, beliefs, and challenges. As such, a ‘one size fits all model’ when it comes to teaching practice does not meet the needs of all students. Students who have learning difficulties, whether it is academic, social, emotional or behavioural tend to have feelings of inadequacy and insecurity (Cooley, 2007). Students can experience feelings of frustration, confusion, low self-esteem, lack of self-confidence and helplessness. All too often, students comment that “I can’t do this because I’m stupid”, “I don’t understand” or “I don’t care” when confronted with a task in class. Engaging these students is imperative so that they gain more positive feelings of themselves and what they can achieve. Effective teachers will use a variety of instructional strategies to ensure that the interests and needs of all students are met thereby improving chances of graduating. Table-1 provides examples of some instructional strategies that can be used to meet the needs of diverse learners.
Table 1: Instructional Strategies that meet the needs of Diverse Learners
(adapted from Bender, 2012; Cooley, 2007)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Explanation</th>
</tr>
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<tr>
<td>Differentiation</td>
<td>provides individualized instruction that may include modifying teaching style, pace and level of work and/or providing choice in order to capitalize on student interests and strengths</td>
</tr>
<tr>
<td>Addressing Learning Styles</td>
<td>provides students with different ways to access information in the classroom in order to maximize learning opportunities: kinesthetic, visual, auditory</td>
</tr>
<tr>
<td>Use of Multiple Intelligences</td>
<td>provides students ways of using their learning strengths: linguistic, musical-rhythmic, bodily-kinesthetic, logical-mathematical, visual-spatial, interpersonal, intrapersonal, naturalist</td>
</tr>
<tr>
<td>Student Interest</td>
<td>provides opportunities for students to voice their interests thereby motivating them to learn more about their topic of choice</td>
</tr>
<tr>
<td>Goal Setting</td>
<td>provides opportunities for active participation in the learning process so that they set goals that will allow them to engage in their learning</td>
</tr>
<tr>
<td>Use of Technology</td>
<td>computers can stimulate student interest and allow students with special needs to access specialized software that can help them read and write</td>
</tr>
<tr>
<td>Collaboration</td>
<td>students can work in groups to share ideas, take on different roles and learn from each other</td>
</tr>
</tbody>
</table>

The instructional strategies in table-1 promote a more student-centred classroom (as opposed to a teacher-centred classroom) that involves active participation (rather than passivity), idea sharing and an increase in student voice thereby increasing the engagement levels of struggling students.

**Student Engagement**

In the middle of the lesson, I pause for a moment to absorb my surroundings. Students in the BRIDGE program (a vocational school program for disengaged learners) have been given a reading and a series of questions that relate to the disappearance of frogs. After about 15 minutes into the task, Lester is quietly and eagerly working on the material, attempting to highlight key words that will help him answer the questions. Justin’s worksheet is on the floor as he sits slouched, drumming his fingers on his desk. Bruce has been doodling on his paper, and using one hand to hold his chin up. Stan is working on the task, albeit, not liking it one bit. Suzie and Yolanda are sitting beside each other but turned around with their backs to the front of the room so they can chat with another girl behind them. After 30 minutes, the teacher asks for the work to be handed in. Only 4 of 17 students have actually made an attempt to write something down. The rest of the students exhibit what I would call ‘disengagement’ from the task—the lack of motivation to complete the work. (Field Notes, April 2012)
If you are an educator, then you may be able to relate to the situation above. Teachers are very hard working individuals—they spend hours creating lessons that are relevant and meaningful to students. But how often have they encountered the blank faces of students staring back at them? Or those doodling on their notebooks? The vignette above highlights one of the characteristics that disengaged students exhibit—the lack of motivation to complete assigned tasks. Often the lack of motivation stems from the fact that the students lack the skills in order to complete the work (Greene, 2008) and the fact that this particular task seemed uninteresting to most students.

Historically, student engagement has targeted ‘at-risk youth’ because the perception is that these students must overcome greater challenges (mental health issues, negative home life, poverty, gaps in academic knowledge) than average in order to graduate high school. However, student engagement is a challenge that faces educators in all situations. Students of all levels and abilities may become disengaged from a task if they do not feel that it is meaningful.

So what can motivate a student to become engaged in their learning? According to Linnenbrink and Pintrich, (2002), motivation is situated and contextual. Hence, instructional practice can have an impact on motivating and engaging students in learning. Furthermore, although students bring their own experiences and interests into the classroom, it is also important to understand how their own thinking and behaviour contributes to their learning (Linnenbrink & Pintrich, 2002). That is, how do students feel about themselves and their ability to achieve success?
**Student Motivation**

Intrinsic and extrinsic motivations are two facets that are central to understanding why, how and to what degree students are motivated to learn. According to Pintrich and Schunk (2002), intrinsic motivation occurs when a student is engaged in an activity out of pure interest whereas extrinsic motivation allows students to complete an activity for some type of reward. Extrinsic motivation such as marks can push high school students to achieve high grades, complete work and stay focused even when they are not interested in what they are doing. However, their intrinsic motivation to learn may be lacking. That is, they are not really interested in what they are learning, but know that they need to do so for the test. Student motivation and engagement are closely linked. Put simply, if a student is engaged in learning, then they are typically motivated to learn and succeed.

According to Schlechty (2001), engagement is different from ‘being on task’:

- Engagement is active. It requires that students be attentive as well as in attendance; it requires the student to be committed to the task and find some inherent value in what he or she is being asked to do. The engaged student not only does the task assigned, but also does it with enthusiasm and diligence. Moreover, the student performs the task because he or she perceives the task to be associated with a near term end that he or she values (p. 64).

Students that are intrinsically motivated to learn will do so because they are interested in the work that is being done. They will want to learn more about the topic on their own and not because it is something they have to do in class. This allows students to develop a deeper understanding of the content covered. According to Schussler (2009, p. 115), engagement is “learning that involves formulating a deeper connection between the student and the material whereby a student develops an interest in the topic or retains the learning beyond the short term”. Hence one of the main goals of education is to not only improve student achievement but also foster a curiosity for learning that will be continued outside of the classroom walls.
Reasons for Disengagement

Challenge yourself to remember your own high school experiences. What qualities made your favourite teacher? What was different about those fun and engaging lessons compared to others that were not? How supportive was your own family in your schooling? There is so much that defines our high school experience that it is impossible to cite just one thing that contributed to our engagement and success in the classroom. For the purpose of this research, disengagement refers to a student's lack of interest and motivation to engage with a class related activity (Bryson & Land, 2007). Balfanz, Herzog and MacIver (2007) refer to disengagement as “the process of detaching from school, disconnecting from its norms and expectations, reducing effort and involvement at school, and withdrawing from a commitment to school and to school completion” (p.224). An important job for educators is to determine why some students experience such detachment.

Many research studies have examined reasons for student disengagement, especially in intermediate students since attitude and motivation to learn tends to decrease with age (Eccles, Wigfield & Schiefele, 1998 in Hidi & Harackiewicz, 2000). Balfalz, Herzog and MacIver (2007) examined predictors that affect student achievement in middle grade mathematics. They include, for example, teacher support, usefulness of subject matter and interest levels of the student. Each of these predictors is discussed in more detail in the following sections.

Teacher support

Teachers play a significant role in how successful a student is in school. They can identify negative behaviours and intervene when they sense that students are struggling socially or academically. Early identification and intervention is paramount in ensuring that struggling students will graduate (Balfanz, Herzog & MacIver, 2007; Garriot, 2007). Educators can
intervene on a personal level by developing strong relationships with students and providing them guidance and support (Stuhlman & Pianta, 2002). Establishing a rapport with students is essential so that mutual trust can be built. For some students, teachers are the only stable figures that they have in their lives. Thus a supporting and caring environment is important in order to maintain a feeling of comfort so that students stay in class and engage in their learning.

*Usefulness of work*

Of all the predictors, usefulness was the strongest predictor of how much effort a student would put forth in the class (Balfanz, Herzog & MacIver, 2007). If students do not see the relevance of what they are studying, they may not put forth the effort needed to be successful. However, the study by Balfanz, Herzog and MacIver (2007) specifically focused on high poverty schools in large urban centres and did not address the reasons for potential academic failure which may include learning disabilities.

Ponticell and Beckett (2012) conducted a study to examine how at risk students perceive motivation. If a student is engaged in a task, then they will be motivated to learn. Students did not like to be ‘talked at’ or lectured, while they sat and listened. According to Ponticell and Beckett (1997), ‘better’ learning occurred when students and teachers exchanged ideas, solved problems, and engaged in research projects. Such learning is active and requires students to be involved in the learning process rather than being passive recipients of knowledge.

*Lack of interest or excitement*

Field and Olafson (1999) conducted a study in order to gain a better understanding of what factors prompted resistance behaviours in 7th graders. These behaviours were often disruptive, attention-seeking, uncooperative, impulsive or dependent. Students that often encountered rote learning cited boredom as one reason for their resistance. Another significant
finding was that resistance was also attributed to a learning disability which may account for gaps in academic knowledge.

**Engaging the Disengaged with Experiential Education**

Teachers use instructional strategies to facilitate learning. However, if those strategies are not effective, then students may not buy into the material being delivered. In the classroom, boredom and failure are commonly cited reasons for disengagement (Azzam, 2007). Accordingly, instructional factors play a significant role in student motivation (Ponticell & Beckett, 2012). The next section will focus on experiential education as one pedagogical strategy that has been shown to engage student interest, allow students opportunities to learn beyond the classroom walls and make curriculum relevant. It will specifically address learning in the context of science and environmental education since those are the subject areas related to this study.

**Defining Experiential Education**

Effective educators select instructional strategies that are situational and meet the needs of students. They consider the content to be studied, the learning styles of the students and goal of the educational experience when designing lessons. Many struggling learners identify themselves as being ‘hands-on’. That is, they find interest and excitement in curriculum that allows them to use their senses and manipulate material with their hands. Experiential education provides opportunities for these students to manipulate objects to create meaning and *really* experience learning. According to Knapp (1992), the foundations of experiential education are based on two beliefs. First, that student learning should not be limited to the classroom and second, that students learn as they make meaning from their experiences.

Experiential education leads students through the learning process by providing them
with opportunities to integrate their own experiences into the subject matter that they are studying (Carver, 1996). According to Miller (2007), a holistic education emphasizes learning about the whole child and ensuring that their needs and interests are met. Experiential education involves students in sharing the teaching and learning process and addresses the whole child by considering their emotional, physical, spiritual and social well-being (Carver, 1996).

**Characteristics of Experiential Education**

Experiential education is rooted in the belief that students need to use their senses to make meaning of the world around them. The following are characteristics that define experiential education:

*Experiential education involves active learning*

Learning does not occur in isolation. It is an active process that involves constructing knowledge, both individually and with others. Students are not empty vessels that need filling. They draw upon experiences that they bring to specific situations and those that are shared by others (Carver, 1996; Hodson, 2003). Active learning is defined as the process by which students are mentally and/or physically engaged in the active process of learning (Carver, 1996). They are not overly dependent on teachers for information and will actively take on a role in their own education (Petress, 2008). Active learners are curious and intrinsically motivated to learn more about things that are of interest to them. They are enthusiastic about a topic, demonstrate a passion for learning and want to share with others. Active learning also increases motivation and enthusiasm, not only for completing tasks, but for intrinsic purposes. Falk and Dierking (2002) are advocates for ‘free choice learning…It is self-directed, voluntary and guided by the individual’s needs and interests’ (p.11). Free choice learning extends even beyond the school day to include dialogue with family or friends. According to Falk and Dierking (2002),
learning is always changing. Ultimately, learning can be viewed as the ‘never-ending integration and interaction of these three contexts over time in order to make meaning’ (p.11).

Experiential programs such as outdoor centres, adventure camps, place-based initiatives, and service learning have grown as educators look for new ways to engage youth that may not experience the same academic success in a traditional learning environment (Roberts, 2005). A study by Unger, Dumond and McDonald (2005) found that outdoor wilderness environments had a positive impact on relationship building and self-worth for at-risk youth. Similarly, Lieberman and Hoody (1998) report on the efficacy of using the environment as an integrating context for learning. They found that environment-based education has a positive impact on student behaviour, engagement and achievement. Sobel (2005) also advocates for the use of place-based education in order to promote student engagement and achievement.

*Experiential education is authentic*

Yoon (2005) recounted an experiential learning opportunity that allowed students to take part in a debate about the relocation of a beaver family in a nearby outdoor education centre. Consequently, personalization of the curriculum allowed disruptive students in her class to become engaged and contribute to proposing solutions that impacted their local community. Seeing the environmental impact of the beaver family resonated with students. Thus, the physical setting where learning takes place is influential (Falk & Dierking, 2002). When students are outside investigating a local ecosystem, they are experiencing a real world issue and are able apply knowledge that they had learned in class to more of an authentic context.

*Experiential education draws upon student experience*

As students acquire new concepts, they make meaning of these concepts based on already existing notions. This constructivist approach enables students to become responsible for their
own learning and become ‘self-actualized’: they address problems that are of interest to them (Maslow, 1968 in Bencze, 2000). Consequently, motivation for learning increases as they take ownership for their work. The goal is for students to become active learners: to learn science while doing science and to develop a positive attitude towards learning. Thus a democratic (choice) curriculum advocates for active rather than passive learning (Bencze, 2000). Students must be able to see the connections between conceptual understanding and procedural understanding (Bencze, 2000). Field studies are an excellent way to bridge the gap between conceptual and procedural understanding.

*Experiential education allows for curriculum integration*

Unfortunately, compartmentalization of high school makes it difficult for students to see the relevance of a given discipline in other subject areas. However, the interdisciplinary nature of experiential education allows students to make connections between different subject areas such as math, geography, science and language arts. Science is one discipline that could benefit from such integration. Hodson (2003) argues that curriculum must be relevant, current and accessible to all students, not just future scientists.

The revised Ontario science curriculum now places a great deal of emphasis on STSE education (relating science to society, technology and the environment) which allows teachers the ability to integrate subject matter from other areas as students explore ‘big ideas’ around how humans impact the environment. Exposure to outdoor environments can help students to identify many of issues that surround them on a daily basis: terrestrial and aquatic pollution, air quality, climate change and pesticide use to name a few. They can use principles from geography, math and language arts to learn and communicate their findings about environmental issues. Furthermore, classes can take advantage of local environments such as parks, a local stream or
even a schoolyard (Ayyavoo, 2005; Haines, 2006; Larson & LeMone, 2009) in order to experience nature and learn more about environmental issues.

Exposure to STSE education may allow students to become better advocates for their environment as they prepare for the real world. STSE enriches the lives of students by providing them with the opportunities to examine real life issues (Pedretti, 1997; Pedretti and Little, 2008; Yoon, 2005). They have the power and freedom to question social issues. STSE also fosters creativity, social responsibility, critical thinking, active citizenship and informed decision making (Aikenhead, 1994). All of the aforementioned facets have the potential to provide authentic contexts for learning and allow students to become more aware of their natural environment and the impacts that their decisions have on nature. In this study, lessons were developed in part, around STSE outcomes, which included an examination on how humans impact Maple Valley Trail.

Environmental Literacy: Education for the Real World

*Must we always teach our children with books? Let them look at the mountains and the stars above. Let them look at the beauty of the waters and the trees and flowers on earth. They will then begin to think, and to think is the beginning of a real education.*

- David Polis

David Orr (2004) poses a concerning question for all educators: What is education for? Educators want their students to be successful in the real world, but what does that success entail? What does it mean to be successful and what skills are needed? In the real world, students will need to problem solve, think critically, and use their knowledge to make informed decisions. Orr (2004, p.12) advocates that the world “does not need more successful people..it needs people of moral courage willing to join the fight to make the world habitable and humane”. Thus, preparing students for the real world involves becoming *environmentally literate* (OME, 2009; Orr, 2004); that is, instilling values to develop a healthy respect for our
natural environment by promoting sustainability so that future generations can prosper.

According to Hart, Jickling and Kool (1999), these are the “most urgent quests of our time” (p.105). Environmental literacy also encourages active citizenship whereby students become empowered with knowledge to make critical and informed decisions that contribute to environmental degradation or preservation, and to carry out those decisions with some sort of action (Hodson, 1998; Orr, 1992). Hart, Jickling and Kool (1999) emphasize the sense of urgency that exists in taking interest and understanding the effects environmental degradation, who benefits and if they are held accountable and what is needed to mitigate such issues.

Educators should always question why and how they deliver curriculum to students. In a world that is ever changing, teachers must ensure that the curriculum is current, relevant, and that the means of delivery is accessible to all students. Although the Ontario Ministry of Education (2004, 2009) has outlined what they feel students are expected to learn through their curriculum documents, teachers must use their own professional judgement when delivering material to cover these expectations. Knowing that the curriculum is laden with many expectations, what knowledge should be emphasized? How can teachers ensure that students are being educated so that they can be productive members of society and respectful of the natural environment?

Students are not only influenced by the content of curriculum, but also by the hidden curriculum (Eisner, 1979). According to Orr (2004), “all education is environmental education by what is included or excluded we teach students that they are part of or apart from the natural world” (p.12). Compartmentalized learning causes further disconnect (Gibson, 2011; Orr, 2004). For example, if students learn about math without reference to technology or science, then they often make the assumption that the three areas are unrelated. Orr (2004) draws this parallel to other areas of the curriculum as well. Neglecting to draw upon connections between disciplines
makes it difficult for students to generate connections between what they learn and develop critical thinking and creative skills that are essential for the real world. In essence, real world problems draw upon knowledge from different areas and students must be encouraged to make these connections (Beane, 1995). Thus, integration of subject areas is also an important component of environmental education (Hart, Jickling & Kool, 1999; Orr, 2004).

According to the Tbilisi Declaration (UNESCO-UNEP, 1978), Rio Declaration on Environment and Development (UNESCO, 1992) and the Working Group on Environmental Education (2007), environmental education can play a significant role in educational reform. Its interdisciplinary nature, problem and action-oriented approach can allow students to become lifelong learners and forward thinkers. According to Recommendation 1(vii) of the Tbilisi Declaration, “environmental education should bring about a closer link between educational processes and real life, building its activities around the environmental problems that are faced by particular communities and focusing analysis on these by means of an interdisciplinary comprehensive approach which will permit a proper understanding of environmental problems” (p. 26). Thus, students will gain a more purposeful experience as they focus on local environmental issues in their community that are easily accessible and where they can take direct action. Place-based education, a concept defined in more detail later in this chapter, focuses on natural local environments and is an ideal pedagogical approach to foster a greater understanding of environmental issues. Furthermore, it allows for subject integration so that students can make connections between disciplines. Finally, place-based education provides kinesthetic and experiential learning opportunities to engage students who may otherwise think of school as an institution that they are forced to attend.
Goals and Objectives of Environmental Education

An environment-based education movement—at all levels of education—will help students realize that school isn’t supposed to be a polite form of incarceration, but a portal to the wider world.
- Richard Louv

According to the Belgrade Charter (UNESCO-UNEP, 1975) and Tbilisi Declaration (UNESCO-UNEP, 1977), the goal of environmental education is “to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones” (p.3). From that charter, several objectives were developed to focus on citizenship and environmentally responsible behaviour (see table-2).

Table 2: Objectives of Environmental Education (adapted from UNESCO-UNEP, 1979)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>To help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems</td>
</tr>
<tr>
<td>Knowledge</td>
<td>To help individuals and social groups acquire basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it.</td>
</tr>
<tr>
<td>Attitude</td>
<td>To help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation to actively participate in its protection and improvement.</td>
</tr>
<tr>
<td>Skills</td>
<td>To help individuals and social groups acquire the skills for solving environmental problems.</td>
</tr>
<tr>
<td>Evaluation ability</td>
<td>To help individuals and social groups evaluate environmental measures and education programs in terms of ecological, political, social, economic, esthetic and educational factors.</td>
</tr>
<tr>
<td>Participation</td>
<td>To help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve those problems.</td>
</tr>
</tbody>
</table>

Over the past decade, environmental education has received very little emphasis in Ontario schools. Teachers wanting to implement environmental education may face many barriers such as lack of resources, time, liability and rigid curriculum expectations (Palmer,
2002). This raises the question as to how often the objectives from table-2 are implemented in classroom. Consequently, the Working Group on Environmental Education was formed to examine the existing state of environmental education in Ontario. Several recommendations were made in a report called Shaping our schools, Shaping Our Future: Environmental Education in Ontario (OME, 2009) to move environmental education in Ontario forward as part of a reform initiative to ensure the success of students in school and beyond.


*Environmental education will provide a rich context for learning that engages all students in applying their knowledge and skills to real-world situations through an integrated approach, based on environmental and sustainability concepts found in all relevant subject areas. Such context will combine classroom learning with experiential learning, and provide opportunities to interact with, develop caring concern for, and take action in the places where the students live, study and play. It will provide connections between the curriculum and the world around us, allow students to directly observe the impacts and issues, and expose students to the many points of view that must be considered in making choices to preserve the health of the natural environment* (OME, 2007, p.4).

Firstly, students must learn *about the environment* by gaining an understanding of conceptual and theoretical knowledge. Secondly, students need to learn *for the environment*. This constitutes an awareness of environmental issues and the interactions that exist between humans and the environment. Finally, learning *in the environment* where students gain a more accurate view of their natural surroundings using their senses and engaging in meaningful outdoor activities. Such an activity is an example of the experiential education advocated for earlier in this chapter.
Developing environmental literacy

Environmental literacy extends beyond the knowledge of basic ecological principles. An environmentally literate student is able to assess and evaluate issues from different perspectives. Critical thinking, problem solving and decision making are all lifelong skills that students will need in the real world. An environmentally literate student will also understand the value of sustaining and preserving our natural environment and be motivated to take action. To be consistent with the Ontario curriculum documents, this paper will use and define environmental literacy as the “knowledge and perspectives required to understand public issues and place them in a meaningful environmental context” (OME, 2009, p.6). It will also extend the definition to include taking action on environmental issues (Gruenewald, 2003; Hodson, 1998; McLaren, 1995; Smith, 2007; Stevenson, 2007).

There is much concern that environmental education has only focused on changing behaviours and that students do not have enough exposure to the scientific principles that underlie ecology (ICEE, 1997 as cited in Gayford, 2002). That is, lessons are immediately geared towards an awareness of human and environment interactions and what should be done to minimize environmental problems instead of the structure and function of ecosystems. Without such knowledge, it is difficult for students to truly understand the impact that humans have on the environment. Ecological knowledge is important in order to form basic connections (Capra, 1996; Orr, 1992). Shepardson (2005) found that students in grade 7, 8 and 9 had a very limited understanding of what an environment is. In a study by Loughland, Reid and Petocz (2002), students identified the environment as a place that contains living organisms and also acknowledged the relationships between humans and the environment. However, they still showed very little understanding of basic ecological principles that include structure and
function. This is problematic: if students do not have a solid understanding of ecological principles, how can they fully comprehend the impact and extent of environmental issues?

According to Hungerford, Peyton and Wilke (1980), there are four goal levels for environmental education that teachers should consider when planning their lessons (see table-3 below).

Table 3: Four Goal Levels of Environmental Education Curricula (Hungerford, Peyton & Wilke, 1980)

<table>
<thead>
<tr>
<th>Level</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Students focus on basic ecological principles such as the structure and function of ecosystems</td>
</tr>
<tr>
<td>Level 2</td>
<td>Students focus on how humans interact with and value their environment</td>
</tr>
<tr>
<td>Level 3</td>
<td>Using inquiry based methods, students investigate environmental issues and propose alternative solutions</td>
</tr>
<tr>
<td>Level 4</td>
<td>Students develop skills to take action</td>
</tr>
</tbody>
</table>

In another model based on the abilities of an environmentally literate person developed by McLaren (1995), Reading (2005) acknowledges the importance of action. According to Reading (2005), students move through three levels including foundation, exploration and empowerment. This model fosters an understanding of basic ecological principles, human interactions and environmental stewardship and has been successful in elementary schools that use an integrated approach to curriculum delivery (Reading, 2005). This approach may be more difficult at the high school level where subject areas are compartmentalized.

It has been argued that providing students with opportunities to experience their natural environment, may promote changes in behaviour and action (Hodson, 1998; Hungerford & Volk, 1990; Russell, 1999; Smith, 2007; Smith & Sobel, 2010). I suggest that the use of natural habitats can help educators (and students) achieve the four goals set out by Hungerford, Peyton
and Wilke (1980). Using the natural habitat context, students can:

- learn the basic terminology and concepts associated with aquatic ecosystems and water quality (level 1)
- use their senses to observe the impact that humans have had on the surrounding environment (level 2)
- formulate a question and carry out an investigation related to the health of the stream and surrounding ecosystem by examining biological and physical characteristics (level 3)
- use the knowledge that they have generated to propose plans for conservation such as a stream clean up, tree planting or educational campaign for younger students (level 4)

There are many ways that teachers can foster environmental education: debates, role play simulations, research projects, community action projects, field trips and open-ended discussions. All of the aforementioned instructional strategies provide opportunities for students to think critically about environmental issues. However, they also need to foster a connection with the natural environment in order to develop a true understanding and connection of local places. Creek study at the Maple Valley Trail adjacent to Maplewood Secondary School will provide a rich (and local) context for experiential learning for and about the environment which is an integral component of environmental place-based education.

**Place-Based Education: A 'Natural' Connection**

*You can discover more in an hour of play than you can in a lifetime of conversation.*
- Unknown

Children are fascinated by their natural surroundings. Who can forget the imagination and creativity required to muster up role play situations in the local forest? Or coming home with a pocketful of rocks, eager to show parents? From hide and seek to a simple picnic, most remember those care-free play experiences where children come together as a group to create, engage, imagine and explore through outdoor play. According to Louv (2005), this experience is not as much a priority for today’s youth. There are a variety of reasons for this: concern for safety, involvement in extra-curricular activities and the need for constant stimulation through
media and technology. Louv (2005) suggests that our lack of connection to the outdoors affects our emotional, physical and spiritual well-being. Being outside also has the potential to impact ways of learning.

Children and youth with learning challenges are often better suited to learn in a differentiated environment that uses kinesthetic, visual and spatial modes (Tomlinson, 1999). Environmental place-based education is a well-suited model of curriculum delivery that meets the diverse needs of such students (Sobel, 2005). According to Sobel (2005), students with special needs perhaps marginalized in the past, can be brought into the mainstream with place-based education and community service. In the next section I examine the characteristics of place-based education.

Characteristics of Place-based Education

Place-based education is an approach that adopts local settings as a context for student learning. According to Sobel (2004, p.7),

*Place-based education is the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum. Emphasizing hands-on, real world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school.*

Smith (2002a) identifies five domains of place-based education: historical/cultural; environmental monitoring/advocacy; real world problem solving; entrepreneurialism and involvement with public process. The multidisciplinary nature of place-based education addresses social, political, cultural, economic and natural dimensions of place. This research will focus on the domain concerned with environmental monitoring and advocacy and I will highlight
many examples of these later in this paper. Place-based education concerned with environmental monitoring and advocacy merges areas of nature studies, conservation education, service learning and community based education.

According to Stevenson (2007), there is a rhetoric-reality gap between conventional schooling and environmental education ideology. Since place-based education is a specific facet of environmental education, it could be argued that the differences Stevenson (2007) addresses between environmental education and conventional schooling could be applied to place-based education as well. Whereas conventional schooling is typically passive, focuses on knowledge reproduction, teacher-centred and seeks to maintain social order, place-based education is critical, student-centred, active, constructive and democratic (Stevenson, 2007). Smith (2007) also argues for the need to 'break regularities' in the public school system. In a standards driven school system, the mode of conventional education makes it difficult to implement authentic teaching and learning for social and ecological justice.

There are many skills and benefits that can be gained from environmental place-based education. According to the Council of Outdoor Educators of Ontario (2007), outdoor and experiential learning provides students with opportunities to make connections in their daily lives; it builds character, promotes lifelong well-being, and fosters ecological literacy. Outdoor space also provides a context for learning in multiple curriculum areas, can increases student's awareness of environmental issues and can be a motivating factor to succeed academically (COEO, 2007). Depending on the context, it can also serve as an inspiration to taking action on local and/or global issues.


Enhancing environmental literacy

Learning in the community is an integral component of environmental place-based education. All too often, teachers resort to teaching about the environment within the confines of the classroom using a textbook, video or newspaper articles. According to Orr (2004), this is one of the difficulties faced when promoting ecological literacy. Although ecological literacy requires that students get outside to gain intimate knowledge of our landscapes (Orr, 2004), there are fewer opportunities at school for direct experiences (Louv, 2008; Orr, 1992). For example, in science class, where ecological concepts are taught, it is often convenient to deliver a content driven lesson and have students copy down definitions and examples of biotic and abiotic factors of the environment. This transmissive approach to teaching results in an accumulation of knowledge and skills with little opportunity to engage in active, contextual learning (Miller, 2007; Stevenson, 2007). Students may get a different experience learning these ecological concepts in a local natural setting. This scenario allows students to become active participants and also use their senses to achieve the same expectations, which results in a more transformative approach to teaching and learning (Miller, 2007; Stevenson, 2007). However, there are barriers to teaching environmental and place-based education which include lack of external resources, time, and giving up order and control in the classroom (Palmer, 1998; Stevenson, 2007). This may be a hindrance for teachers who already feel the pressure to deliver all curriculum expectations.

Research supports the merits of environmental place-based education in improving environmental literacy. For example, students engaged in river studies developed a greater understanding of local environmental issues (Finkel et al., 1998; Parker & Mahoney, 1998; Schmaus, 2001). Students became rooted in these local places and developed a healthy respect
and willingness to protect them. Furthermore, the experience can be used to develop environmental literacy across many different grade levels from early elementary years to advanced high school and post-secondary students (Brune, 2002; Lackstrom & Stroup, 2009). Such opportunities are few and far between, as most high school curricula is compartmentalized and each subject is taught in isolation. However, in place-based education, for example, a creek study allows students to “become partners in a cause that requires involvement at all levels of skills and knowledge” (Williams, Bidlack & Winnett, 1993, p.83)

*Increased student motivation and achievement*

Engaging disaffected students requires creating a learning environment that encourages students to share ideas and collaborate with others in a positive way and to develop problem solving and decision making skills about content that is engaging and meaningful (Berliner, 2004). Traditional teaching approaches may be ineffective with unmotivated learners (Yoon, 2005). Rote learning and memorization invoke for some, a fear of failure as students are taught what will be on the test. Test scores provide very little motivation to students who are already receiving failing grades (Baines & Slutsky, 2009). Research suggests that teachers should focus on experiential and differentiated instruction that appeals to all learning styles (Erickson, 1998; Kolb, 1984; Tomlinson, 1999).

Although environmental education increases student engagement (Battersby, 1999), the opportunity to experience environmental education in an outdoor setting can further enrich a student's experience. Yoon (2003) wrote about a disengaged boy who began to show initiative and leadership after a trip to an outdoor education centre where the class worked together to debate the potential displacement of a beaver family. According to Baines and Slutsky (2009), when a teacher turns learning into play, students no longer need to be coerced: they are
intrinsically motivated to participate and they become eager to engage in the activity in the future. One could argue that growing up, children identified the outdoors as a place to ‘play’ and would be more than willing to experience that ‘fun’ at school.

Emekauwa’s (2004) research highlights the benefits of environmental place-based education in impoverished East Feliciana Parish School District. Low income and student achievement were characteristic of schools across the board. It was difficult to retain qualified teachers due to low salaries and competition from other districts. Results showed that student's test scores improved significantly over five years in science and math when a place-based approach was implemented in five pilot schools. The results of such a study are encouraging for the students that will participate in my research study. However, much of the success is attributed to the intense workshop training that teachers undertook. Unfortunately, there are no workshops focusing on place-based education within the Appleton District School Board.

Smith (2002) describes Open Meadows School which used place-based education for students that were not thriving in a traditional classroom. Students were engaged at a school that integrated academics with community-based projects. According to Smith (2002), the projects helped students connect with the community and future aspirations. Students reflected upon how the experience changed their thinking: they were more aware of environmental issues and felt empowered to make a difference.

The outdoors is a place where children can run freely, explore and expend their energy. According to King and Gurlan (2006), the physical nature of boys (playfighting, fidgeting) can be seen as behaviour problems in a classroom. Increasing learning opportunities that are experiential may keep them energized and attentive. Being part of the experience adds an entirely new level of intimacy with the natural world that students encounter. According to
Brune (2002), discipline problems are reduced and there is an observable improvement in teamwork when children learn in outdoor classrooms.

*Building community partnerships*

Place-based learning helps students realize that they can play an active role in the community. According to Emmons (1997), environmental action is intended to achieve a specific outcome and involves decision making, planning, implementation and reflection. Students have the opportunity to apply their knowledge and take action in situations that have meaning for the entire school and local community.

For example, students in Illinois investigated a fish kill in a pond close to a local country club (Williams, Bidlack & Winnett, 1993). Chemistry students determined that the kill was due to an increase in fertilizer from golf greens and the math students helped take action by calculating the correct amount of fertilizer needed for the greens.

Activities such as plant species inventories allow organizations such as the U.S. Forest Service to document the diversity of a particular area. If schools are able to form partnerships with community or government organizations, then both parties can work together towards a common goal. In the case of a Utah secondary school, students partnered with Brigham Young University and the U.S. Forest Service to produce a plant species list for Box Death Hollow Wilderness Area (Bunderson & Cooper, 1997). Collaboration between plant specialists, teachers and students promoted favourable attitudes towards learning. The most important component was the attention paid to any threatened or endangered species in the area. Once the species in the area were documented, then conservation measures could be taken to raise public awareness to ensure overall health of the ecosystem.
Service provides students with a means to see how their knowledge impacts others. Cole (2004) documents how her high school environmental science class created inquiry based activities using a local stream for a class of third graders. The students were able to share their knowledge with the youngsters. Activities included macro-invertebrate sampling, graphing population changes, predator-prey simulations and an ecosystem scavenger hunt. The high school students became positive role models for the younger students and the experience left them confident and proud of their accomplishments. In turn, the fourth graders were excited to participate and all gained a 'newfound respect' for their natural environment. High praise was given by the school staff, parents and other community members.

Providing opportunities for stewardship and action

In a final example, high school students in Wyoming helped governments, community citizens and state agencies decide the best uses for Tongue River (Schmaus, 2001). Students used technology to monitor and take readings of the biological and physical characteristics of the river. The results were inputted into a database created by the Department of Environmental Quality. Students worked with each other and community members to generate data. Through surveys, the students realized that this area was a popular site for walking so they acted to help maintain and extend the paths. From this experience, students suggested creating signs that highlight the historical and biophysical characteristics of the area. The class received a grant to proceed and students were able to move forward with their idea. The process also allowed students to work with their municipal government, the Environmental Protection Agency, Wyoming Game and Fish and Northern Community College. The students were extremely proud of their work and communicated their efforts in the local newspaper.

All of the above examples are considered place-based because the projects allow students
to get to know and form a connection with ecosystems in their local community. Such examples provide teachers with the inspiration to take students to the next level. Taking action may provide students with a sense of ownership, pride and responsibility that hopefully, they carry with them beyond school.

**Implications of Place-Based Education for Teachers**

Many of the cited examples of place-based education include teachers that go above and beyond the call of duty. In many cases, examples are drawn from charter schools or environmental schools that have been created for environmental place-based education. Thus, the teachers that are drawn to these schools may already have the background knowledge in environmental issues and may be comfortable tackling such issues in class. However, in most schools, outdoor experiences are hindered by lack of confidence in teaching beyond the classroom, standardization, funding, resources, time, health and safety concerns and lack of administrative support (Dillon, Rickinson, Teamey, Morris, Choi & Sanders, 2006; Stevenson, 2007). One of the reasons that place-based education initiatives were so successful in East Feliciana Parish School District was that place-based education was introduced at all levels of the board: supervisors, administrators and trustees. Also, involved teachers participated in workshops over three summers in order to become more familiar with integrating science, math and technology, local geography, history and natural resources (Emekauwa, 2004).

Senechal (2007) also cited supportive administrators with the success of place-based education in her class of disengaged minority youth. Controversial issues brought a great deal of opposition and skepticism from members of the community and school district, however, her principal supported her efforts. Her efforts eventually impacted adult policy, thinking and behaviour in Greater Egelston.
According to Endreny (2010), place-based education experiences can be placed on a continuum. At one end, a few lessons can be used to draw student's attention to local phenomena whereas at the other end, entire schools have been structured to incorporate place-based learning in their curriculum. This latter approach is extremely difficult in an era that emphasizes standards, competition and individualistic learning (Gruenewald, 2003). As place-based experiences were new to Maplewood Secondary School, teachers created and implemented only a few lessons related to environmental place-based education in attempts to re-engage their struggling students and provide them with an opportunity to learn more about the natural environment. In the next chapter, I describe the methodology and methods that were used to carry out this study.
CHAPTER 3: RESEARCH METHODOLOGY

The intent of qualitative research is to understand how and why a certain phenomenon or issue exists (Creswell, 2007). Recall that my research seeks to understand what factors enhance students’ views of schooling and learning while participating in place-based education. Furthermore, I ask how place-based education impacts students’ views on the natural environment. For my study, a case study was appropriate, as I was interested in understanding disengaged students’ experiences in a particular bounded context. I conducted a case study analysis of high school students enrolled in a locally developed program and examined how they reacted and responded to place-based pedagogy. I spent three months with them in the classroom and out in the field, collaborating with the BRIDGE teachers to create learning activities, helping students as they engaged in learning activities, arranging community partnerships, and collecting data on student reactions to outdoor learning. In this section, I will discuss the characteristics of qualitative research, and the paradigm informing my work. I also consider methodological issues related to case study research and the means by which I gathered and analyzed my data. Finally, I address the limitations of my study.

Characteristics of Qualitative Research

Although there are several approaches to qualitative research, each process shares several common characteristics. In this section, I discuss these common characteristics and discuss them briefly with respect to my research.

Qualitative research is experiential

Researchers gather data for case studies by interacting with participants in their natural setting (Creswell, 2007, Merriam 1998). However, researchers are also aware of the effect that they can have on those that they are observing. This observer effect can change the way that
participants behave and interact in the presence of a researcher (Bogdan & Biklen, 2007). Since qualitative researchers seek to understand how participants behave in their natural setting, the interactions between researcher and subjects must be “natural, unobtrusive and non-threaten ing. They must blend into the woodwork” (Bogdan & Biklen, 2007, p.39). Although I began as an observer, I quickly became more active in the classroom as students became comfortable with my presence. I did not actively teach any of the lessons; however I did provide help to the students during class and answered any questions that they had about the content.

*Qualitative research is emergent*

The design of qualitative research is always changing and therefore “the initial plan for research cannot be tightly prescribed” (Creswell, 2007). Typical of qualitative research are those modifications that arise after data collection begins. In this study, for example, I found that students were very reluctant to write. Teachers were also hesitant of assigning work that required students to write too much. Therefore, the samples of student work handed in were minimal. According to Cresswell (2007), the researcher must address any issues that arise once data collection begins and changes to process may be needed in order to obtain information that is needed to best inform the research questions.

*Qualitative research is interpretive*

The researcher develops meaning through interaction with the participants and seeks their viewpoints (Creswell, 2007). Since each participant comes to the study with a different background and set of experiences, they will each provide differing perspectives on the research question at hand. They will have varied interests, opinions, and biases that have been shaped by their own personal experiences and understandings. Emerging themes will be a result of a focus on these unique experiences and perceptions rather than on an agenda brought forth by the
researcher. It is imperative that the researcher continually reflects upon his or her own practice to check for his or her own bias and provides an interpretation that is as accurate as possible. In this study, I tried to be aware of my own biases, particularly as I began to analyze data. I will discuss issues related to bias later in this chapter.

*Qualitative research uses multiple sources of data*

Multiple sources of evidence increase the validity of the research (Creswell, 2007; Merriam, 1998), and allow for the triangulation of data. For this study, I gathered evidence from multiple sources including observation, surveys, work samples and interviews to determine how participants responded to environmental place-based education. More will be said about data collection techniques later in this chapter.

**Paradigm Informing My Work**

According to Creswell (2007), the research process begins with “assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem” (p.37). In other words, each researcher brings his or her own beliefs and assumptions to their work.

During my undergraduate science degree, I tended to follow a positivist approach to investigations. However, in my experiences with high school students and knowledge gained through my graduate courses, I have come to realize that the environment has considerable influence over human behaviour and that human behaviour and interactions are difficult to quantify. Students come to school with a range of experiences that are a result of exposure to their cultural surroundings, family values, and beliefs. Thus, one cannot separate one's background from current experiences and understandings. Furthermore, researchers cannot separate their own background beliefs, values and experiences from the phenomenon being
studied. Consequently, it is difficult, if not impossible, to remain objective when conducting research. How the world is viewed by the participants is a critical aspect of good qualitative research (Willis, Willis, Jost, & Nilakanta, 2007). In conducting qualitative research, worldviews influence a researcher's assumptions, underlying reasons for conducting research, beliefs about what data is most imperative to collect, and methods used to analyze data (Willis, Willis, Jost & Nilakanta, 2007).

The Interpretive Paradigm

Interpretive researchers are concerned with understanding phenomena based on the subjective perspectives of individuals. There is no one truth or answer to a problem—people’s interpretations of reality are influenced by their background and prior experiences. The beliefs that define a particular research paradigm can be summarized by three categories: 1) ontological questions that inquire about the nature and form of reality; 2) epistemological questions that are concerned with what knowledge can be known and 3) methodological questions that focus on how the researcher can go about finding and creating new understandings (Guba & Lincoln, 1994). Accordingly, my study aligns with the interpretive paradigm in the following ways:

**Ontological**

- The reality that I am seeking to make sense of is shaped by one's interactions with their surroundings. Subjectivity influences one's reality and there is no absolute truth. This concept of relativism is essentially the idea that culture and experience influences the reality that one sees and we cannot be sure that the reality that we see is true (Willis, Willis, Jost, & Nilakanta, 2007).

- Both researcher and participant are seeking to make meaning of their surroundings. Thus, people come to know what they know by thinking about and reflecting upon it
rationally (Willis, Willis, Jost, & Nilakanta, 2007)

**Epistemological**

- The study involved the use of inductive thought: gathering data and making generalizations. Inductive thought involves researchers using generated data from the field to build a theory or explanation rather than creating hypotheses ahead of time based on an existing theory (Merriam, 1998). The prior development of theoretical propositions was also used to guide data collection and analysis.

- The study sought to understand how each participant relates to the 'whole' or big question. It was a communal process that was informed by participants (Willis, Willis, Jost, & Nilakanta, 2007). Each participant brought forth their own philosophy, values, and beliefs. How the stories from each participant relate and contribute to the construction of new meaning is important.

**Methodological**

- The research was conducted in the participant's natural setting thus the information gained was completely situational. I went and observed teachers and students in their classroom as they worked through activities related to environmental place-based education. I documented their thoughts before and after activities and also looked for reactions from students and teachers throughout the process.

- The interview process was semi-structured. I had a list of questions as a guide, but my intentions were to let the participants speak with little interruption. In some interviews, this was easier than others. I found that the students were more inclined to share their thoughts when the dialogue became more of a conversation than an interview. In the first interview, I often got the response “I don’t know”. Consequently, I had to rephrase
questions in a way that I did not lead them to any ‘answer’. The discourse was analysed by seeking meaning and themes throughout the interview.

**Case Study Methodology**

The case study is a common approach in educational research as it seeks to explain how and why a social phenomenon works and informs research questions that require an in-depth examination (Yin, 2009). Given the interpretivist stance outlined earlier in this chapter, case study analysis was the most appropriate methodology to employ in my study. It provides a systemic way to gather and interpret data that includes socially constructed perspectives from a variety of participants. The rich description allows the researcher to gain an understanding of a particular problem in great depth and detail. For the purpose of this research, the case study will be viewed as a methodological construct.

Yin (1981 in Yin, 2009, p. 18) provides a twofold definition of a case study.

- A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within real-life context especially when the boundaries between phenomenon and context are not clearly evident.

Secondly,
- the case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result;
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result;
- benefits from the prior development of theoretical propositions to guide data collection and analysis

This study was developed as a single site descriptive (observational) case study. According to Bogdan and Biklen (2007), the focus of observational case studies is specific: a place, a group of people and some activity or event. My study used a combination of the above aspects. The place that was studied was the classroom—both the traditional indoor classroom and the outdoor learning space.

According to Bogdan and Biklen (2007, p.61) a group is defined as “a collection of
people who interact, who identify with each other, and who share expectations about each other’s behaviour”. The specific group of people that were studied were students in a specialized program whose goal was re-engagement with school and preparation for future academic and social successes. The activity focus was the lessons that students participated in, specifically those that used the local environment as a context for learning. It was difficult to focus on just one aspect since they were all an integrated case: teachers, students and their response to environmental place-based education. As Bogdan and Biklen (2007) point out, selecting a case is an artificial act as the researcher attempts to isolate one facet of the world that is normally integrated. Thus, this is one limitation of qualitative case study research.

Another facet of case study research is boundedness (Yin, 2009). This case was bounded by number of participants, time, and place. There were a set number of participants that were followed in one classroom over several months. Data collection began in February 2012 and ended in November 2012.

Participants

Participants of this study were students located at a large suburban high school in a mixed income area. Overall, the school provides a wide range of programming for its students. The courses offered at Maplewood Secondary School lead to a variety of pathways that include apprenticeships, workplace, college and university. Maplewood Secondary School has a significant population of students who are taking courses at the essential and applied levels. The students taking part in this project were of intermediate age (12-14 years old). In a class of 17 students, 11 consented to participate in the study: 2 females and 9 males (appendix A). Parental consent was also obtained (appendix B). The students had been identified as ‘at-risk’ by their home school and came to this particular high school for a more engaging experience with
opportunities to take part in a unique program that emphasizes hands-on learning experiences (see appendix C for the BRIDGE program referral form). Students in the BRIDGE program have identified learning challenges and have encountered numerous failures in their subsequent years at school. As a result, they are disengaged from school, have very low self-esteem and their behaviours surrounding school activities are fairly negative. The literacy and numeracy levels amongst this student population are lower than grade expectations and in some cases, the students experience trying situations in their home lives which get in the way of their schooling.

In this specialized program, students stayed together for the entire day and two teachers were with the students at all times. The teacher-student ratio in this program was also smaller than a regular intermediate classroom with approximately eight students to each teacher. Two male teachers, Mr. Bill and Mr. Andy participated in the study.

Mr. Bill is a biology teacher with 10 years of teaching experience. Mr. Andy is a physical education teacher with two years of teaching experience. It was the second year that both had taught in the BRIDGE program and both teachers were well respected by their students. Both teachers tried to make the classroom a fun and engaging environment through storytelling, discussions, videos and hands-on learning opportunities. They both agreed to participate in this study because of the experiential opportunity that this study would provide for their students. They were interested in taking their students outside for a different learning experience and were eager to see how their students would respond. Mr. Bill and Mr. Andy played an important role in this study as they were involved with the planning and implementation of a series of lessons that allowed students an opportunity to get out of their desks and learn in a setting that many of them were eager to explore.
Context and Curriculum Planning

In this study, I collaborated with Mr. Bill and Mr. Andy to create a series of lessons that addressed learning environmental education in an outdoor setting. Specifically, it exposed students to the natural environment adjacent to their school which included a creek and forest. My role was not instructional or interventionist: I brainstormed ideas with the teachers for lessons, provided them with resources such as field equipment and co-ordinated speakers and events from community organizations. Furthermore, I helped create a partnership with a local elementary school for the Stream of Dreams program.

Activities drew upon various subjects areas such as science, math, literacy, and geography and were geared towards developing a greater understanding and awareness of local ecosystems and environmental issues. Although instruction took place both in and out of the classroom, the main focus of this study was on the use the local natural area for instruction and inquiry. The activities involved frequent trips to Maple Valley Trail (a short walk across the school parking lot) where students took on the role of field scientists to investigate various aspects of the natural world and how humans have contributed to environmental degradation in the area.

Community Partnerships

Participating students and teachers also had the opportunity to work with community organizations in order to help facilitate an understanding of the local area.

Ecospark

Ecospark is non-profit environmental education organization that facilitates free environmental workshops for schools in their immediate area. “Heidi” and “Pete” were two representatives from Ecospark that facilitated the stream study for the students and provided all
of the equipment.

City Green

City Green is a non-profit environmental protection group that promotes awareness and education about environmental issues in the city where Maplewood Secondary School was located. They also lobby municipal government to pass legislation that acts to further preserve the city's natural environment. City Green provides an outreach program where field experts and resources are provided for school groups. A guest speaker came and spoke to the students in the classroom about their local watershed and how it is being impacted by humans. This presentation provided the BRIDGE students with the background needed to prepare for their field study.

Local Elementary School

As a culminating activity, BRIDGE students used what they learned about the local environment and related issues to educate students from Local Elementary School in early June 2012. The classes met up on three different occasions in order to participate in outdoor activities such as a creek clean up, nature scavenger hunt, invasive species pull and the Stream of Dreams program. Each BRIDGE student was responsible for mentoring one or two elementary students during the outdoor activities.

Field and Stream Rescue Team

This organization promotes active citizenship in the community through tree planting and creek clean ups. “John” came one sunny afternoon in May to help facilitate the creek clean up and invasive species pull along the edge of the forest. The organization provided gloves and bags for each of the BRIDGE students and their grade 2 buddies.
Conservation Authority and the Stream of Dreams Project

The local Conservation Authority monitors the quality of the local environment within the region and facilitates the Stream of Dreams program for elementary schools in Appleton District School Board. Stream of Dreams is an educational program that teaches communities about the human impact on local watersheds through art. I helped Local Elementary School apply for a grant to bring the program to their school. As such, the BRIDGE students were instrumental in helping facilitate the creation of a fish mural to be placed on a chain link fence in the surrounding neighbourhood. The BRIDGE students cut out over 500 wooden fish in their technology class for each of the students at Local Elementary School and also spent an afternoon helping their grade 2 buddies paint their fish.

Volunteers from the Conservation Authority and parents from Local Elementary School helped mount the wooden fish on the fences of both schools. Visible to the main road and neighbourhood, the mural will continue bring attention to the importance of maintaining a healthy local ecosystem.
Methods

In order to ensure the highest possible quality of data, the following methods were used for data collection:

Classroom observation

Participant observation is an important component of qualitative research, allowing the researcher to observe participants in their natural setting and to become immersed in their daily lives (Creswell, 2007). The level and type of participation that I engaged in varied throughout the course of the study. I took on more of an observational role initially so that I could get a sense of how the participants interact. For the first week, I did not take any notes so to not seem intimidating to the students. My goal as a researcher was to develop a rapport with the students and to put them at ease with an extra body in the classroom. After a week, I began taking notes and as the study progressed, I became more interactive with students and teachers regarding the activities that they engaged in. I did not take on an instructional role at any time during the research study.

Students and teachers in this study were observed in their classroom as they engaged in activities related to place-based education. Observing teachers in their natural setting provided insight to their teaching style, pedagogy, teaching philosophy and rapport with students. Observing students allowed for their actions and emotions to be documented.

Participant interviews

Students took part in semi-structured open-ended interviews before the project started, and immediately after the project ended. Questions sought to understand if and how aspects of their place-based educational experience were instrumental in bringing about change in their knowledge and attitudes towards the environment and student engagement. Interview protocols
are found in appendices D-E. According to Bogdan and Biklen (2007), “qualitative interviews offer the interviewer considerable latitude to pursue a range of topics and offer the subject to shape the content of the interview” (p.104). Consequently, I kept an open mind about where the interview could go. A semi-structured interview allowed for the use of questions as a guide, but also allowed for the opportunity to ask different questions based on the participant's answers and further probe interesting responses or to seek clarification.

Based on participant permission, I took audio recordings of student and teacher interviews because long interviews were difficult to recall. This provided additional evidence above and beyond the notes taken during the interview process where I could transcribe and use direct quotations as evidence.

**Personal documents**

Personal documents are defined as “a first person narrative that describes an individual's actions, experiences and beliefs” (Plummer, 1983, as cited in Bogdan & Biklen, 2007). Various samples of student work were collected throughout the project and used to determine how their attitudes and knowledge evolve over time. Such documents or subject-produced data are commonly collected in studies where methods such as interviews and participant observations are used (Bogdan & Biklen, 2007). Samples of work included a journal response, engagement survey, community map and student notes taking during the unit. Yin (2009) identifies ways in which such documents are useful in case studies: to corroborate evidence from other sources and to make inferences. They also provide a rich description of how the participant views the world and are reflective of their perspective (Bogdan & Biklen, 2007; Merriam, 1998).

Yin (2009) further states that documents do not contain the *unmitigated truth*. Student work was completed for a “specific purpose and some specific audience other than those of the
case study being done” (p.105). In this study, all student work was produced as part of the regular curriculum. Student engagement is part of the school improvement plans and consequently, engagement surveys were encouraged so that the teachers could gauge student interest. As a result, teachers can reflect upon and modify their practice to suit student needs. Thus, they are a reliable source of data, albeit highly subjective (Merriam, 1998). In contrast to the statement made by Bogdan and Biklen (2007) in that “personal documents that the subjects write themselves are usually discovered rather than solicited by the researcher”, this study involved all forms of documentation solicited by the teacher as part of the overall expectation that students created products for evaluation.

Field notes

Observational field notes are an important way to provide a more detailed description of direct observations in class and during a subject interview. Various components such as voice tone, emotion, facial expressions, and gestures were described to allow for a more complete recording. Field notes also included contextual descriptions of the physical setting of the classroom, the activities and the participants, relevant conversations, and researcher comments which according to Merriam (1998) is a relevant form of documentation.

Field notes can “provide any study with a personal log that helps the researcher keep track of the development of the project, to visualize how the research plan has been affected by the data collected, and to remain aware of how he or she has been influenced by the data” (Bogdan & Biklen, 2007, p.119). I used my field notes to record ideas, hunches, and reflections to guard against bias.
Photographs

Photographs of students and teachers were taken to provide support for written observations as they engaged in the planned activities. The purpose of photographs was to capture details of a setting or activity that may be overlooked (Bogdan & Biklen, 2007) and to catch students in the moment as they are engaging in various activities. Cameras were also be used by the participants in a study to capture photographs of selected phenomenon (Bogdan & Biklen, 2007; Merriam, 1998). A couple of students who did not want to take part in the study were given the cameras to take pictures of students on the days they went outside. Such photos acted as a means to stimulate discussion back in the class which further enhanced the process for data collection (Bogdan & Biklen, 2007).

Data Analysis

Data analysis involved several steps. My goal during analysis was to decipher what the data represented (Creswell, 2007; Merriam, 1998; Miles & Huberman, 1994). It involved analysing student work samples, reading interview transcripts, looking at photographs and looking over field notes to draw connections between sources of evidence in relation to the core questions of the study.

In this study, semi-structured interviews were conducted twice throughout the school year. Each interview was transcribed and concerns were followed up and validated by the participants. Text was condensed to identify emerging themes and topics. Longer statements from interview transcripts were compressed into shorter phrases that captured the main ideas (Kvale, 1996). I searched for patterns and trends that allowed me to explain and frame my ideas in relation to educational theory. Preliminary data analysis and interpretation was concurrent with the collection of data although most of the formal analysis was left until most of the data
had been documented (Merriam, 1998).

Coding categories were developed once analysis began. Data was analyzed for patterns and topics in which key words or phrases became coding categories (Miles & Huberman, 1994). These categories provided a means for sorting the data that had been collected. I used inductive data analysis to build patterns. Codes were created during analysis rather than analyzing documents with pre-determined codes (Miles & Huberman, 1994).

The text was interpreted so that I could work out structures and relations of meaning that were not immediately apparent in the text. Strauss and Glassor (1967) suggest comparing emerging data with previous work. Thus, I continually reflected upon the data to place it in a meaningful context. The work was interpreted based on my own perspectives of what was being investigated and I was the sole interpreter of information.

Ensuring Credibility

It was difficult to remain objective during observation, as it is impossible to eliminate the effects of a researcher on the participants and the study (Denzin & Lincoln, 2007; Merriam, 1998). I was mindful of how my presence influenced the participants being studied. This observer effect has the potential to change the behaviour of the participants during the study (Bogdan & Biklen, 2007). Creswell (2007) suggests the use of multiple observers to increase reliability; however, this attempt requires the use of additional resources, which was not feasible in this study. According to Merriam (1998), “the question is not whether the process of observing affects what is observed, but how the researcher can identify those effects and account for them in interpreting the data” (p.103). Further, Bodgan and Biklen (2007) suggest that the researcher becomes more reflective and conscious of one’s own personal bias and beliefs and how they shape the research. It is impossible to separate who you are from the phenomenon
being studied. Thus, being open minded and focusing on how the data shapes one's thinking is key (Bogdan & Biklen, 2007). Consequently, attempts were made to address researcher bias and several measures were taken to ensure credibility and accuracy in this study.

First, data was gathered from multiple sources: student work, participant observation, field notes and interview transcriptions. Triangulation of data was imperative since it provided corroboration and justification for the themes that were developed from the different sources (Merriam, 1998; Miles & Huberman, 1994). Generalizations become stronger if supported by many different types of evidence.

Second, during the interview, I paid close attention to what the interviewee was saying so that any vague responses could be followed up with more probing (Kvale, 1996). Use of prompts or paraphrasing allowed the participants to elaborate on statements such as “I don’t know” or one word answers. When I felt that parts of the transcript were vague, I took the questions back to the interviewee for clarification. The follow up questions were asked to ensure that the participant's voice was accurate (Kvale, 1996).

Third, field notes and observations were as detailed as possible. According to Creswell (2007) rich description adds to the validity of the results. I also documented my influence as frequently as possible during the observation periods and during data analysis. Providing a rich thick description, I documented events in great detail and I shared my findings with each individual student to ensure that my interpretation was an accurate representation of their understanding.

Fourth, I was in the field for an extended period of time. According to Creswell (2007), prolonged fieldwork is important in gaining the trust of participants. Immersion in the field for three months allowed me time to develop a rapport with the participants to ensure that they were
as comfortable with me as possible for them to share their insight.

Fifth, the aim of qualitative research is to generate knowledge that is based on the experiences and viewpoints of the participants (Merriam, 1998; Miles & Huberman, 1994). Thus, researcher bias was a key concern. The researcher must provide on-going reflection to check for any bias. Although impossible to eliminate, I attempted to remain impartial and tried not to steer the participants into doing or stating what I wanted to see or hear. However, I did reflect upon how my background experiences can affect my interpretations, which according to Creswell (2007), constitutes good qualitative research.

Finally, if participants contributed information that did not seem to fit with the literature or with what other participants were saying, then this information was still acknowledged and explained. This adds reliability since we cannot expect that everyone will experience the activities or lessons in the same way.

**Ethical Considerations**

Permission was gained from the classroom teachers and principal at Maplewood Secondary to engage in research within the school. The study was given ethical clearance from the Research Advisory Committee at the Appleton District School Board and the Ethics Review Committee at the University of Toronto.

The participants were all enrolled in a locally developed program at the high school of interest. Once the research study was approved, I recruited the students in person during school hours in the classroom. An information package was distributed to the students in the first semester of school in 2011 that included a consent form for them and their parents (if they were under 16 years of age) and a letter outlining the intent of this study (see appendix A and B). Any interested students in the classroom were able to participate.
All input provided by students and teachers remained strictly confidential to those outside of the class. All participants were identified by pseudonyms and generic descriptors were used to describe the locale. Participants only included teachers and students who signed a consent form. If teachers, parents, guardians or students chose not to participate in this study, then their voices were not used in the research. Participants also had the right to withdraw at any time without consequence (academic or otherwise) or explanation.

There were no anticipated physical, social or legal risks in this study. Participants were fully informed of everything that was required of them prior to the start of the research. Students engaged in activities that were a part of the teacher's planned curriculum. Participation took place in the classroom and parts of this study involved teachers and students using an outdoor setting for teaching and learning. Based on a recommendation from Appleton District School Board, I communicated with the Green City Department of Parks to ensure that the outdoor trails of interest surrounding the school were regularly inspected and maintained (personal communication, June 17, 2011). Appropriate school board protocol was followed when engaging in activities that were off school grounds. As with all field trips, a letter was sent home for parents to sign and the nature of the trips were be approved by the school principal. All participation took place during regular school hours and weather conditions were monitored so that participants were not exposed to dangerous situations outside.

All interviews took place at the school within school hours. Although I am a teacher at the school, I did not have any prior experience teaching any of these students and just came back from a leave of absence. I worked collaboratively with the teachers to develop activities that were implemented in class as classroom teachers often do. Since I am a teacher educator, there was a power differential between myself and the participants, however, I clearly identified and
explained my role as a researcher to both the student and teachers. There was no evaluative component to this research (for students or teachers); I was only interested in exploring their experiences, understandings and reactions to place-based education.

Once data was collected, any paper evidence (i.e. sample of student work, transcriptions) was stored at school under lock and key in the office of the Department Head of the program or at my home. Any audio files and photographs were stored in a password protected computer that was in my hands at all times. Files were also backed up on a computer at home. The data will be stored for five years, in case there is potential for future research projects. At that time, paper evidence will be shredded and all computer files will be deleted.

**Limitations of the Study**

A qualitative study does not come without its own limitations. I will present this information in the form of questions that I asked myself as I reflected upon the study.

*How did my interactions with students affect the study?*

I began by going into the classroom a couple of times a week in order to familiarize myself with the setting and the students. During this time, I did not take any notes so that students would not feel intimidated by my presence. After about four visits, I began taking notes on the classroom setting, nature of class discussion and the interactions between students and teachers. Eventually, I became an active participant in class and I walked around, frequently to engage students in dialogue about their work. I started to form relationships with the students by helping them complete assigned work and engaging in conversations about school and things that were of interest to them.

Throughout the study, it was difficult to maintain the same level of rapport with all students. I found that the females in the class tended to come to me more to engage in conversation about various issues. As such, it more difficult to develop a rapport with some of
the males in the classroom and this may have impacted the amount of detail that they provided me with during interviews.

It was also very difficult to get students to produce sample work as they were very reluctant to write. However, they were very engaged in class discussions and during mapping projects where they had to go outside and create a community map of the area. I had to rely on the interpretations of my own field notes, photographs, interviews and class discussions. Although ample data was collected, more written material would have provided yet another method of validation.

*What exactly influenced environmental knowledge and attitudes?*

It is difficult to access and tease apart external factors that influence students’ experiences. Since the students all came to the study with different backgrounds, constructivist learning theory suggests that students will learn best when they are allowed to construct personal understanding and link it to prior experiences. Such an approach advocates for group learning, interaction and exchanging ideas with others. According to Littledyke (2008), a constructivist approach to teaching enhances environmental attitudes. Although this study looks specifically on how the outdoors influences learning, it cannot ignore the social nature of human beings. I question whether students are learning intrinsically and motivated to learn because they are outdoors or are they learning because they are being provided with a constructive situation where they are grouped with others in which they can talk about the activities that they are engaged in? Di Enno and Hilton (2005) found that a constructivist teaching approach had a positive impact on environmental knowledge and attitudes. Students also have access to a large amount of information in the media. I did not set out to explore what they discussed and learned outside of the classroom.
How might learning disabilities impact knowledge retention?

It was difficult to assess the knowledge gained by the students. They were very reluctant to write things down on paper and seeing as most students had either a confidential formal or informal IEP, I did not have access to their specific learning difficulties. Thus, teachers rarely gave the students a test or quiz in order to assess their knowledge. Their learning styles were based on my previous assumptions of working with such students and what they and teachers told me of their learning difficulties and preferred learning styles. For any pencil/paper task during this study, I could not determine with certainty that their lack of detail was due to the fact that they did not know the material or just could not recall it due to impaired cognitive functioning. Further exploration could address the factors that influence what and how much students do and learn from this creek study.

How engaged were students in the field?

According to Falk and Dierking (2002), physical setting is one factor that influences learning but also the motivation of the learner themselves. In this study, I used a survey to determine overall student engagement for learning outdoors, but how are engagement and motivation linked? How much learning was driven by the student versus what the teacher decided was needed to be accomplished? As a next step, an open ended stream study could allow students to generate their own questions and investigations about the nature of their outdoor surroundings. This preliminary teacher directed approach serves as a scaffold for future studies.

How effective was the creek study in changing the perceptions and attitudes of the BRIDGE students over time or in the long term?

It was also difficult to assess what exactly caused a change in environmental attitudes, whether it was the creek study itself or the teaching that the students did with the elementary
counterparts. What can be said is that some combination of the two activities did have a significant impact on student attitudes and awareness. Further study can explore and assess how student attitudes have changed since the creek study, whether or not the same values hold and whether any outside influences during that time affected the students. One also cannot draw conclusions as to whether or not a change in attitudes and perceptions is ongoing or long lasting. Farmer, Knapp and Benton (2007) evaluated the long term memory retention of grade 4 students a year after an ecological field trip to Great Smokey Mountains National Park. Their study found that many of the students still were able to recall ecological knowledge gained from the trip and still had concerns about the environmental issues encountered at the park. However, the ‘wow’ factor associated with a national park versus a local creek may have an impact on long term knowledge retention.

What are the long term effects of this study?

Although most students indicated that they would take some sort of action for the environment based on the investigation results, it is unknown whether or not they will truly follow through with this. Further research needs to be done in order to investigate whether or not students have actually followed through with this claim. Do they still have the same passion displayed after the study? Have they participated in any action piece since the study? Do they anticipate that they will engage in action? If not, what sort of barriers might they have encountered? It would be interesting to follow the students and ask them after a year to see if or how their views have differed.
CHAPTER 4: SETTING THE CONTEXT FOR THE STUDY

This chapter provides a context for the BRIDGE program and includes some research data that pertains to understanding the context. The chapter provides a rich description of the participants and describes a typical day in the BRIDGE program.

Student Participants

The BRIDGE program is a special program at Maplewood Secondary School that caters to students that are disengaged from school. The students taking part in this project were of intermediate age (12-14 years old). In a class of 17 students, 11 consented to participate in the study: 2 females and 9 males. The students had been identified as at risk by their home school by their grade 7 teachers and came to this particular high school in grade 8 for a more engaging experience with opportunities to take part in a unique program that emphasizes hands-on learning experiences. Table-4 (see page 62) provides a detailed description of the student participants and highlights the type of outdoor experiences they have had prior to coming to the study.

Students were together all day and rotated through four periods each day that included technology, language arts, physical education, math, science and geography. Technology, language arts and physical education ran an entire period (76 minutes) all year. The last period of the day was dedicated to a mix of subject areas such as math, science, geography and outdoor education. A strong focus on literacy and numeracy was embedded within the courses throughout the day. Students gained actual high school credits in physical education and technology.
Table 4: Description of Student Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Prior Outdoor Experiences</th>
<th>How do you like to learn?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kevin</td>
<td>M</td>
<td>Camping; racing and dirt biking; going to the cottage; playing sports; snorkelling on vacations</td>
<td>Hands on</td>
</tr>
<tr>
<td>Bruce</td>
<td>M</td>
<td>Camping; fishing; biking; playing sports</td>
<td>Hands on</td>
</tr>
<tr>
<td>Nate</td>
<td>M</td>
<td>Building forts; going on family picnics; swimming at a local conservation area with the family</td>
<td>Hands on</td>
</tr>
<tr>
<td>Ted</td>
<td>M</td>
<td>“I went camping once, it was fun”</td>
<td>Hands on</td>
</tr>
<tr>
<td>Suzie</td>
<td>F</td>
<td>Going to the forest; swimming, hiking and bike riding; tent camping; trailer camping; fishing in Muskoka; ice fishing; “I got to ride my dad’s 4 wheeler and got to go 70 on it!”; catching frogs</td>
<td>Hands on</td>
</tr>
<tr>
<td>Yolanda</td>
<td>F</td>
<td>“I don’t really like going outside”</td>
<td>Pencil/paper</td>
</tr>
<tr>
<td>Larry</td>
<td>M</td>
<td>Going to a trailer, biking, building forts; going to Sauble Beach</td>
<td>Hands on and pencil/paper</td>
</tr>
<tr>
<td>Frank</td>
<td>M</td>
<td>Playing basketball; Some family camping trips; playing outside on my own; “I went fishing a long time ago once with my dad”</td>
<td>Moving around</td>
</tr>
<tr>
<td>Stan</td>
<td>M</td>
<td>Cliff diving; fishing; skateboarding with friends; going to conservation areas with dad; camping; hiking on the escarpment</td>
<td>Hands on</td>
</tr>
<tr>
<td>Lester</td>
<td>M</td>
<td>Riding my bike; exploring with my friends in the local creek; my family campground in Sudbury; fishing and boating with my grandpa; exploring in the caves near the big copper mine in Sudbury</td>
<td>Hands on and pencil/paper</td>
</tr>
<tr>
<td>Justin</td>
<td>M</td>
<td>Skateboarding; basketball; wild water kingdom family picnics; “I remember my friend would come and get me and we would make snowball forts in the field out back and throw snow balls and climb trees and go down in the creek. We had a lot of fun down there”</td>
<td>“I like science..makin g things and using my hands.”</td>
</tr>
</tbody>
</table>

Teacher Participants

Two teachers - Mr. Bill and Mr. Andy - were assigned to BRIDGE for the last period of the day and partook in a team teaching situation. Mr. Bill is a science department head with 10 years of teaching experience with the Appleton District School Board. Prior to that, he spent many years teaching abroad. He loves to share stories about his trips and experiences in Africa. He is a wonderful storyteller who also incorporates humour into his lessons. He is well
respected and has an excellent rapport with the students. Mr. Bill has extensive experience using technology in the classroom and often teaches using Smartboard files and videos. A trained biologist, Mr. Bill teaches senior biology and grade 10 science in the morning. He joined the BRIDGE program in the afternoons for a different experience and loves working with students with special needs. His ‘calm, cool and collected’ approach to teaching makes it very easy for students to relate to him. Mr. Bill brings much expertise in science teaching and is an avid outdoorsman. He remembers many trips to his cottage, backcountry camping and hiking in the woods. Mr. Bill is very comfortable with the outdoors and enjoys taking students outside to learn.

Mr. Andy is newer to teaching. With three years of teaching experience, this was his first year at Maplewood Secondary School. Mr. Andy has a background in physical education. Mr. Bill and Mr. Andy took turns leading the class, depending on the directions that lessons take them. Mr. Bill tends to lead more science and computer based classes whereas Mr. Andy is more comfortable leading students in team games and sports. Mr. Andy is soft spoken and also has developed an excellent rapport with the students. He is able to take students aside and apply conflict resolution in order to de-escalate situations involving inappropriate behaviours. Mr. Andy is enjoying his time in the BRIDGE program and is working on attaining additional qualifications in special education. Mr. Andy is not as comfortable with the outdoors as Mr. Bill is as he did not have much exposure to outdoor activities such as camping, boating, fishing or hiking growing up. Although he is comfortable with taking students outside for outdoor education (survival skills and cooperative games), he is not comfortable taking the students on a hike through the woods or into the creek because of his lack of scientific knowledge.
The Classroom Setting

The physical classroom was shared with other classes during the day: the walls were covered with work from various classes. Desks were arranged in pairs and all faced the chalkboard, and a Smartboard was mounted at the front of the room. Situated at the front of the school, this second floor classroom had a large window. Often, students were distracted by looking out the window to see who was wandering outside. This prompted discussions about who was skipping class or out having a smoke. Consequently, the curtains were often left closed. When students engaged in group work they moved their desks in small groups to collaborate with others. Group work was not a main instructional strategy as many students had difficulty relating to others and found it hard to focus. The teacher’s desk was located at the front of the room beside the window. The front of the classroom had a shelf where students kept their binders of work. All student work was kept in the classroom and pens and pencils were given out to students who didn’t bring such things to class. There were no computers in the classroom, but students had access to class set of small netbooks that could be signed out when needed. Students also had access to a resource room on the same floor which was a quiet spot to work or use computers.

A Typical Afternoon in the BRIDGE Program

The study took place during period 5, the last period of the day and a time when teachers provided students with a mix of geography, science and math. Due to the fact that there was no set curriculum in this program, the teachers were at liberty to design lessons that catered to student interests. Therefore, they did not follow the grade 8 Ontario Curriculum documents. The locally developed BRIDGE program allowed teachers to provide remedial support to students who were at different grade levels in terms of literacy and numeracy. Some students had
wide gaps in their knowledge base when it came to meeting Ontario curriculum expectations in elementary school. The BRIDGE program aimed to support these students and their particular needs.

Each day, students came in from gym class and were still quite excited from the activities in fourth period. Since the teachers were coming from other classes, the students were often the first to get into the classroom. Students chatted with each other until the teachers came: recapping the day’s events while they walked around the room. Once the teachers came in, some students asked for food and water from the snack bin. In order to settle the students down, the teachers required them to put their heads on their desks, close their eyes and stop talking for a few minutes. According to Mr. Bill, this “calms them down so that we can get on with our day. They still want to move around since they just had gym. Many of them have a hard time sitting still”.

The afternoon’s lessons were a mix of class discussion, video and hands on learning. Often, class discussions evolved from ‘teaching moments’ that arose from behavioural issues or stories/events that students voiced during class. Videos from YouTube were used to supplement class discussions and at times, portions of feature films were also used as a basis for discussion. Hands on activities that occurred throughout the year included building outdoor forts, robotics, animal dissections and geocaching. Students were limited to performing experiments because the room was not a science lab. At times, Mr. Bill and Mr. Andy would swap rooms to perform science demonstrations and simple experiments. When I began my observation days, students were just finishing a two-month build of mini robots and competed in a regional robotics contest. Students were extremely proud as teams from the class won medals in various categories.
Key Lessons in the Research Study

Lessons in the environment unit occurred in four stages. The first stage involved providing students with the appropriate background knowledge needed to complete the study. This work involved examining the outdoor setting, going on nature hikes and seeing the vegetation that was in the area. In the second stage, students completed a community map of the school yard and forest in order to get a better understanding of what natural and man-made items were located around the school. In the process, students were able to recognize the difference in biodiversity between the schoolyard and forest. In the third stage, students completed an in depth investigation of the Maple Valley Creek in order to determine the overall health of the stream. Representatives from a non-profit environmental education organization facilitated the creek study. In the fourth stage, students took action on educating others on the environmental issues that surround the creek. They paired up with grade 2 buddies from a local elementary school for an invasive species pull, forest clean up and Stream of Dreams mural creation. Table-5 highlights the main topics that students took part in for this study.
Table 5: Key Lessons in the Study

<table>
<thead>
<tr>
<th>Key Lessons</th>
<th>Location</th>
<th>Focus of the task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature hikes</td>
<td>Outdoor</td>
<td>-familiarize students with Maple Valley Trail -expose students to the outdoors</td>
</tr>
<tr>
<td>Using Dichotomous Keys</td>
<td>Indoor</td>
<td>-prepare students for benthic invertebrate identification</td>
</tr>
<tr>
<td>Class Discussions</td>
<td>Indoor</td>
<td>- introduce or review theoretical concepts -voice and share opinions, stories or experiences related to environmental education and the outdoors</td>
</tr>
<tr>
<td>Schoolyard Mapping</td>
<td>Outdoor</td>
<td>-expose students to the outdoors -identify natural and man-made areas in the local community</td>
</tr>
<tr>
<td>Creek Study</td>
<td>Outdoor</td>
<td>-expose students to natural settings -allow students the opportunity to be involved in scientific investigation</td>
</tr>
<tr>
<td>Nature Scavenger Hunt</td>
<td>Outdoor</td>
<td>-work with younger students to share their enthusiasm for natural settings</td>
</tr>
<tr>
<td>Invasive Species Pull</td>
<td>Outdoor</td>
<td>-eliminate invasive species from the local community -work as part of a team to educate younger students about taking action</td>
</tr>
<tr>
<td>Stream of Dreams Mural</td>
<td>Indoor</td>
<td>-create a mural that allows students to creatively express themselves -contribute to creating a greater awareness of water issues in the community</td>
</tr>
</tbody>
</table>

**Under a Sky of Blue: A Day in the Woods**

Maple Valley Trail is located directly adjacent to the school. Students only needed to walk across the parking lot to access the trail which led to a large forest separating the school with a local community college. The forest is situated on the periphery of the north and east side of the school. The trail is used by local community members for recreational purposes such as jogging, biking and walking their dogs. The trail is also easy access to the local community college. The forest is also used by the high school students to hang out in during the school day. We came across many groups of students that were walking home during lunch, or just hanging out by the creek. The small creek ran southeast into the lake. Due to the nature of use, graffiti and litter was evident in the area.
The class embarked on a nature hike on a beautiful Wednesday afternoon in May. The sun was shining and there wasn’t a cloud in the sky. Temperatures were comfortable which made Yolanda happy. The outing lasted about a half hour and students were separated into two groups of 8. Each group was accompanied by a teacher and Educational Assistant (EA). The group kept close as we walked throughout the school and students were talking with each other about music, other students and behaviours that occurred in the previous gym class. As we began walking towards the trail, students began to disperse, some moving ahead quickly (Stan, Bruce, Kevin, Lester) and some lagging behind and chatting with the EA (Suzie and Yolanda). Justin, Larry and Dave were in the middle of the pack, poking each other and saying inappropriate things. They were sanctioned by the teacher and were separated. Once we got into the forest, many students immediately ran across the bridge of the creek and headed to the shore to look into the water. Bruce came to the edge of the creek, crouching down to peek in. Justin, Larry and Dave were threatening to push one another in. Suzie stared at a large log and Yolanda stood behind her looking nowhere in particular. Other students began to play tag around the ‘meeting place’. The ‘meeting place’ was an area in the forest that where two paths converged, creating an open area for students to group together. Half of the students sat on the bridge and the others stood on the gravel path while Mr. Bill readdressed the behavioural expectations. It took a while for the teacher to calm the situation down, but as the two groups split, it was easier to manage. I was in a group that included Suzie, Yolanda, Kevin and Bruce. As we went on the nature walk, other students in the group still wanted to run ahead but were called back by the EA. Kevin and Bruce were walking calmly side by side and were sharing their own experiences in this area.
The purpose of this first visit to the creek was to familiarize the students to the area. The EA in my group had a background in horticulture. Students were asking questions about the plants and trees. One student asked whether or not there was poison ivy around and Kevin replied, that he didn’t think so in this area. The EA confirmed and pointed out that much of the low lying vegetation around the path was actually garlic mustard. I pointed out the buckthorn as well and we had a brief discussion about invasive species and headed back to class.

On the second trip to Maple Valley Trail, students became familiar with the equipment that was to be used in the stream study. The students hurried to the creek, knowing that they would have a chance to get into the water if they got there first. Unexpectedly, Larry volunteered to put on hip waders to go into the water. Larry is one of the more impulsive students in the class and seeks out negative attention by misbehaving. As Larry was putting on the hip waders, he kept smiling citing that this was a new experience for him. He couldn’t figure out how to tie the waders on, so just held them up with his hands and jumped in the water. As Larry splashed around, Justin and Bruce were using the ends of the kick nets as swords and trying to stab each other with them on the shore. It was difficult to maintain order in this situation. Students were yelling, running into and out of the creek whether they had hip waders or not and 4 adults were trying to maintain order. Students were more interested in ‘playing around’ than actually following the protocol that they needed to know for the stream study that week. As teachers tried to explain the sampling methods, students did not appear to be listening and teachers had a hard time gaining control of the class. At this point, I was concerned about the stream study and how their behaviours would impact the investigation with EcoSpark.
In Class Tasks

Back in the classroom, students were not easily calmed after trips outside. One day, Mr. Bill asked them to put their head on their desks and when calm, a class discussion ensued about what struck them on their walk outside. Although their behaviours outside were less than stellar, I was surprised to hear that many provided some insightful comments to the discussion. Most students agreed that there was too much garbage along the path and a discussion on littering and pollution ensued. At that point, students were asked to write an exit pass answering what they thought pollution was. Below is a sample of student’s written ideas during the brainstorm.

Spelling and grammar has not been edited in order to reflect the student’s needs and abilities.

<table>
<thead>
<tr>
<th>What is pollution?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution is wen people thro trash that they don’t need on the ground. (Larry)</td>
</tr>
<tr>
<td>Stuff that tamanate the creek/lake. (Stan)</td>
</tr>
<tr>
<td>Pollution is what bad stuff that doesn’t belong in something like waste and garbage. (Suzie)</td>
</tr>
<tr>
<td>Pollution is when people fill are world with garbage. (Justin)</td>
</tr>
<tr>
<td>Waste going into the enviroment and contaminating the species.(Lester)</td>
</tr>
<tr>
<td>Pollution is contaminations, waste, garbage and a negative impact in our environment.</td>
</tr>
</tbody>
</table>

Class discussions were an important way for students to voice their opinions about events and activities that were of interest to them. Mr. Bill often started off the class by telling a story in order to introduce the day’s lesson. As one teacher talked the other teacher ensured that students were acting appropriately in the classroom; listening, or putting their hand if they wanted to contribute to class discussions. As Mr. Bill stated, “each one of them is eager to tell a story and they want their story to be heard”. However, students often interrupted the teachers
and each other to voice their thoughts, and this impulsive nature was common for many of the boys in the class.

**Summary**

Mr. Bill and Mr. Andy had their hands full with the different challenges that each student had in the class. However, it was obvious to me, as a researcher and teacher, that both teachers and students were mutually respectful of those challenges. Mr. Bill and Mr. Andy spent a great deal of time and energy ensuring that they provided students with significant, meaningful learning opportunities and a safe environment to take risks, voice their opinions and ask questions. As the next chapter will show, students in the class had a great deal of respect for their teachers and were grateful for the experience that had brought them all to Maplewood Secondary School. In the next chapter, I will discuss how students responded to the creek study lessons that allowed them to explore their natural environment and how that may have impacted their views about school and learning.
CHAPTER 5: FINDINGS AND DISCUSSION:

FACTORS ENHANCING STUDENTS’ VIEWS OF SCHOOL AND LEARNING

“People learn better in a happy frame of mind”-Clark and Starr, 1996

Specifically focusing on research question one, which seeks to understand what factors enhance students’ views of school and learning while participating in place-based education, I present my research findings and discuss them in relation to relevant literature. This chapter includes an examination of student’s preferred learning styles and how the outdoors provided an engaging context for learning. I also analyse the various roles that students took on during the study and the impact that outdoor learning had on themselves and their perception of school and learning. Data analyses led to the emergence of five major factors that appear to be central to how the BRIDGE students perceive school and learning. These factors include opportunities for student voice, use of hands-on activities, getting outside to learn, contextualizing activities and the importance of roles and collaboration.

Telling Stories: Let My Voice Be Heard

Class discussions were an integral part of the BRIDGE program. Lester and Stan were usually quiet during discussions. They paid attention to what was being said but did not contribute. However, when discussions revolved around outdoor experiences and environmental issues, Lester and Stan were eager to voice their experiences. When I asked each of them about that discrepancy, they each responded that it was a topic that was interesting to them and that they knew a lot about it.

Discussions around the environment began even before the students went outside to participate in the stream study. Mr. Andy introduced the topic of water quality and showed
several YouTube videos related to the subject. Students were asked what they felt was polluting our waterways and if it was important to protect. Ted offered the following:

It’s trash. People litter and throw it in the water. There is also trash companies that put it in pipes that eventually lead to water. It’s important to protect because it’s our drinking water and we can’t have it polluted. We can reduce pollution and ban power plants from sending greenhouse gases and toxic waste to waters. Another way to reduce pollution is don’t litter. Use a blue bin for recycling or a green bin for food and waste.

[class discussion]

Other students were also fascinated with talk about water quality. When asked if they had heard about the Walkerton E-coli scandal, about half of the students put up their hand. Mr. Bill continued to tell the students about the issues surrounding Walkerton and how several deaths had occurred as a result of the poor quality of drinking water. When asked about their thoughts, most responded with phrases such as “that sucks” or “too bad”, however Lester had a particularly insightful comment:

We should care about what happened there, so that the same thing doesn’t happen somewhere else. (Lester, class discussion)

Lester shared his experiences at his family trailer and how it would be nice to be able to drink the water from the tap. He did not like the fact that they had to keep bringing up bottled water to drink.

Mr. Bill: So why are you bothered by that?

Lester: It creates another huge pile of garbage! All those plastic bottles now have to go somewhere.

Later, when asked how the discussion went, Mr. Andy was pleasantly surprised, but added that they hadn’t had a class discussion in quite a while and that it was not something that they could do every day:

You teach a lot of this through real experience stories, or otherwise, they can’t relate. So Lester coming up with the story about his trailer and having to drink water there makes sense to him now (Mr. Bill)
The topic has to make sense to them and has to be something that is important, like Mr. Bill says. It is something that they have to know a little bit about already...something in their lives. (Mr. Andy)

Students were always encouraged to take risks and voice their opinions. It was evident that Mr. Andy and Mr. Bill created a safe, inclusive environment that allowed students to contribute to class discussions in a respectful and appropriate way. Creating a safe, inclusive environment is imperative for student success and teachers play a significant role in developing a relationship with students that will make them feel comfortable to take risks (Balfanz, Herzog & Maclver, 2007; Black, 2004; Deed, 2008). Providing a curriculum that is student driven will foster opportunities to succeed (Schussler, 2009). In this case, students engaged in authentic conversations rather than ‘classroom talk’ and had the ability to make connections to their personal experiences.

According to Daniels and Arapostathis (2005), students will engage in activities in which they show the most aptitude. Lester and Stan were normally very quiet during class discussions, however, when Mr. Bill and Mr. Andy introduced environmental issues, both boys volunteered their opinions. Since they both knew something about the subject matter already, they were more willing to take risks and contribute to discussions.

**Hands Down- These are the Best Learning Activities!**

Students came to the BRIDGE program because it offers experiential opportunities for learning. When asked about the way that they learn, all students interviewed said that they prefer hands-on learning and that they liked this year better than the experiences they encountered at their previous schools. Students cited the following for the reasons that they did not fare well at their previous schools: teaching style, learning style, boredom. For many, the teaching style, workload and pace did not meet the needs of their own learning styles and abilities. When
students did not understand the content or could not keep up, they consequently fell behind. As a result, they became disengaged and unmotivated to work.

The goal of the BRIDGE program is to re-engage students with subjects that allow them to express themselves; create things and work with their hands. Many students cited working in the machine shop as a subject that they liked during their year at Maplewood Secondary School:

Well, it is more hands on here, in the shop. I like it. My other class last year, even if I didn’t work they wouldn’t care. They would just tell me to keep working.

Well, when you are just sitting and just listening, it is more boring. I like more interactive stuff.

(Interview 1, Kevin)

Bruce also shared his views regarding hands-on learning:

Bruce: Getting lots of hands on…work. [looks at his hands]
Tanya: How different is it from sitting in a classroom?
Bruce: I have more fun…there is more freedom. [holds hands in the air and smiles]

Yolanda commented on the fact that at her old school, all she remembered was doing pencil and paper work from the textbook.

Tanya: And how come you don’t like that?

Yolanda: It’s boring, you just sit there and listen and he [previous teacher] assumes that you can memorize everything. [scowl]

Yolanda went on to discuss the kinds of classes that she likes this year in the BRIDGE program. She prefers the hands-on nature of the classes that don’t involve a lot of reading or writing:

Yolanda: I like science here because instead of like bookwork or something, Mr. Andy and Mr. Bill let us do hands-on stuff, like the robots.

Tanya: That’s really cool! And why do you think that hands-on is a really good way to learn?
Yolanda: So we can get experience of what we’ll be learning instead of just thinking it.

Mr. Andy shared that the class would be doing many activities outdoors over the next week. An immediate chatter of voices filled the classroom as students began asking questions and a flurry of hands went up. Most students were very excited about the prospects of going outside, but others were not as enthused.

Stan: What are we going to do?

Mr. Andy: Go out and take some walks in the woods

Justin: Awww….but we did that back in the fall.

Bruce: Who cares Justin? At least we get to go outside. I’d rather be out there rather than cooped up in this place (folds arms and sits back in chair)

Yolanda: Yah, well, I ain’t goin’ out there if it’s too hot, or too cold or if there are bugs. I’d rather stay here thanks. I’d rather sit. (sneers and rolls her eyes)

Lester immediately put his hand up and asked if we could go into the creek. Stan nodded his head in agreement stating “I can actually do stuff outside because I’m good at it, I hate the writing that we do in here. It’s so boring. I’d rather be out there and talking, moving around”.

Although Yolanda talked earlier about preferring the hands-on nature of BRIDGE classes, she was not enthusiastic about going outside. Once the bell rang, Suzie and Yolanda came up to me and asked if they could be partners outside. They stated that they would make a great team and that they would ‘balance each other out’ since Yolanda didn’t want to go outside and Suzie did. I urged Yolanda to give it a chance and she reluctantly agreed. Suzie also encouraged Yolanda by saying “just imagine not sitting having to sit all period Yolanda” to which Yolanda replied “well, I hate moving” and they hurried off to catch their bus.

Rock (2004) suggests that both high and low achieving students may experience difficulties sustaining attention and behaviour during times of seatwork when they cannot or will not complete the task at hand. In their previous schools, BRIDGE students became bored with
independent seat work that involved reading and writing. Engaging students with hands-on and authentic learning seemed to help support these reluctant learners, and appealed to multiple intelligences. There were many other opportunities for students to engage in hands-on work: for example, during the creek study, some students were in the water collecting invertebrates while others where on the shore sorting and identifying bugs or documenting the day with photography.

According to Mayer (2002), education has two goals. The first is retention, which is the ability to recall learned information at a later date. The second is transfer, where students take what they have learned in order to solve new problems or ask/answer new questions. Many of the students in the BRIDGE program experienced rote learning in their previous schools. They often became frustrated with pencil/paper tasks that asked them to define terms or quizzes that asked them to recall information. Meaningful learning goes beyond the recollection of factual knowledge to the transfer to what has been learned to new situations and problems. The outdoors provided a context where students could apply their knowledge and engage in hands-on learning.

**Being Outdoors**

For many of the students, the outdoors was motivating and meaningful. In this section, I explore this idea more fully. Most students reported that getting outside was a better way to learn concepts related to nature and that it provided hands-on learning opportunities. Kevin had some previous outdoor experience in his old schools:

Kevin: You can learn more about the outdoors.

Tanya: What do you mean?

Kevin: It is easier to see what the teacher is talking about out there…I mean rather than a textbook.
Nate never had an outdoor experience in school. He learned about the environment in the classroom when his class was doing activities related to habitats. However, he saw the importance of going outside to learn. In his mind, it was best to make use of his senses to take in information. Nate suggested that actually seeing something in nature is more beneficial.

Tanya: So all of that stuff you learned inside a classroom? What do you think about getting outside to learn about the environment?

Nate: No, if you talk about it, people get a visual idea of what it is like, but you really don’t know unless you get out there.

Tanya: Do you mean that you might picture something wrong?

Nate: Well, it’s just better if you actually see it rather than just picturing it in your head. What you are picturing in your head may not be right, so it’s better to go outside and see for yourself.

None of the students in this study were interested with the in class work that they had to do in relation to this project. My observations noted that any pencil paper tasks were met with resistance. Resistance came in various forms. Students did not mind talking about the issues that they were going to be faced with but did not want to complete the worksheets. Ballentyne and Packer (2002) also found that middle school students least liked measuring water quality and using activity sheets to help learn about the environment. In their study, students most liked “learning outside of the classroom, seeing something new, being able to touch plants, animals and birds”. Students in this study also enjoyed the fun factor of going outside and doing something different. Interview comments include:

My favourite part of the stream study was when me and Mr. Andy were trying to catch crayfish for fun (Bruce)

The part of the stream study that I liked the best was going into the water. The reason why I liked going into the water is because I had a chance to do something different besides staying in class. (Suzie)
Putting on the waders and going in the creek because it was fun. (Stan)

My favourite part of studying the stream was looking for the bugs because I like going into the water and being active. (Jason)

I liked going in the water and looking at the different bugs because it was fun. (Nate)

The part of the stream study that I liked the best is the sorting of the bugs and then we put the water and the bugs into the ice cube tray because I learn what kind of bugs are in the stream and I like trying to find out what different kind of bugs are in the stream because it was kinda interesting. (Lester)

In a study by San Martin and Calabrese (2011) students described their preferred learning styles, which prompted their teachers to improve their practice. Findings revealed that relevant experiences were important for the participants as was as the ‘fun factor’ for learning. Ponticell and Beckett (2012) also found that humour and fun supported student learning. Learning experiences need to be enjoyable for students. Bruce, Stan and Nate all described various parts of the creek study as being ‘fun’. Jason enjoyed the fact that he could be ‘active’ and Lester was ‘interested’ in learning about the different bugs that he found. All of these states of mind can contribute to a more motivating and engaging learning environment for students. According to Hidi and Harackiewicz (2000), a person’s interest in a topic can be measured by how much they like a particular activity. Furthermore, the situation can also enhance how engaged students are in a task, thereby impacting motivation to learn (Pintrich & Schunk, 2002).

A study by Ainley and Ainley (2011) also support the fact that enjoyment and interest of a topic results in higher engagement. Their study showed a positive relationship between students’ emotions and their response to learning science. Emotions such as enjoyment and interest of subject matter were strong indicators of whether or not students were more likely to want to learn more about science. That is, there was a positive correlation between enjoyment and knowledge extension. According to Ainley and Ainley (2011), previous science experiences
also impacted their future experiences. The authors found the following indicators of engagement in science: previous enjoyable and interesting science experiences and lessons that were fun and exciting.

According to Renni, Feher, Dierking and Falk (2003), it is important to address the physical setting in which learning occurs and that learning context must be authentic. Falk and Dierking propose (2002) the contextual model of learning in that “all learning is situated in a series of contexts’ and that it is “not some abstract experience that happens in the real world” (p.10). The outdoor activities performed by the students in the BRIDGE program involved working in teams to collect, analyse and interpret data. Instead of learning about ecological principles from a textbook or video, they experienced learning in an authentic environment. As Mr. Andy said “it was the best way for them to learn the vocabulary”.

When students are focused on learning, they may have a ‘flow’ experience. Flow theory describes the state of individuals when they are experiencing deep concentration, enjoyment and involvement in a certain task (Csikszentmihalyi, 1990). The quality of an experience is high when people report feelings of happiness, satisfaction, fulfillment and motivation. After being outdoors, I heard students saying “Wow! I can’t believe that it is already the end of the period! Time flew by so quickly!” Students were so engaged in their tasks that time did not matter to them. Work by Csikszentmihalyi and Hermanson (1995) has shown that students are intrinsically motivated to learn when they complete tasks that are of interest to them. That is, they are learning in the moment and nothing else seems to matter. BRIDGE students had numerous opportunities to seek out different interests in an informal learning environment.

Words such as ‘fun, good, explore, cool, play, interesting’ further provide support for a high quality learning experience. According to Gardner (1993 in Rennie, Feher, Dierking and
Falk, 2003), there are many different ways that students learn and field study supports kinesthetic, interpersonal, auditory and visual learning within an authentic context. Such differentiation meets the needs of diverse learners thereby increasing the likelihood of flow experience. This is difficult to mirror within a classroom setting.

**Contextualization of Activities**

In this research, the stream study was designed to provide authenticity with respect to the procedure and content of what they were studying. The activity was centred on a bigger idea that examined the relationship between humans and the natural environment. In the next section I provide an example of how lack of clarity and context led to frustration.

*Using dichotomous keys*

When using the dichotomous key activity in the classroom, many students found it ‘boring’ and ‘useless’. In the dichotomous key activity, students used criteria to identify pictures of bugs. Each stage in the key allows students to distinguish between defining characteristics (i.e. number of legs, number of antennas) which move them onto subsequent stages until they are able to identify their species. Many students were distracted which resulted in lack of focus on the task at hand. Very few completed the task of identifying the bugs. By the end of the period, the dichotomous keys were either crumpled up in the garbage or on the floor covered with dirty footprints:

> It was stupid. I didn’t understand what to do. (Justin)

> I didn’t get it…and no offense, it was really boring. (Yolanda)

> I didn’t understand how to use that thing a ma bobber. What is it called again?

> [dichotomous key] I couldn’t even say the names of the bugs!!! Besides it was boring. Looking at the bugs in the jar was kinda cool but I couldn’t figure out what they are. I don’t know how this thing works [points to the crumpled key]. (Justin)
Sorry, it wasn’t much fun at all…pretty boring. But the bugs were cool. (Lester)

The students became very frustrated trying to identify the names of the bugs. The key was too difficult and complicated to use for them. They had never seen a dichotomous key before and were overwhelmed by the complexity of the task. None were able to pronounce the species name for the bugs. The described the specimens as ‘the small bug’ or ‘the one with the huge wings’.

It is important for tasks to be challenging to sustain engagement; however, this task was beyond the student’s capabilities. According to Csikszentmihalyi and Hermanson (1995), the quality of the experience is related to how challenging or boring a task is perceived. I reflected upon the task with the teachers.

Mr. Andy: Well, I certainly have seen better days.

Mr. Bill: But at least they were talking about the bugs themselves….but yeah, they hated using the keys. They just didn’t understand how to use them. In high school, students learn about dichotomous keys in grade 11 biology.

Tanya: Yeah, I guess we should have spent much more time on this..perhaps gotten them to create a simple key using nuts and bolts or small items or something.

Mr. Bill: But even then, it would have been a challenge for some of them. They’d understand the differences in terms of what things looked like, they’d probably be able to organize the items into various groups, but then trying to write down and create a key…the logic piece would be very challenging to write….you know….if bug A has wings then go to 1 if no wings then go to 2. The engagement level around the weird looking bugs was ok but the key piece..no way.

A study by Deed (2008) supports the fact that students shut down when the task becomes difficult. Students resisted beginning the work because of their perceptions of success—they didn’t think that they could do it, so they did not want to bother. Students had difficulty reading and saying the names of the species on the dichotomous keys. Students who are not able to read well often resist trying (Powell, McIntyre & Rightmeyer, 2006; Smith & Wilhelm, 2002). In this
situation, students lost control of what they were learning. Deed (2008) found that boys would readily complete work that was easy, brief and less challenging. In this study, participants perceived reading and writing tasks to be difficult and something they felt that they could not do. As such, the students needed constant prompting and guidance for such challenging tasks. If they felt that there was no chance of success, then they disengaged from the task. Consequently, tasks that involved doing, were perceived as fun and interesting.

The part of the stream study that I like the best is the sorting of the bugs with the sucker this then we put the water and the bugs into the ice cube tray because I learn what kind of bugs are in the stream and I like trying to find out what different kind of bugs are in the stream because it was kinda interesting. (Lester, journal entry)

Although Lester could not identify any of the bugs using the dichotomous key, he was able to sort them based on physical characteristics (i.e. bugs with the sucker). He wanted to find out what bugs they were because it was an area of interest to him.

You can tell how healthy the water is by what bugs there are in the water like the tolerance of the bugs to pollution. If the bugs have low tolerance the water is healthy and if the bugs have high tolerance the water is not healthy. (Lester, journal entry)

He also extended this learning to make a connection to why the sorting and identification of bugs is important. He was able to easily make this connection based on the results from the data collection and what he previously learned.

The Importance of Roles and Collaboration

Working like real scientists

When taking part in the stream study, students felt like real scientists. They were able to use, move around and manipulate the tools that scientists would use when conducting studies in the field. Recall that the Ecospark staff was present to facilitate and assist the students. The students looked up to the Ecospark facilitators as experts in the field and directed all of their questions to “Pete and Hailey”. Justin even corrected Kevin as to how the sampling methods
As the above vignette shows, the stream study allowed students to work together in order to achieve a common goal of determining the overall health of the stream. In their reflections, students mentioned either working with one other or a group of students. Justin recognized the importance of having to work with his friend Kevin in order to collect the bugs (see Justin’s sampling procedure on page 85). He would not have been able to do it on his own as he could not hold the net and stir up the sediment at the same time. Bruce also stated that “if you want to find if the stream is healthy, is you should have more than 2 people”.

I would describe it as organized chaos. Yolanda is laughing and running around with the camera in her hand, taking photos of trees, plants and students yet complaining of the heat. She does not like anyone taking a picture of her, but she likes to take pictures of others. She asks Suzie to pose with the Ecospark facilitator. Suzie then turns to the facilitator to ask a question about the sampling method. Yolanda runs off to have some friends pose by the bridge. Kevin and Justin are working together to stir up the sediment in the creek. “No! You don’t move the dirt like that!” Justin takes over while Kevin holds the net. Justin moves his legs just as someone would dancing to the song “Twist and Shout”! (Field notes, May 15 2013)
Providing students with meaningful roles and tasks has a positive impact on behaviour (Wise, 2003). Group work was an important aspect of this activity as Suzie stressed in her journal by using the term ‘group’ multiple times:

We found out in groups that the stream was not healthy. The reason why it wasn’t healthy because in groups we caught bugs buy swooshing the water around with a net in the water. After that we took out big rocks and washed all the dirt out. When each group got a bucket and ice cube tray we took different little bugs and separated them. The guy that was in charge said that the stream wasn’t healthy because of the type of bugs that were in it. We then talked about how to prevent the bad bugs to be in there and some of the things were pollution, trash and dead animals. (Suzie, Journal Entry)

Yolanda also identified her role in a group and realized that she was needed to help others.

What I did was help my group with the ice cube thing since I didn’t wear any boot weighers [sic:waders]. After a couple of minutes I took a lot of pictures. When Mr. Geo asked people who wanted to come back to class room I went because it was too hot. We used the net and the sieve to collect bugs. (Yolanda, Journal Entry)
Mr. Andy commented that the stream study was ‘extremely successful’. When asked what contributed to the day’s success, he responded:

I think because everyone was uh, participating..there was a job for everyone to do..and it gave every learning skill a set that they could focus on and excel at. They didn’t have to worry, they could just focus on getting in..they didn’t have to worry about not being able to catch any fish or wildlife or any creatures in the water because there was written work that you could do. We had that photography component which was good and it just gave everyone a chance to succeed. I thought it worked really well for them. (Mr. Andy, Post Stream Interview)

He remembered two students in particular; Larry and Bruce that he couldn’t believe were so focused on the task at hand.

Yah, there were two students in particular..the first was Larry, he was a standout. I thought at first he would jump on the bandwagon with some students that are not very good for him but he kind of went off on his own and did his own thing and that was good for him. He didn’t have to worry about being cool. He could just go off and catch fish and he succeeding and that was his way of saying look, I’m cool, I can do it. As well as Bruce, he did a great job. He was excited to be there and get in the water and try new things. (Mr. Andy, post stream interview)

Students as teachers and leaders

According to Black (2004) “students are apprentices while they’re observing and thinking and teachers when they share what they’ve learned” (p.43). Student participants were able to share their knowledge of the creek and surroundings with their grade 2 buddies. This experience formed a bond between the BRIDGE students and their young new friends. Students used terms such as ‘happy, sad, role model, feels pretty cool, good, fun, pride” to describe the interactions between them and their buddies.

Nate felt a sense of pride knowing that his buddy looked up to him and it made Nate feel good to know that his friend was having so much fun. Nate, describes his grade 2 buddy:

He was very energetic, he was smiling all the time, I looked over, I never saw him without a smile. And he was always smiling every time I looked at him, he was always smiling (Nate, Interview 2).

Nate thought it was ‘cool’ to be a leader and it made him feel ‘proud’ of himself. He also
liked the fact that he could share what he knew:

We found acorns and I told him that squirrels eat them.  (Nate, Interview 2)

Bruce thoroughly enjoyed the entire experience.  He loved every aspect of being outside. When talking about his experiences during the nature walk and invasive species pull, he recalled how important it is to teach and learn about how actions impact surroundings and how much of an influence he feels he has on the young students.

Happy to get out!  It’s important to be a role model….they are still young and they have to learn how not to do bad things but they have to learn.  They all wanted to go back out [to the forest].  My buddies wanted to go out. They were having fun. They were sad when we left and when I told my buddy that I wasn’t going to be there tomorrow, he was sad.  That made me feel kinda sad too. (Bruce, Interview 2)

The grade 2s were running around all exciting about the chance to be with their big buddies.  There was an element of chaos as the grade 2s were taking advantage of the fact that they were outside again and I could hear such phrases as “can’t catch me!”, “what’s over there?”, “what do we get to see today?”.  I recall one instance when Larry was absent on the third day that the class went with their buddies. His buddy became upset when he realized that Larry was
not there. Although the little boy was placed in another group, he still asked about Larry, where he was and if he was going to be back tomorrow. When Mr. Andy told Larry what had happened, he felt terrible about the situation. He felt so badly about being absent and by the fact that his little friend was looking forward to being with him. Larry looked surprised and awkward at the same time. He was at a loss for words.

Huh? I can’t believe…. it….he hardly knows me? I guess ……..he really wants to do stuff with me. That feels like…..pretty cool! I like that feeling. I feel kind of weird….in a good way. [sheepish grin]  (Larry)

Larry was a tough kid, a bully to others in the class. The fact that he made this moving comment shows that he felt important and responsible for the well-being of his buddy in some small way. This emotional connection made Larry feel good about himself and was surprised that even only after a couple of meetings, his buddy looked up to him and wanted to spend time with him.

Kevin also had a lot of fun with his little buddy. They were able to find everything on the list for the nature scavenger hunt and when they came and showed it to me, Kevin had written all of the items down on paper. He enjoyed the nature scavenger hunt because it allowed him to show his little buddy what he had learned from previous classes. He was able to help them identify garlic mustard and why it is bad for the environment. He also told his buddy that
littering is a bad thing but the garbage clean-up is a good thing that people can do for the environment.

Kevin: Because you can show them and tell them what’s bad for the environment and what’s good so that they can know what to do when they are older.

Tanya: You were sharing some of the things that you know with the kids..that’s great! And could you tell if the kids if they were having fun?

Kevin: Yah, cause they were pointing out stuff and finding the garlic mustard and laughing.

Tanya: Did you say laughing?

Kevin: Yah..and smiling! [laughs]

Tanya: Where they asking you lots of questions?

Kevin: Yah, like is that bad and stuff.

Tanya: Ok! That’s good! So how did it make you feel?

Kevin: It made me feel good because it got them someone to look up to instead of no one.

Tanya: So in terms of being a leader? How does it make you feel?

Kevin: I like being a leader because you can…I guess put the future in someone..help them have a good future. I don’t like picking through garbage though..its’ gross but it’s good to help the environment…and the kids.

According to Carver (1996), experiential education allows students to share in the process of teaching and learning. In this instance, students in the BRIDGE program had an opportunity to share their learning and learn from their grade 2 buddies. This holistic approach allowed students in the BRIDGE program to become student teachers, valuable in the education of others. This responsibility had a positive impact on their self-confidence. Students cited “feeling good” as an emotion that came about as they worked with their buddies.
Summary

Overall, the students showed a great deal of pride and ownership of their learning. They identified many factors that affected their experience in positive ways. Factors include engaging in class discussion so that students can share their opinions and thoughts, hands-on learning opportunities that get students out of their desks, meaningful and contextualized tasks and the importance of roles and collaboration. The fact that the activities focused on the environment allowed them to be exposed to natural settings and share their knowledge with other younger more impressionable students. Knowledge and attitudes that evolved out of this exposure to the environment will be the focus on the next chapter.
CHAPTER 6: FINDINGS AND DISCUSSION: EVOLVING KNOWLEDGE AND ATTITUDES

In this section, I present the findings to my second research question which seeks to understand how place-based education impacts students’ views of the natural environment. Data analyses led to the emergence of two main themes: evolving knowledge and evolving attitudes towards the natural environment. Through an analysis of relevant research literature, student work, class discussions and participant interviews, I address how students’ knowledge and attitudes of the environment were impacted. The chapter concludes with an account of how students’ attitudes of the natural environment evolved throughout the study.

Evolving Knowledge

A critical component of place-based education is the emphasis that is placed on students as creators of knowledge (Smith, 2002). BRIDGE students worked together to observe and engage in inquiry as they constructed key ideas related to biodiversity. They were able to see, hear, talk about, take pictures of, smell and touch their surroundings. Using their senses, they were able to gather information in a way that could not be replicated in a classroom.

As a diagnostic, students were asked to write down what they thought the terms biodiversity and environment meant. Although none of the students could relate to the term biodiversity, several made an attempt to define environment. They provided very simple, 1-2 words responses such as: “the plant life”; nature/weather; I don’t know; Trees, nature, dirt, leaves animals; the physical factors along with the pollution; green, trees, grass.
To introduce the concept of biodiversity, the teachers were curious to see what living and non-living components of their environment the students could recall from their first hike. As a class, the students compiled the items listed in table-6.

Table 6: A comparison of living and non-living things in the area surrounding Maplewood Secondary after the first nature hike.

<table>
<thead>
<tr>
<th>Area</th>
<th>Living</th>
<th>Non-Living</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoolyard</td>
<td>Trees, grass, dandelions</td>
<td>Pavement, school, baseball diamond, fences, cars, basketball net</td>
</tr>
<tr>
<td>Forest Area</td>
<td>Trees, bushes, grass, leaves, squirrels, birds</td>
<td>Bridge, sign, footpath, rocks</td>
</tr>
</tbody>
</table>

Students had difficulty recalling items from the day before and argued that the teacher had not told them to pay attention things like that! According to Larry “you should have told us to look out for these things before we went out”. I found this exchange interesting. The first hike was a way to get students familiar with their surroundings. It was more of a passive learning experience as students were not asked to “look for anything”. As we walked the day before, all were more concerned with chatting with friends rather than observing their surroundings. In subsequent trips outside students were prompted to observe their natural surroundings and engage in active construction of knowledge by documenting what they saw in nature. In the next section, I explore the idea of using community maps as a means of learning about biodiversity.

*Learning about biodiversity through community mapping*

Multiple trips around Maplewood Secondary allowed students to gather data and make a more exhaustive list identifying living and non-living things. Once the students became more familiar with Maple Valley Trail, they created a community map of the area. This activity allowed students to gain more of an awareness of their surroundings and to examine in more detail, the difference in diversity between a forest area and the schoolyard environment. Figure-
1 illustrates Bruce’s final rendition of his map. Bruce labeled his map with several examples of living and non-living things including squirrels, lichen, crayfish, slugs, dirt, worms, trees, birds, leaves, frogs, fish, fungi.

Figure 1: Bruce’s community map

According to Bruce, the forest had so many more plants and animals in it than the schoolyard. This is evident in his community map as the green areas are indicators of forest where birds, trees, snails, slugs, worms, dirt, mice, worms, squirrels, lichen and frogs are found. Arrows pointing to the creek highlight crayfish, fish, water spiders and frogs. Notice that the area immediately surrounding the school contains no labels. According to Bruce, there was nothing around the school except cars, parking lots and soccer fields. Bruce now had a greater understanding that the amount of biodiversity is greater in a forest than a schoolyard.
Bruce: There are so many more plants and animals in the forest. They are all over the place! So great to get out there! Just love it and staring at these things!

Tanya: Why do you think this is the case?

Bruce: Probably cause the forest has more trees and space for things to live…the school doesn’t have many trees and there’s lots of grass…that’s not much room for lots of animals to live. [pause]. Animals need to drink water too. And the forest has water in the creek.

Frank also shared his community map with me (see Figure-2). Although not as detailed as Bruce, Frank’s map distinguishes the schoolyard from the forest. Like Bruce’s map, the area around the school contains large open spaces (grass and parking lot), whereas the forested area is labelled with a creek, trees, maggots, birds, mosquitos, slugs, animals, rocks, logs/wood and insects.

![Figure 2: Frank’s Community Map](image)

Interestingly, Frank also labeled humans in both the schoolyard and forest environments. When I probed further, Frank stated “well, we’re everywhere! We’re part of it all too you know.”

Based on his community map, Frank was also able to gain a better understanding of the different
organisms present in each area. More living things were found in the forested area compared to the schoolyard. Although most students did not come out of this student remembering what the term ‘biodiversity’ means, they still had an understanding of the number of different types of organisms living in the area and what factors lead to this difference. These factors include shelter, water, dirt and shade all found in the forest. Since the schoolyard was man made, very little of those factors were present.

The grass is getting mowed all the time, so it doesn’t get a chance to grow. Nothing can grow in it. (Suzie)

There’s less things in the school area, since there’s not as many trees. (Frank)

As part of the culminating discussion, the class was asked to brainstorm a list of living and non-living items again (Table- 7). Findings suggest that exposure to the outdoors allowed students to develop a more exhaustive and nuanced list of vocabulary related to nature and understanding aspects of diversity.

Table 7: A comparison of living and non-living things in the area surrounding Maplewood Secondary School after the second nature hike.

<table>
<thead>
<tr>
<th>Area</th>
<th>Living</th>
<th>Non-Living</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schoolyard</strong></td>
<td>Trees; leaves; grass; bugs; shrubs; weeds; humans; birds; squirrel; ants; bees</td>
<td>Concrete; light posts; rocks; gravel; school; baseball diamond; garbage cans; bike; soccer posts; washroom; parking lot; basketball court; batting cages/dugout; bleachers; garbage; cars; fenced in play area; speed bump; twigs and dead leaves; signs; air; dirt; trail</td>
</tr>
<tr>
<td><strong>Forest Area</strong></td>
<td>Trees; bushes; fish; crayfish; leaves; humans; flowers; berries; spiders; mosses; fungi; bees; water spiders; slugs; maggots; potato bugs; mosquitoes; squirrels (nest); birds (chirping); frogs; snails; worms; snakes; lichens; rats/mice</td>
<td>Rocks; gravel; bridge; garbage; metal railing; wooden fence; dirt; trail/path; air; mud; sewer; dead leaves; twigs; logs; water; signs; stump</td>
</tr>
</tbody>
</table>
**Discussion, space and place**

Research supports the fact that learning space impacts knowledge retention (Braun, Buyer & Randler, 2010; Lisowski & Disinger, 1991; Lindemann-Matthies, 2002; Montgomery & Millenbah, 2011; Prokop, Tuncer & Kvasnicak, 2007). In this study, students engaged in field work to gather information about a local setting and consequently, were better able to speak about Maple Valley Trail and the issues surrounding it. Likewise, Endreny (2010) found that conceptions of 5th graders changed during a place-based study of a local watershed. Students gained a better understanding of how urban land use affected the quality of water through interactive lessons in the outdoors whereas student learned little from lessons that were taught in the classroom.

Place-based education engages in real world problem solving (Sobel, 2004). According to Smith (2002), there is a difference in the types of experiences schools provide compared to other ‘places’ where “in other places, people experience the world directly; in school, that experience is mediated, and the jobs of the students –despite all the well-intentioned attempts to engage them as participants in the construction of meaning, -is to internalize and master knowledge created by others” (p.586). Using the Maple Valley Trail as a specific locale, students in the BRIDGE program where able to observe and investigate local natural phenomena that allowed them to develop a greater understanding of the terms biodiversity and environment.

**Evolving Attitudes: Humans are Part of the Problem and the Solution**

Students were asked to recall one thing that they learned from the unit. It was interesting to note that none of them stated specific facts or knowledge. When asked, their answer always related to some sort of impact or consequence that related to human activity. As such, results suggest that their awareness for the natural environment increased.
When initially questioned about environmental issues, most students cited general ‘mainstream’ issues such as sea ice melting (polar bears), pollution and global warming. One class, students engaged in discussion about human impact based on the experiences that they had in the outdoors. Students were now able to list human activities that have a direct impact on Maplewood Secondary School. Pollution and garbage was visible in the creek and surrounding forest. Students were surprised to collect so much of it during the creek clean up. It was also evident in the schoolyard as we walked to and from the forest. Buildings such as residential houses, schools and apartments are found along the edge of the forest and new developments are being constructed to the north of the school. Students also became aware of the multiple uses of the forest. Not only was it home to plants and animals, it was an area used by local college students, community members and other students for biking, walking dogs, trail walking and hanging out. Finally, students became more aware of the negative role of garlic mustard in the ecosystem after the invasive species pull. Aside from pollution and global warming, the environmental issues mentioned during this discussion were novel for the students. Furthermore, they were now able to differentiate which issues had more of an impact on the local environment compared to the global environment.

*Into the creek, onto the lake*

Visually, students could not see evidence of chemical pollution in the area but were able to make an inference based on the knowledge that they had gained from the Stream of Dreams program. Initially, none of the students had indicated water pollution as a significant environmental issue, and more specifically, no one had suggested local environmental issues that affected Maple Valley Trail. Bruce, Frank Lester, Nate and Justin all cited chemical pollution when asked what they learned from the environment unit.
That whatever you pour down the drain doesn’t get treated. It all goes to the creek. Interesting…but bad. (Bruce, class discussion)

Dirty water goes into the lake when we put dirty chemicals in it (Frank, class discussion)

Lester: If you have washer fluid or bleach and you throw it down the sewer, it can end up in the pipes and eventually leak into the streams, ponds, lakes and oceans. (Lester, interview)

When asked about chemical pollution, Nate offered the following thoughts;

Nate: Ummm, well, the rain drain, that’s how it gets into the creek by the school.

Tanya: And what gets in there?

Nate: Rain water, the people just throw their garbage in there and chemicals and stuff. When they wash their cars, that stuff goes down the drain.

Tanya: Ah! That’s a good point! And where does all that stuff go?

Nate: In our creek. And it goes straight to the lake.

Participating in the Stream of Dreams program allowed students to gain greater awareness of the potential impacts of chemical use. Chemicals enter our ecosystem when people spray their lawns with fertilizers, pesticides and even wash their cars in the driveway. It was the latter activity that surprised students the most.

It is more safe to go to the car wash to wash your car than your driveway. It costs more but it helps save the environment. (Nate)

Justin also agreed with the others about chemical pollution, but he also explicitly made a connection to the impact on living things. He came to a greater understanding that the invertebrates that he saw in the creek have a certain tolerance for chemical pollution.

Tanya: What is one thing that you learned from this whole experience, one thing that you didn’t know before?

Justin: Um, the bugs can withstand lot of bad water in the creeks.

Tanya: And where does all this bad stuff come from? The pollution that goes into the creek?
Justin: From our sewers and stuff. If we don’t know what is going in there, then we
don’t know how to stop it.

Justin recognized the importance of understanding what actually goes down the drain. If people
are not aware of this occurrence, then they do not have the knowledge to make an informed
decision of ceasing their actions.

Invaders of the green kind

The BRIDGE students engaged in an invasive species pull with their grade 2 buddies.
The pull allowed them to remove several large garbage bags full of the invasive plant along the
periphery of the forest adjacent to Maplewood Secondary School. Stan, Lester and Kevin cited
garlic mustard as a new concept and were more aware of the impact that it has on the
environment. Lester had never heard the term ‘garlic mustard’ before. However, after the garlic
mustard pull with his grade 2 buddy, he gained a greater awareness of the dangers of the plant
and the importance of ridding the forest of the species.

I never knew about it. In general, it is a pointy plant, and they kill native plants (Lester).
Not only did Kevin mention garlic mustard, he also recalled “that one beetle that is eating trees”.
The emerald ash borer is a significant threat in the area since much of the neighbourhood is
home to ash trees. Compared to their first interviews, the students were able to cite
environmental issues that were more localized.

Observations on the feelings of the beautiful and the bugs

Place-based learning involves developing an emotional connection with a place (Sobel, 2002). Kevin had a particular connection with the forest because he lives in the area and often
comes to the creek to explore and ride with his friends. On the first nature hike, he and Bruce
walked along the path and shared their experiences.
Kevin: I come out here on my dirtbike with my friends on the street.

Bruce: Yeah! I love dirtbiking as well, but I go to a different spot. But this would be a cool place to come.

Kevin: easy for me… I just live around the corner. We come here a lot.

Yolanda and another friend were more concerned about the bugs in the area which brought about a more negative image about the area.

Yolanda: I hate coming out here.. there are too many bugs around. Can we go back inside?

Throughout the study, Yolanda was not able to make much of a connection with Maple Valley Trail. She consistently complained of the heat and the bugs and wanted to go back inside. Although Yolanda would not get involved with any of the inquiry aspects of the creek study, she gladly took pictures of her peers as they worked through the investigation. Yolanda enjoyed the social nature of being outside as I observed her hurrying around taking digital photographs and immediately showing the photos to the students.

Students were able to determine the overall health of the stream by analysing the type of benthic macro invertebrates in the creek. Students recorded the data on their worksheets and plugged in the values into a counter that allowed a program to determine the overall health of the stream. Students found that the stream was somewhat impaired. Being out in the stream and seeing the effects of human activity brought out some emotional connections for the students. When they saw that the stream may not be healthy some of the students voiced their concerns which included worry and anger.

Well, a little sick, because that is alot of stuff that is put in there that shouldn’t be there (Bruce)

It made me kind of worried, when I saw all the stuff and when we went to paint the fish, when the lady told us about all the creek water and how dirty it was, it was like, I was a little worried. (Nate)
It made me feel disgusted because it all ends up in our drinking water and stuff. (Suzie)

Findings suggest that students were now more aware of the human impact of the creek. They understood that such pollution and garbage was not good and were also able to make connections between the immediate impact of the creek and where that pollution may end up.

Some students made reference to their emotional state when talking about other pollution types that affected Maple Valley Trail. Kevin expressed concern for animals when he talked about littering.

Tanya: How does it make you feel when you see that?

Kevin: Sad. Because I love animals. I have a dog.

Tanya: And you say that it makes you feel sad when you see stuff like that. Do you think there is anything that you can do to help?

Kevin: Like try not to litter and be good to be the environment like pick up after someone litters.

Bruce also expressed his emotion when talking about seeing how pollution affects the environment.

Kind of mad because they shouldn’t be dumping stuff in to the water that shouldn’t be dumped there. And all that stuff going into our food that was grown in the crops and those things blowing around…that’s not good for us. (Bruce)

Bruce has taken part in pond and street cleanup and feels ‘pretty disgusted’ about all of the trash that is being thrown on the ground. Bruce also gained a greater awareness of what does not belong in the creek. He realized that much of what people do around their house (wash their cars in the driveway, spraying their lawn with chemicals), has a negative impact on the creek.

Let “worries me” turn to worry free

According to Rickinson and Lundholm (2008), emotional responses to environmental subject matter affect people’s engagement level with learning activities. For example, if the subject matter is uninteresting for students, then they tend to ignore and not pay attention to it.
In this study, Yolanda was the only participant who constantly showed a ‘disinterest’ to environmental education and going outside. Aspects of the environment that concerned Yolanda included the heat, bugs and physical movement—she liked to sit in class and chat with her friends.

The attitudes of most students changed during the course of the study. They became more aware of local environmental issues and the impact that they have on nature. One important aspect about environmental education is sustainability—the fact that our resources should be sustainable for the use of future generations. Although the word “sustainability” was never used with this class, students still eluded to the future based on what they had learned over the course of the unit.

Tanya: And what sort of feelings do you have about helping the environment? Do you think it’s important?

Lester: Yah, because if we have fresh water and trees, shouldn’t our kids and grandkids have the same?

Lester was able to make the connection between human impact of today’s world and the consequences that future generations could encounter.

A study by Eagles and Demare (1999) found a correlation between positive environmental attitudes and discussion and home, watching films about nature and reading about the environment. Such a study suggests that there are many factors that contribute to environmental awareness. It is difficult to evaluate whether short term exposure to nature in this study was the exact cause of changing attitudes, but findings suggest that in the short term, it was certainly a factor. Students used their senses to experience the issue first hand.

Yolanda, Suzie and Kevin could not identify many of the species during the stream study, but knew common names for some animals such as water spider and crayfish. Although they had a lesson on dichotomous keys two days prior, they were still confused about how it worked.
They were not concerned since the EcoSpark facilitator was going to identify and count them, so they went on and intently watched the bugs move around in the container. According to Suzie,

   It really didn’t look like there were this many bugs in the creek before we started. It doesn’t look like anything is in there but there actually is. (Suzie)

Suzie realized that even such small critters had a home in the creek and unless you actually looked closely enough, you wouldn’t even know they were there. I proceeded to ask why this observation was important to which she responded

   Well, why would you try and help a creek if there was nothing in it? If you know something is in it that could get hurt then you could try. (Suzie)

According to Ballentyne et al (2001), experiences in nature are very effective ways of reaching students so that they can come away from the experience with an ‘environmental message’. Researchers stress that it is specifically those experiences that students have that allow them to visualize environmental impacts on the natural surroundings that are most effective. Being out in nature was effective for Suzie, since she didn’t realize prior to coming out that anything actually lived in the creek. Mr. Andy offered a similar perception:

   Pretty excited about the crayfish, not only that but the fish and calling each other over to see the cool fish they had seen in the water. I think for some of them they didn’t realize it was a living system. They just thought it was polluted and gross and that nothing would live here. So I think it was interesting for them to see what lives in that water and that there is fish and crayfish. That was pretty fun. (Mr. Andy)

Once students started taking a closer look at what was inside the water, they discovered that it did indeed contain life. This experience allowed Suzie and others to see first-hand that there are many organisms that live in the creek. Kevin agreed but Yolanda was impartial stating that she doesn’t like bugs anyways so who really cares?
After BRIDGE students had a chance to visualize the impacts of human activity on Maple Valley Trail, they worked with their grade 2 buddies to create the fish mural. This fish mural was a way of raising awareness of water issues in the local environment.

Frank offered the following about how the environment has changed based on a conversation with his mom.

Tanya: And what sort of feelings do you have about the creek not being clear?
Frank: Mad, because it’s dirty and years before, my mom showed me about how the water used to be and now there is lots of littering.
Tanya: And do you think you can help make a difference to help the environment?
Frank: Yah, I can probably tell the school to try and stop this everyone throwing everything around. Just keep it with you and throw it in the garbage. Also, if you see anything, just pick it up and throw it in the garbage….the rivers and lakes would be cleaner.

Frank was the only student that made a reference to talking about this issue outside of school. I was surprised because Frank found this topic so interesting; he continued the dialogue at home, sharing what he was learning with his family. It prompted me to wonder if other students were
talking to their families about the creek study. Such dialogues show how learning can continue outside of school.

Kevin also commented on the importance for the future. He enjoyed working with the grade 2 buddies doing the scavenger hunt. During that time, he was able to have conversations with his buddy related to pollution and what items can be found in nature.

Kevin: You can show them [grade 2 students] and tell them what’s bad for the environment and what’s good so that they can know what to do when they are older.

Kevin also made a connection to his personal life when talking about the polluted creek. He talked about the fact that he lives close to this creek and he and his dog go for walks here regularly. Kevin referred to the garbage and ‘yucky stuff” that surrounded Maple Valley Trail: “It’s my neighbourhood and my dog goes swimming in there and it’s all bad. I live around there.”

**To Help or Not to Help? That is the Question**

Place-based education involves engaging students investigating issues that are rooted in local places. Through a collaborative approach, BRIDGE students were able to identify problems associated with Maple Valley Trail. They studied the biological and physical characteristics of the area and engaged in activities that helped mitigate the problems. After the creek study, many students indicated that they would be more willing to urge others to ‘help’ the environment. All suggestions related to their experience in the creek. Students made reference to the garbage in the area and specific examples included telling others to stop littering, setting up extra trash bins, doing a clean-up of the area and create posters to educate others. In their journal responses, several students made reference to helping as a group.

We could go to the stream and pick up all the garbage and we could start a fundraiser to clean the streams. (Justin)
To help the stream, the class and I can go around and pick up all the garbage. Another way to help the stream is to put more garbage cans in around the trail so people won’t throw garbage in the stream. (Suzie)

Some suggestions I can make for me or my class are we clean up some of the stream and not litter. Some things I can do to help the stream is don’t put garbage on the road like put your garbage in the trash bin and the recycling (Lester)

Clean the stream; don’t litter; take out the bad bugs and replace them with good ones; rearrange the stream (Yolanda)

Tell people to help save the stream. As well, don’t litter in the stream, Tell city hall how bad the stream is. Make posters. (Stan)

I thing we can prevent the pollution by stop you friends from littering. You stop littering also. (Kevin)

I can try to tell people and stop littering and start cleaning our water. (Nate)

We can have one day that we all should clean it for one period to help out. (Bruce)

Don’t litter or pollute; recycle; reuse (Ted)

When I spoke with students during their post study interview, many of them also made reference to the fact that action can be taken to make the world a better place.

Tanya: So tell me something that you learned from the environment unit.

Kevin: I learned that..like one person’s idea can change a lot, like from the Stream of Dreams and the kids painting. They were happy and painting the fish and stuff.

Tanya: And when you say one person’s idea can change a lot..what did you mean by that?

Kevin: Like that little girl who like, didn’t like how the stream was and it turned all yucky in one night so she stopped it by painting fish and being aware.

Tanya: And now do you feel that you can do something? Based on that?

Kevin: I can’t change the whole world, but yah, I can help. I painted a fish too!

His response was based on a talk by a representative from Conservation Region who provided all students with a background to the Stream of Dreams program. The program began in BC when a resident family was horrified by the toxic waste dump that occurred in their local creek killing all of the wildlife within it. A painted wooden fish mural was created to raise
awareness of the polluted creek and reminded residents that their actions impact the natural surroundings. Based on what he learned, Kevin realized that one person can make a difference. He acknowledges that although he can’t do everything, he was inspired enough by the story to remember that one action.

However, increased awareness and familiarity with the environment does not necessarily translate into action. In this study, most students were unsure if they would continue to take action on their own. The actions in this study were planned for the students and they all had to participate as part of the unit. However, I question whether or not they would actually make the choice to do so on their own time. A longitudinal study could determine whether or not students made such choices after the study.

**Getting Outside: It’s Natural!**

Some of the students in this study reminisced about their childhood experiences outside. Many cited camping, hiking, going on picnics, cottages, fishing, swimming and going to the trailer as experiences that they either remembered and/or still take part in today. Consider the following excerpt from my first interview with Lester. He spends a great deal of time at the beginning of the interview sharing his experiences in the outdoors.

Tanya: Do you like to go outside on your own time that you like? What about with your family?

Lester: I ride my bike, go outside and go exploring with my friends. I go to 16 mile a lot.

Tanya: How often would you like to get out there?

Lester: More than recently than I am.

Tanya: Why do you like going out to the trails?

Lester: Because I like looking at the scenery, you don’t have to see all the houses and the cars.

Tanya: Do you think that is a bit of a problem?
Lester: Yeah, they are recently putting in a lot more houses.
Tanya: Where do you live?
Lester: By R-O-P-S. They are building way more houses out there.
Tanya: How do you feel about that?
Lester: I feel that it will be a lot more busier on the streets, like Toronto.
Tanya: Do you think that there will be an effect on the environment?
Lester: Maybe because there might be more littering and stuff..more cars.

Tanya: And you say that you like going out to the trails so that you don’t have to see the cars and houses and you like the scenery. How does it make you feel when you are out there?
Lester: Pretty good.

Lester continues to talk about a campground that his family has built close to Sudbury. He spends most of the summer up there with his family and he has developed many memories of the things that he and his grandpa have done together. When asked to elaborate on his experiences there he stated:

My grandpa showed me his BB guns, we go fishing a lot and boat riding and we explore a lot because there is a lot of caves and stuff. There is an old big copper mine by it.

(Lester)

In a study by Sebba (1997), children were asked to describe outdoor experiences that they engaged in. Many children wrote about what they saw (i.e. trees, clouds), heard (i.e. birds, silence), felt (warmth, cold) and smelled, indicating how aware children are of the events that they are consciously taking in by their senses. In her study (1997), the natural environment stimulated the senses, actions and feelings of the participants. A portion of Lester’s interview mirrored this claim. He spoke of how quiet it was without the noise from cars. He even compared the difference in air quality.
Tanya: Do you like the experience that you have up there with your family?

Lester: Yah, it’s more quiet and you can actually hear the birds and stuff without cars honking. Even the air is different. It is thicker down here than it is up there.

Suzie also spoke of her experiences growing up. She has gone camping with her family and uses their trailer in Muskoka. Suzie likes to fish, and rides her dad’s ‘4-wheeler’ up there. Locally, she likes to swim, hike and going for a bike ride in the woods.

Tanya: So what is it about the woods that you like?

Suzie: Exercising…listening to the birds and stuff. Sometimes I like going by myself because it’s more quieter so I go whenever I get a chance to. I like going there and I really know how to get around the forest because I’ve been there so many times.

Stan enjoyed spending time with his dad and fondly remembers camping, hiking, cliff diving, going to local conservation areas. He is proud of the fact that he knows so much about nature and its importance.

I think it’s important because it’s better than sitting inside and playing video games all day and you can go out and learn about the trees and how they grow and if you cut them down you can count the rings to tell how old there are [smiles and sits back, crossing his arms] (Stan)

When asked how important it is to learn about the environment, Stan recognized the fact that green spaces are on the decline.

I think it is very important because our ancestors, European, the pioneers, always used to live in the wilderness and nowadays there’s too many cities and there’s not enough places that you can go like Conservation Areas and stuff and some people live in Toronto and they have to drive long way to get there. They have to drive along way to get to those places. (Stan)

In Sebba’s study (1997), adults were asked to recount the nature of the environmental experience that sticks out in their mind the most. All participants related to their perceptual experience (what they saw, felt, heard, did) and less so about the reactions they had to the exposure. Farmer, Knapp and Benton (2007) examined the long term effects of an
environmental education field trip on grade 4 students. They found that after a year, the students still recalled what they saw and heard during the trip. They recalled many action verbs describing their experiences. Likewise, Stan, Suzie, Lester, Bruce and Kevin recall actions from their childhood experiences: exercising, biking, fishing, listening, swimming, riding, exploring and camping. Outdoor activity involves *active participation*. Active participation is linked to student achievement since students are engaged in their learning rather than passive involvement (Pratton & Hales, 1986).

Studies suggest that students were still not more likely than other students to take action for the natural environment (Eagles & Demare; 1999). They found that camping experiences did not change the environmental attitudes of some children. However, the children in their study already came with moderate levels of environmental attitudes, thus little impact was seen. Similarly in this study, Suzie, Lester, Bruce and Stan all had camping experience with family but were not more likely than other students to take action. My findings suggest that if parents and family provide opportunities for outdoor experiences with their children at a young age, students spoke fondly of those memories and provided me with more insight into their enjoyment outdoors by providing more descriptive data sets. They also had a greater awareness for the environment at the start of the unit than students with limited outdoor experiences. Further study could examine the correlation between previous outdoor experiences and whether or not that prior experience provides students with a more likely motivator for intrinsic motivation to learn.

**Summary**

Most students thoroughly enjoyed going outside to learn more about their local surroundings. The creek and forest provided a context for engaging in discussion about biodiversity and human impact on the environment. Throughout this study, students showed an
overall gain in knowledge about biodiversity and became more aware of local environmental issues such as chemical pollution that they had very little knowledge of before. Although reluctant and hesitant at first, partnering with grade 2 students from a local elementary school proved to be one of the most engaging parts of the environment unit. This opportunity allowed BRIDGE students to share their knowledge of the creek and forest with their grade 2 buddies. Through this experience, BRIDGE students gained a great deal of pride and felt good about themselves as leaders. The garlic mustard pull, creek clean up and Stream of Dreams program allowed the BRIDGE students and their Grade 2 buddies to engage in action that they may not otherwise have the opportunity to experience. As such, it is hoped that they take away their evolving knowledge and greater awareness for local environmental issues to engage in purposeful action beyond this study.

In the final chapter, I will discuss the implications of environmental place-based education for participants of this study by discussing the importance of preparing students for outdoor learning, integrating different subject areas, and providing opportunities for extension. I will discuss the significance of the study and conclude with a summary of relevant findings.
CHAPTER 7: STUDY IMPLICATIONS AND CONCLUSIONS

Place-based education is a pedagogical approach that involves taking students beyond classroom walls to experience learning. In this chapter, I address the implications for teaching and learning by addressing the importance of preparing students for outdoor learning and integrating different subject areas. Furthermore, I provide opportunities for extension activities that students could engage in after the trips. I then discuss the significance of the study to the students of Maplewood Secondary School and to the educational community at large. Finally, I conclude by summarizing the relevant findings of my research.

Preparing Students for Outdoor Learning

Field studies are an engaging way to introduce students to topics related to ecology as they have a positive impact on student views and interest towards scientific (ecological) concepts (Zoldosova & Prokop, 2006). Pedretti, Nazir, Tan, Bellamo and Ayyavoo (2012), found that many Ontario teachers believe that outdoor education plays a very important role in learning about the environment. However, such a pedagogical approach does not come with some hesitation around issues of student behaviour. Often teachers cite class management issues as a hindrance for taking students outside.

Behaviours tended to subside with each subsequent trip outside. During the first two outdoor experiences, chaos ensued as students attempted to run in different directions, play tag, jump or push each other into the creek. I was worried as to how students were going to behave when the Ecospark reps came for the stream study. Yolanda recalled that in her elementary school, one of her teachers brought the class back into the school once behaviours got out of control. Consequently, her class never went outside again.
Tanya: So you feel more comfortable inside because there’s people around to help you if there is a problem. Can you think of any lesson where someone took you outside?

Yolanda: No. We wouldn’t be able to go outside because all of our classmates would just go running around. We did it once…our language teacher I think in grade 5 or 6 she read a book to us outside once and we had to write down the connections or something. But people just would run around and throw out their papers

Tanya: Oh I see… Why do you think they were doing that when they were outside?

Yolanda: Because they were free outside so they wouldn’t care what the teacher would say or the consequences.

Tanya: That’s interesting…So how did that make you feel? Were you one of the people throwing stuff around? Or were you one of the ones that wanted to stay outside?

Yolanda: No I wanted to stay outside but after the people started throwing stuff around, we had to go inside and after that we went inside.

Tanya: That’s too bad. And what did she say? Did she give a specific reason as to why she took you back inside?

Yolanda: Because we didn’t do our work and fooling around we didn’t learn anything and by learning inside we’d be more focused and stuff.

When students in this study first went into the forested area, they were very poorly behaved. They ran around in every direction, yelled and screeched, played tag and tried to push each other into the water. After several exposures to the site, the students were much better behaved. Several factors may have affected this scenario. One aspect that may have impacted the effectiveness of the creek study is what Orion and Hofstein (1994) call the ‘novelty environment’. They suggest that there are three factors influencing students’ experiences in a ‘novelty environment’: cognitive, geographical and psychological novelty. Each is explained below.

1. Cognitive novelty: What concepts and skills do the students need to deal with during the activity?
Some of the concepts asked of the students during this study were too advanced. For example, all students had difficulty using the dichotomous key. Although they had one in-class period training with reading the key, they were confused about the species names (and could not enunciate them). Dichotomous keys are complex and first introduced in grade 11 biology. Teachers must ensure that the activity is appropriate for student abilities and grade level.

2. Geographical novelty: How familiar the students are with the field trip area (Maple Valley Creek)

Since the BRIDGE program is unique to the city of Maplewood, most students were bussed into Maplewood Secondary School. Only four students came from feeder schools and were familiar to the Maple Valley Creek area prior to the start of the school year. However, in the fall of 2011, Mr. Bill and Mr. Andy took the students out to the forest by the school to engage students in outdoor adventure activities. At that time, they built forts with materials that they found in the forest. Therefore, by the time students engaged in the creek study, they all had exposure to being outdoors in Maple Valley Trail (the forested area). No other field work was done prior to this study. In a study by Martin, Falk and Balling (1981), it was found that new learning tasks in novel environments are ‘poor settings’ compared to familiar learning environments. A recommendation in this study is that teachers must prepare students for outdoor learning by exposing them to that same environment multiple times to increase familiarity.

3. Psychological novelty: Students’ prior experiences with the outdoors as a fun adventure rather than a learning activity.

Based on analyses of interview transcripts, each student had a very different experience with prior outdoor experiences. Consequently, experiences gained by each student during the creek study were very different. Yolanda had very little exposure to being outside when she was
young and did not care for being outside during the study. However, she was aware of the importance of the study and chose to take on the role of a photographer and took pictures. Not having direct contact with the creek study may have impacted her knowledge of the inquiry process. Thus teachers could consider providing students with different roles based on their interest and background experiences.

It is also important that expectations (for an excursion) are clearly laid out for the students. Gibson, Bibby and Haines (2011) created an integrated outdoor learning environment for students which linked language arts, science and environmental education. Shortly after going outside, students became passive, fooled around and lost interest in the outdoor learning task. Upon reflection, teachers realized that they expected too much from the students who “didn’t know how to act together outside as a learning community” (p. 19). Hence, it is imperative that teachers take the time to establish rules and expectations when heading outdoors. However, they persevered and the “students had slowly accumulated outdoor experience and a comfort level that only time and incremental learning can bring” (p.19). In this study, debrief discussions allowed students to reflect upon their actions and suggest changes that would allow a less chaotic experience the next time. Each time the students went out, the behaviours decreased as students were given a purpose and role in the outdoor environment.

In another study by Orion and Hofstein (1991), it was found that grade 9 and 10 students were more influenced by the social and adventure aspects of a field trip than the learning that took place. In this study, all students in the class intrinsically sought out others to walk with and work with when they were outside. According to Orion and Hofstein (1991), preparing students for field trips will bridge the gap between what they expect to get out of the field trip and the reality of the trip itself.
Integrating Different Subject Areas

According to Lederman and Niess (1997), integrated instruction combines content from different subject areas to form a ‘seamless whole’ and is structured around problems that are relevant to student’s lives. The students in this class were considered ‘at-risk’ and needed a purpose to come to class. Tyack and Tobin (1994) state that conventional schooling is not efficient for those students who come from poor or immigrant families and based on my own experiences, this is also true for students who struggle academically. Consequently, developing meaningful opportunities for student learning and participation is essential for keeping them engaged and in school.

Beane (1995) advocates for a curriculum that is whole rather than fragmented. Integration of content areas allows for multiple intelligences to be utilized and thereby gaining more access to knowledge (Beane, 1995). The students in this study exhibit diverse learning styles, but most benefit from kinesthetic, visual and intrapersonal opportunities. Since many students lack self-confidence, they also benefit from collaborative learning.

The creek study was a contextualized learning activity that was relevant to student’s lives. Lessons allowed them to think about the impact that human actions have on the environment. According to Hargreaves, Earl, Moore and Manning (2001), contextualized questions provide opportunities for students to see how scientific knowledge and investigation can contribute to their understanding of local issues. How does pollution affect the stream and forest? How healthy is the stream? What are the implications? When curriculum is adapted to local issues, it more effectively meets the needs of all students (Hargreaves, Earl, Moore & Manning, 2001). BRIDGE students used principles from math, geography, language and science to collectively learn about water issues and take action to minimize the problem.
Providing Opportunities for Extension

When students saw how much garbage there was in the creek and forest, they wanted to come back and do a clean-up. The work that students did on the ecosystem prompted them to think about human impact on the natural environment. This is a route that many students use to walk to and from school. Consequently, learning about such issues does not have to stop once students have completed the investigations. There are many extension activities that can stem from work outside, for example:

- Participating in a town hall debate, representing several interest groups. How does the use of pesticides, fertilizer or other chemicals found in run off affect the local creek and forest?
- Encouraging partnership with the Town and local Conservation authority for long term monitoring of the ecosystem.
- Writing letters to the municipal government stating their views for and against possible development adjacent to the forest based on the data that they have generated
- Continuing the study on a yearly basis to document any changes in data.
- Visiting a local institution that deals with water issues to speak to scientists first hand
- Having a guest speaker come to the classroom to speak about their research and experiences.
- Discussing how investigation can be linked to the following disciplines: politics, economics, ethics, geography, law
- Organizing and extending the invitation for community members to take part in tree planting or clean-up activities along the creek bank.
- Analysing environmental issues from another cultural perspective (i.e. Aboriginal)

Extending activities will allow students to gain an even deeper understanding of environmental issues and provide them with more opportunities to learn more about taking action.

Significance of the Study

This study provides an understanding of how environmental place-based education impacts disengaged students. Participating students engaged in a series of place-based lessons
that allowed them to compare the biodiversity of a forest ecosystem and schoolyard, determine the overall health of a local creek and educate grade 2 students from a feeder elementary school. BRIDGE students and their grade 2 buddies worked together to find various objects in nature during a scavenger hunt, and take action with an invasive species pull and forest clean up. As a culminating activity, all participants helped facilitate the Stream of Dreams program. The BRIDGE students helped their grade 2 buddies paint wooden fish to mount on a chain link fence to raise awareness of watershed issues in their community.

This study found that environmental place-based education was beneficial for students. Students gained a greater awareness for environmental issues (specifically those that affected the local creek), adopted a more diverse vocabulary related to ecology and took opportunities to take action on environmental issues in their community.

Students in this program thrived on kinesthetic learning opportunities and thoroughly enjoyed being in the outdoors. However, it must be noted that students needed a sense of purpose for their ventures outside. Opportunities to just ‘go out and explore’ resulted in chaos, misbehavior and non-compliance. Guided inquiry such as the stream study allowed students to take on various roles and focus on the task at hand.

It is also worth noting that student behaviour changed for the better the more times they were exposed to the outdoors. The first few trips outside resulted in chaos, screaming, running, yelling, play fighting and jumping in the creek without respect for their surroundings. Once the novelty of being outside wore off, students were better able to understand their role. This note is important for teachers who take their students outside once, have a negative experience and then never take students out again.

This research study had direct practical benefits to the participating students, teachers and
The participating teachers took part in continuous learning opportunities as they were introduced to new pedagogy. Curriculum resources were developed by the teachers and implemented in the classroom. This experience can be shared with other teachers within the board.

Students also benefited from participating in this research. Students in this program had difficulty with traditional classroom activities such as reading and writing. Consequently, students acted out in a negative way during classes that involved such tasks. This particular group of students benefited from the experiential nature of the lessons and activities that were developed in the study. The students engaged in activities that promoted leadership skills, communication, teamwork, accountability and citizenship. They all looked forward to seeing their little buddies and felt a sense of pride as they became role models for the younger students. Students also took away more of an awareness and responsibility to act in order to help improve environmental conditions. Results can be used to promote such learning activities within other classrooms and regional programs as well.

Community-based partnerships were formed between the school and environmental organizations in order to help the participants gain a deeper understanding of local environmental issues. The local stream study attracted media attention and a photograph of one participant and a representative from EcoSpark was posted in the town newspaper. Such media attention portrays the high school in a positive manner as it highlighted the relevant work that students are doing to contribute to the EcoSpark database.

The knowledge gained by the participants was shared with students from a local elementary school and all partners involved engaged in the Stream of Dreams project which raised watershed awareness in the community surrounding the schools. This collaboration
opened up lines of communication between a high school and local feeder school, a significant step in creating positive relations between community schools.

As a result of the study, a Stream of Dreams fish mural was created in the spring of 2012 and placed along the fence line that is in close proximity to the tributary studied throughout the year, thereby impacting local community members as well. The student participants mentored and led the local elementary students through the Stream of Dreams project which was facilitated by the Regional Conservation Authority and symbolizes a lasting legacy in the community to improve water quality and to remind members of their environmental responsibilities.

In summary, case study research is particularly helpful when researchers want to know how and why things work in real life contexts. Results can inform the development of theory or add strength to what is already known in existing research. It is hoped that the results of this study will contribute to the field of environmental and place-based education, and will provide an important window into understanding how and why environmental and place-based education impacts student learning. The descriptions generated by case study research allow readers to take away ideas or concepts that can be applied or modified to suit their own practice.

**Concluding Remarks**

Place-based education allows students to use many of their senses to learn: touch, sight, smell and sound. Providing learning opportunities that appeal to a variety of learning styles will hopefully help students retain concepts and re-engage them in learning. By providing an authentic context for learning, students may be motivated and engaged as they make connections to the real world. Being outside helps students develop a greater appreciation for our natural environment thereby becoming more aware of the fragile state of our ecosystems and increases the likelihood to take action in the future.
REFERENCES


APPENDIX A: STUDENT CONSENT FORM

Dear Students:

I am a teacher at Maplewood Secondary School that is interested in working with your teachers to develop lessons related to environmental and outdoor learning. It has been shown that such lessons can increase your motivation to learn and make you more aware of environmental issues. I am also a graduate student at the University of Toronto who is interested in learning more about how outdoor learning impacts students.

In the first semester, I will work closely with Mr. Bill and Mr. Andy and community organizations such as Conservation Authority and City Green to develop hands-on lessons and activities that promote awareness of local environmental issues and outdoor spaces near the school. I am interested in whether or not outdoor learning has an impact on your knowledge and attitudes towards environmental issues and if it has an impact on your enthusiasm for school. I will collect information by interviewing you a few times throughout the year, looking at samples of your work and from my own observations within the classroom, which may include taking photographs while you are engaged in an activity. I will begin visiting the classroom once a week in order to get to know you and your peers and to observe classroom activities and interactions. I will interview you before the environmental activities begin and again when complete towards the end of May to document any changes in attitudes or knowledge that may have resulted from the experience.

Please remember that participation in this study is completely voluntary and that you may stop participating at any time. You can withdraw completely without providing me with any reason and without any penalty to your school work. Any decision (to participate or not) will have no effect on your academic or school performance. I will not be marking any of the work that you do. I am only interested in exploring your experiences, understandings and reactions to environmental and outdoor education. At any time, you can decline to answer any questions related to my research without negative consequences.

You will not be asked to take part in any activity that is considered above and beyond the regular activities that you may encounter on a daily basis. When going off of school property, a field trip permission form will be sent home for your parent or guardian to sign. You will not be exposed to harmful or dangerous situations such as extreme cold or storms as part of this study.

As the researcher of the study, I will be the only person who has access to the information that is collected. All data will be kept secure and confidential during the study (November 2011-June 2012) and for 5 additional years, in case of the possibility of future research. Your real name will never be used and your identity, along with that of the school, will remain confidential. Pseudonyms and general descriptors will be used during data collection and in the final report. I will not access any information from school records.

This study has been approved by your principal, the Appleton District School Board and
the University of Toronto. Conclusions drawn from this study may help support environmental and outdoor education initiatives within the board. Information may also be used for publication in a journal (all identities will remain confidential). A summary of my research findings will be submitted to Mr. Principal for you to access, if you wish.

I hope that you will consider participation in this study. If you have any questions, please feel free to contact any of the following people:

Tanya Williamson          Mr. Principal          Erminia Pedretti,
                          Erminia Pedretti,
                          Professor of Science Education
                          Thesis Research Supervisor

If you have any questions about your rights as participants in this study, please feel free to contact the Office of Research Ethics at the University of Toronto (ethics.review@utoronto.ca, 416-946-3273).

Sincerely,

Tanya Williamson
Teacher, Maplewood Secondary School
Graduate Student, University of Toronto.

Student name: _______________________________________

Date: _____________________________________________

Please check off the appropriate box and return this portion of the form to the school:

☐ I give permission for my participation in the study conducted by Tanya Williamson at Maplewood Secondary School.

☐ I do NOT give permission for my participation in the study conducted by Tanya Williamson at Maplewood Secondary School.

Signature of student: ____________________________________
Dear Parents/Guardians:

I am a graduate student at The University of Toronto/OISE and I am conducting a study on how environmental and outdoor education impacts student learning. I am also a teacher at Maplewood Secondary School who is working collaboratively with your child's teacher to engage them in outdoor learning. Past studies have shown that environment-based education can increase student achievement, engagement, and helps foster positive attitudes towards the natural environment.

This research will begin in December 2011 and continue until June 2012. In the first semester, I will work closely with Mr. Bill and Mr. Andy in the BRIDGE program and community organizations such as Conservation Authority and City Green to develop hands-on lessons and activities that promote the awareness of local environmental issues and outdoor spaces adjacent to the school grounds. I am interested in documenting how participating students react and respond to such lessons using a variety of tools: student interviews, samples of student work and my own observations within the classroom, which may include taking photographs while your child is engaged in an activity. I will begin visiting the classroom once a week in the early stages of the study to develop a rapport with the students and to observe classroom activities and interactions. I will interview your child before the environmental activities begin and again when complete towards the end of May to document any changes in attitudes or knowledge that may have resulted from the experience.

Please be advised that participation in this study is completely voluntary and that your child may discontinue his or her participation at any time, and withdraw completely without reason, and without penalty. Please note that any decision (to participate or not) will have no effect on your child's academic or school performance. There is no evaluative component to this research; instead, I am interested in exploring their experiences, understandings and reactions to environmental and outdoor education. At any time, your child can decline to answer any questions related to my research without negative consequences. Your child's input and identity will remain confidential at all times and I will not access any information from school records.

Your child will not be asked to engage in any activity that is considered above and beyond the regular activities that he or she may engage in on a daily basis. When conducting activities off of school property, a field trip permission form will be sent home for you to sign. Your child will not be exposed to harmful or dangerous situations in this study (i.e. severe weather risks for outdoor lessons).

As the researcher, I will have sole access to the data that is collected. Data will not be shared with the community partners involved in the study. All data will be kept secure and confidential for the duration of the study and for 5 additional years, in case of the possibility of future research. Your child's identity will remain confidential through the use of pseudonyms and generic descriptors will be used to describe the location of the school, setting and program.
This study has been approved by the Ethics Review Board at the University of Toronto, the Research Advisory Committee at the Appleton District School Board and subsequently, the school principal. Conclusions drawn from this study may help support environmental and outdoor education initiatives within the board and upon completion, a summary of my research findings will be submitted to Mr. Principal for you to access, if desired.

I greatly appreciate you considering the participation of your child in this study. Should you have further questions or concerns, please feel free to contact the following people:

Tanya Williamson
Mr. Principal
Erminia Pedretti,
Professor of Science Education,
Thesis Supervisor

If you have any questions about your rights as participants in this study, please feel free to contact the Office of Research Ethics at the University of Toronto (ethics.review@utoronto.ca, 416-946-3273).

Sincerely,

Tanya Williamson
Teacher, Maplewood Secondary School
Graduate Student, University of Toronto.

Child's name: ________________________________________
Date: ______________________________________

Please check off the appropriate box and return this portion of the form to the school by Dec. 22.

I give permission for my child to participate in the study conducted by Tanya Williamson at Maplewood Secondary School.

I do NOT give permission for my child to participate in the study conducted by Tanya Williamson at Maplewood Secondary School.

Signature of Parent/Guardian: ________________________________

Additional comments/concerns: (optional)
APPENDIX C: BRIDGE PROGRAM REFERRAL FORM

BRIDGE PROGRAM

This form is confidential. For Student Services purposes only.

STUDENT: ________________________ STUDENT NUMBER: ________________________
D.O.B. _______________ ELEMENTARY SCHOOL: ________________________________
PERSON MAKING REFERRAL: ________________________ ROLE: __________________

EDUCATIONAL BACKGROUND:

BOARD IDENTIFICATION #: __________________ PSYCH. ED. CONSULTANT: ______________
DATE OF LAST ASSESSMENT: ______________ TYPE OF ASSESSMENT: ______________
BOARD PURCHASED EQUIPMENT: LAPTOP, etc. ________________________________

Brief explanation as to why you think the BRIDGE program is a good fit for this student:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Key Recommendations of Educational Assessment:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Intervention Strategies provided to date:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Attendance:  Comment on attendance patterns you see.


Educational Goals/Plan: (Parents’ expectations)


PERSONAL BACKGROUND

Family issues or concerns: (please indicate with whom the student is living; ie. Both parents, Mom , Dad  etc…


Involvement of community agencies:


SOCIAL SKILLS:

Please describe the student in terms of social interaction with peers and staff.


READING GRADE LEVEL  


WRITING GRADE LEVEL  


NUMERACY GRADE LEVEL  


(DRA SCORES HELPFUL ALONG WITH GRADE LEVEL)

Strategies used successfully to work with the student:
APPENDIX D: INTERVIEW PROTOCOL (PRE AND POST STUDY) FOR STUDENTS

First Interview Questions: Student (Pre-study)

I will introduce myself as the researcher and once again, briefly outline the purpose of the interview. I will thank he/she for agreeing to be interviewed about environmental and outdoor learning. Ask the participant if he/she minds being recorded for ease of transcription. A student may pass on any question, or discontinue the interview at any time.

Reassure the interviewee that the comments from this interview will be kept confidential. Ask participant to create his/her own pseudonym.

Part 1: Introduction:

How are you enjoying your year so far? Tell me about the subjects that you like to learn about and what it is about them that you like.

- Tell me a little bit about yourself. What are your interests? What sort of activities are you engaged in outside of school?
- What have your experiences been like in the outdoors? Tell me about any connections that you have with outdoor spaces.

PROMPTS: forts, forests, hide and seek as a child, camping, cottages

Part 2: School Experiences

- In general, how have your school experiences been? Can you recall a series of lessons that you really enjoyed? Describe those lessons. How do you feel that you learn best?
- Why have you have selected to come to this program? What do you hope to gain from the experience?
- Describe any lessons or activities that you have done in the past that relate to the environment. What did you like or dislike about them?
- What does environmental education mean to you?
- Describe any lessons or activities that you have done in the past that related to outdoor learning. What did you like or dislike about them?
- Have you ever heard of the term place-based education? What does it mean to you?
Part 3: Environmental Issues

- How knowledgeable do you feel about the environment? (Probe as to why). Where or how did you learn about what you know?

- How important do you think it is to learn about the environment? Why do you think this? What sort of environmental issues do you think are most relevant?

Prompts: global vs. local issues

- What sort of feelings do you have about conserving the environment? Do you feel that you can make a difference? If so, how? What sort of skills do you think are needed to make a difference?

- Have you ever been involved in community projects related to the environment? Tell me about those experiences. If you have not been involved in any sort of project, why not?

- Can you think of any issues that affect our local environment? Why do you think that they are important?

Thank participant for being interviewed.
Second Interview Questions: Student (Post-study)

I will introduce myself as the researcher and once again, briefly outline the purpose of the interview. I will thank he/she for agreeing to be interviewed about environmental and outdoor learning. Ask the participant if he/she minds being recorded for ease of transcription. A student may pass on any question, or discontinue the interview at any time.

Reassure the interviewee that the comments from this interview will be kept confidential.

Part 1: Introductions
• Tell me about you school year thus far? Can you elaborate on that?
• Describe the subjects that you liked this past year. Why do you like those subjects?
• Thanks for agreeing to be interviewed about environmental education and place-based education. Now that you have had some experience with these terms, what do they mean to you?

Part 2: School Experience and the BRIDGE Program
• In general, how have your school experiences been this past year? Can you recall a series of lessons that you really enjoyed? Tell me about those lessons.
• Tell me a little as to why you have selected to come to this program? What were your expectations? Have they been met?
• What aspects of the program did you like? Dislike?

Part 3: Environmental Education and Outdoor Learning
• Know that you have completed the unit, how knowledgeable do you feel about the environment? (Probe as to why). Where or how did you learn about what you know?
• How important do you think it is to learn about the environment? Why do you think this? What sort of environmental issues do you think are most relevant?
• How did you find the outdoor learning experiences this past year? Tell me about any connections that you may have developed.
• How did these experiences compare to learning in a classroom setting? Please elaborate.
• Please give me a few examples of lessons that have stuck out in your mind this past year. How did they affect your desire to learn? Did they satisfy your learning style? Why or why not?
- What sort of feelings do you have about conserving the environment? Do you feel that you can make a difference? If so, what? What sort of skills do you think are needed to make a difference?

- What are your thoughts on the community projects that you took part in? Describe your experiences. How did they make you feel?

- Can you think of any issues that affect our local environment? Why do you think that they are important?

- Would you recommend outdoor learning experiences to other students and teachers? Why or why not?

Thank participant for being interviewed.
APPENDIX E: INTERVIEW PROTOCOL (PRE AND POST STUDY) FOR TEACHERS

First Interview Questions: TEACHER (Pre-study)

I will introduce myself as the researcher and once again, briefly outline the purpose of the interview. I will thank he/she for agreeing to be interviewed about environmental and outdoor learning. Ask the participant if he/she minds being recorded for ease of transcription. Participant may pass on any question, or discontinue the interview at any time.

Reassure the interviewee that the comments from this interview will be kept confidential. Ask participant to create his/her own pseudonym.

Part 1: Introduction

- How long have you been teaching?
- What subjects do you teach and what grade levels have you taught?
- Could you tell me a bit about the type of students/program that you teach in?
- Could you provide me with some insight as to why you have agreed to take part in this study?
- Any other information that you'd like to share with me at this time?
- Describe any experiences that you have had in the outdoors. Were they memorable? Why or why not?

Part 2: Environment-based Education

- Have you ever been involved in an activity/lesson/trip that has taken students outside of the classroom into a natural setting? Please describe your experiences.
- Describe the purpose of the activity. What were you expecting to accomplish with the students?
- Could you please describe the type of experience the students had?

PROMPTS: probe about student motivation, successful interactions, behaviour, situations that would foster or impede learning. Ask participant why the trip was (or not) successful.

- How did you feel overall regarding the activity that students were engaged in (from Q2)?
- How often do you take your students beyond the classroom walls to experience learning?
• Have you ever heard of the term environment or place-based education and what does it mean to you?

• How much emphasis should outdoor learning receive in classrooms? What about environmental education?

• How do you perceive this group of students will respond to place-based education?

• What challenges do you anticipate? If any?

PROMPTS: probe about classroom management, student buy in

• How do you feel that place based learning compares to a traditional classroom setting?

PROMPTS: type of learning that occurs (passive vs. Active), student attention/motivation (intrinsic vs. Extrinsic), classroom structure, self-confidence, freedom of choice

• How important do you feel that place-based learning is for educational purposes?
• What are your thoughts on community partnerships within your program? Thank participant for agreeing to conduct the interview.
Second Interview Questions: TEACHER (Post-study)

I will introduce myself as the researcher and once again, briefly outline the purpose of the interview. I will thank he/she for agreeing to be interviewed about environmental education and place-based learning. Ask the participant if he/she minds being recorded for ease of transcription. Participant may pass on any question, or discontinue the interview at any time.

Reassure the interviewee that the comments from this interview will be kept confidential.

Reflecting Upon the Year

- How did you think this past year went? Describe your overall experience.

- Were there any particular lessons or activities that you feel went well? That did not go so well? Please elaborate.

- Describe the behaviours, attitudes and motivation of the students during the above mentioned activities. What expectations did you have for the lesson? Did you accomplish what you set out to do?

- Please comment on the effectiveness of using place-based education as a teaching tool. Would you recommend this approach to other teachers? Why or why not?

- How do you think that the students responded to place-based education? Compare to a traditional classroom setting.

- What challenges did you face using this approach? Please describe them. What would you do differently (if anything)?

- What will environmental place-based education look like in your course next year?

- How much emphasis should outdoor learning receive in a classroom?

- How important do you feel that place-based learning is for educational purposes?

- What are your thoughts on the community partnership that was implemented in the program? How do you feel the students responded to it?

Thank participant for agreeing to conduct the interview.