The Power of Narrative in Developing an Environmental Ethic

This undergraduate thesis has been submitted in partial fulfillment of the A.B Environmental Studies Degree

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Signature

This thesis has been accepted in partial fulfillment of the A.B Environmental Studies degree.

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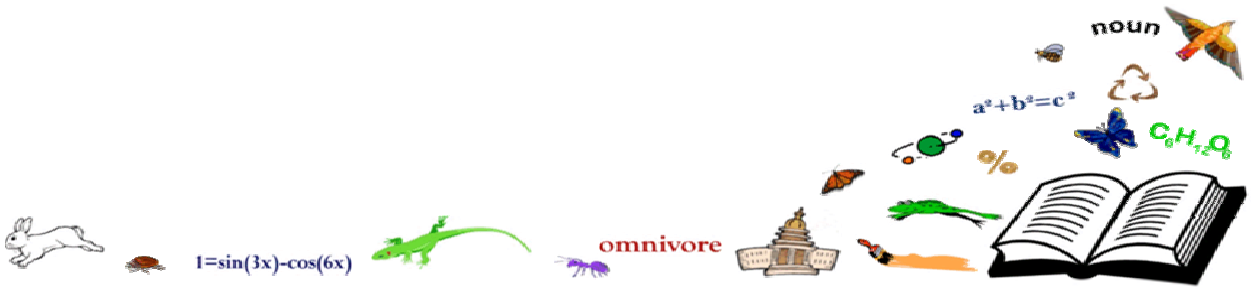

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Yesssssssssss!

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TLP 22 – At first I thought this isn't the time, place for such things, but I may or may not just have to…there are no words – well, besides crazy-amazingness, meant-to-be-itude, magic…ok so maybe there are some. You know – more than anyone – here and now because of you. I for one cant even believe it. ☺

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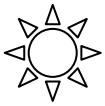

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Abstract

The Power of Narrative in Developing an Environmental Ethic

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This study explored the role of narrative in developing an environmental ethic by creating narrative-based environmental education curriculum and assessing student response.

As our growing human population continues to impact environmental health and natural resources, **environmental education**, or "*increasing people's knowledge and awareness about the environment … and fostering attitudes, motivations, and commitments to make informed decisions and take responsible action*" (UNESCO, Tbilisi Declaration, 1977), becomes critical.

The state of environmental education in America requires improvement and expansion. Despite the barriers, integrating environmental education curricula into existing elementary and other levels of formal education is both appropriate and advantageous.

Inherent in environmental education is the concept of an **environmental ethic**. A number of disciplines discuss and define an 'environmental ethic.' This descriptive study looked at the power of **narrative,** or story, in developing this environmental ethic.

Central question: Does a very narrative-based environmental education curriculum lead to some nascent development of an environmental ethic in third graders?

In order to examine this question, I developed and taught a three-week curriculum integrating science, literature, art and performance. The study took place at Maple Glenn Elementary School in Upper Dublin, Pennsylvania. Qualitative research methods, including observation, informal interviews, and analysis of written work, were used in analyzing the findings.

This particular curriculum-based research project illustrates the possibility that with a narrative based approach, in a short period of time; it is possible to see changes in what we call an environmental ethic. Although no single task or finding shows proof, taken as a whole, the ethnographic data show an overall influence of curriculum content in several students' environmental ethic. The findings suggest that an environmental education curriculum strong in narrative is a powerful tool in teaching children a specific environmental ethic.

Introduction

This study looks at the power of narrative in developing an environmental ethic in children. Within effective environmental education, an environmental or conservation ethic is found. This thesis looks at the role that narrative plays in developing a nascent environmental ethic in third graders. Several theoretical models informed my research, including narrative theory, moral development theory, learning theory (Bruner's Spiral Curriculum and Bloom's Taxonomy), and theories of education reform.

> *"A conservation ethic is that which aims to pass on to future generations the best part of the nonhuman world. To know this world is to gain a proprietary attachment to it. To know it well is to love and take responsibility for it."* (Edward O. Wilson, 2002)

THE STATE OF THE ENVIRONMENT

Once upon a time there was a beauuutiful planet, called Earth. This is a story about the planet Earth and one form of its life, called people… (Taken from an original narrative written for this thesis, 4/21/2004).

The current scientific narrative about the planet Earth tells of an ecosystem in crisis, undergoing great change. It is generally agreed upon that people are effecting such change (D. Orr, 1993). E. O. Wilson, referring to humans as "*bulge-headed paragons*," points a clear finger at our destruction of the Earth (E.O. Wilson, 2002). While some still see the narrative as fiction (H.L. Reynolds, 2003), it is widely accepted that humans are impacting life on Earth.

PUBLIC KNOWLEDGE OF THE EARTH

The people who lived on the planet knew a lot about a lot of things, yet when it came to knowing about the Earth, well, that left something to be desired.

The National Science Foundation performs periodic surveys on public knowledge of science in the United States. Consistent with surveys over the past twenty years, the

results of the *2002 Survey by the National Science Foundation, Science and Engineering Indicators*, found an overall low level of basic science knowledge in the United States. For example, while 75 percent of adults know that the Earth goes around the Sun, only 54 percent understands the earth goes around the sun once a year. The survey also found that more than half, 52 percent of adults, believes humans lived at the same time as the dinosaurs (NSF Survey, 2001).

> *"In the end we will conserve only what we love, we will love only what we understand; and we will understand only what we are taught."* (Baba Dioum, Senegalese ecologist)

Assessment of the scientific knowledge of American students has found inadequacy in students' knowledge as well. Performance on the Third International Mathematics and Science Study (TIMSS) by the International Study Center, 1995, found that as the grade level increases, US students tend to fall below international averages and decrease in performance.

ENVIRONMENTAL EDUCATION

People from around the planet came together to talk about what was happening, in order to figure out what to do. They came away from that talk with a plan. It was time to begin teaching others about what was going on around them. They called this kind of teaching environmental education.

> *"'Environmental education' can be described as instruction directed toward developing a citizenry prepared to live well in a place without destroying it." (D. Orr, 1994)*

In 1977, the first intergovernmental conference on environmental education, convened in Tbilisi, Georgia (USSR), under the organization of UNESCO in cooperation with the U.N. Environment Program (UNEP). Here, the guiding principles and framework of environmental education were set down.

The Tbilisi Declaration defines environmental education as:

> A learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address these challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1977).

The declaration also outlined five categories of objectives for environmental education as seen in figure 1:

Figure 1: Environmental Education Objectives

1. Awareness and sensitivity to the environment and environmental challenges
2. Knowledge and understanding of the environment and environmental challenges
3. Attitudes of concern for the environment and a motivation to improve or maintain environmental quality
4. Skills to identify and help resolve environmental challenges
5. Participation in activities that lead to the resolution of environmental challenges

(UNESCO, 1978)

A Brief History of Environmental Education in the U.S.

The need for education about the environment has a century long history. It became more salient with Rachel Carson's book Silent Spring, published in 1962.[1] Prominent among federal education initiatives were the National Environmental Policy Act of 1969 and the National Environmental Education Act of 1970, both of which identified education as a mechanism for improving the quality of the human environment. In his Environmental Message to Congress in 1970, President Richard Nixon promoted the "…development and teaching of environmental concepts at every point in the educational process," and the first National Environmental Education Act authorizing the creation of the office of Environmental Education and the National Advisory Council for Environmental Education. The act, however, failed to describe a suitable place for environmental education within this country's educational structure.

On November 16, 1990, President George Bush Sr. signed into law the National Environmental Education Act. The National Environmental Education Act of 1990 presented the U.S. Environmental Protection Agency (EPA) its first Congressional

mandate to strengthen and expand environmental education as an integral part of its mission to protect the environment (USEPA Report, 1996).

In December of 1996, The National Environmental Education Advisory Council of the U.S. EPA reported, "Environmental education must become a priority at the local, state, national, and international level so that—as a nation and as leaders in an increasingly interdependent world—we can make balanced decisions that address the complex social, political, economic, and environmental issues of our time. The members of this Council believe that to ensure a sustainable future we must all work together to make environmental education a priority now" (USEPA Report, 1996).

> *"Since all members of society depend on natural resources to survive, and the availability of these resources has limits, it is essential that the public understand the importance of the environment to their quality of life and that they have the knowledge, tools, and ethic to live sustainably."* (US Environmental Protection Agency, 1996)

Environmental Education Today

So they made programs and tried to teach, but when the questioners looked around at what was happening in the United States, they found that these plans and programs were not working.

According to the North American Association for Environmental Education (NAAEE), the programs and activities subsequently created after the Tbilisi Declaration, *"…lacked a clear direction, were inconsistent or failed to achieve the goals set forth."*

In 1997, the Independent Commission on Environmental Education (ICEE) published a controversial report assessing U.S. environmental education materials. The study was conducted due to the increasing national concern over the state of science education in the U.S. The study reviewed approximately 100 widely used and recommended environmental education materials, investigating whether

> *"By the time a student reaches college, environmental education, if it happens at all, is mostly remedial."* David Orr

or not they presented an accurate state of scientific knowledge. The results were overwhelmingly negative.

Some of the key findings included:

- Environmental education materials often fail to prepare students to deal with controversial environmental issues.
- Factual errors are common in many environmental education materials and textbooks.
- Environmental education materials often do not provide a framework for progressive building of knowledge.

Despite the shortcomings, there are some strides being made in Environmental Education. Two K-12 Environmental Education Curricula demonstrated the highest standard of excellence as assessed by the ICEE report. These were Project Learning Tree by the American Forest Foundation and Project WILD by the Californian Department of Fish and Game. The curriculum's strengths, as reviewed under the North American Association for Environmental Education (NAAEE) guidelines, include the encouragement of students to think about stewardship and personal ethics, and the promotion of a sense of personal stake in the environment and the effects of action.

Children's Environmental Education: Barriers and Benefits

State Standards and Curricula

"Teach your children about what is happening to life!" they said. "But there is no time," the teachers responded, "my children can not even read and do math!"

Despite the wealth of programs and materials, widespread support and funding for environmental education is often lacking. Environmental education is not a clear priority at any level within our education system or society, and many programs face on-going resource, funding, and staff limitations. In addition, many view environmental education as an "add-on" and not part of mainstream education (USEPA Report, 1996).

With increased pressure to meet states academic standards educators do not have time for additional curricula. However, Effective environmental education may enhance rather than displace the existing curriculum. Studies by the Association for Supervision and

Curriculum Development (ASCD) have found that environmental education integrated into the curriculum can help students to meet state academic standards (*Advancing Education Through Environmental Literacy*, USEPA, Association for Supervision and Curriculum Development, 2003).

Learning about the environment is often memorable and effective, and can help promote overall academic excellence. Environmental education provides an opportunity to strengthen teaching in many core subjects, especially science, because it is the basis for solving many of our environmental challenges. Environmental education also provides an opportunity to strengthen interdisciplinary teaching because environmental topics can be addressed from many different perspectives, including scientific, historical, cultural, and political perspectives. Finally, environmental education can provide an important opportunity for teachers to bring actual local environmental challenges into the classroom for discussion and problem solving (USEPA Report, 1996). A 1993 federal interagency report on environmental education and training concluded that: *" . . . infusing environmental education into all subject areas can lead to overall improvements in the educational system, including improvements in teaching the core subjects."*

> *"Environmental education is ahead as a field that develops the skills for life problem solving in general."* (C. Basile, 2000)

Bruner's Spiral Curriculum

Complex environmental concepts may initially seem too difficult to introduce at a young age. However, learning theorist, Jerome Bruner disagrees, proposing, *"Any subject can be taught to any child at any age in some form that is honest."* (Bruner, 1996) He argues that schools have wasted a great deal of people's time by postponing the teaching of important areas because they are deemed 'too difficult.' (Bruner, 1996) This is based on his concept of the '*spiral curriculum*,' where *"in teaching a subject, you begin with an 'intuitive' account that is well within the reach of a student, and then circle back later to a more formal or highly structures account,"* until, *"with however many more recyclings are necessary, the*

> *"Any subject can be taught to any child at any age in some form that is honest."* (Bruner, 1996)

learner has mastered the topic or subject in its full generative power" (Bruner, 1996).

In this way learning is an active process in which learners construct new ideas or concepts based upon their current and past knowledge. The task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding (Bruner, 1996).

A Child's Natural Curiosity

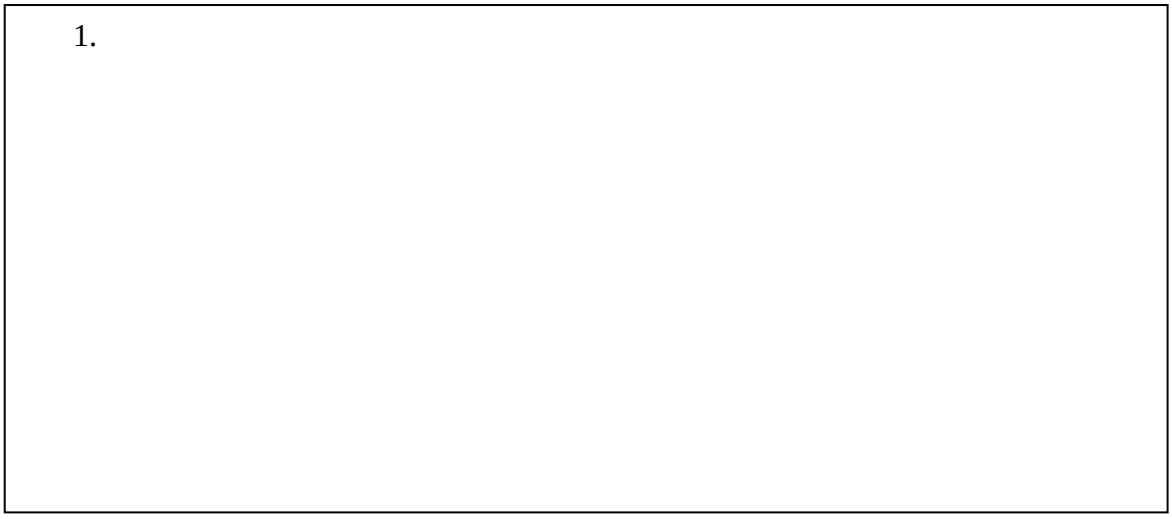
There are many who comment on a young child's receptivity to learn from the natural world. R. Gagne, in his *Conditions of Learning*, emphasizes the importance of a child's receptivity to the subject and of gaining their attention in order for learning to occur. Young children have a natural appreciation and curiosity for nature, or as Rachel Carson calls it, "A Sense of Wonder."

In Rachel Carson's *The Sense of Wonder*, she uses descriptions of her nephew's innate curiosity and enthusiasm for the natural environment and his ability to learn and grasp complex ecological knowledge, to generalize about the ability and character of children. *"Once the emotions have been aroused—a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love—then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning"* (R. Carson, 1998).

Environmental education involves values and moral issues as well as scientific knowledge.[2] Environmental education teaches about human relationships and about interactions between people and environments (M. Caduto, 1998). It encompasses the basic environmental ethic of interdependence, as it "requires viewing human beings as one part of the natural world and human cultures as an outgrowth of interactions between species and particular places" (Smith and Williams, 1999). Inherent in environmental education is the concept of an environmental ethic.

What is an environmental ethic? There is no one definition. A number of disciplines discuss and define an 'environmental ethic.' There is an entire academic field of study called Environmental Ethics.[3] For the purposes of this study I have tried to synthesis these discussions to make a useful definition within the concept of children's environmental education.

Figure 2: Working Definition of an Environmental Ethic



Children's Moral Development

Jean Piaget, a Swiss psychologist, observed human development as progressive stages of cognitive development. His four stages, which commence at infancy and progress into adulthood, characterize the cognitive abilities necessary at each stage to construct meaning of ones environment. Based on his observations of children's application of rules when playing, Piaget determined that morality could be considered a developmental process. Piaget's four main cognitive stages are the Sensorimotor, Preoperational, concrete operational, and formal operations. He also defines Heteronomous Morality (pre-school years) and Autonomous Morality (school years) as the two stages of moral reasoning.

However, based on empirical studies, Carol Gilligan reported a significant degree of correlation between gender and moral orientation. According to her early writings, males are characteristically concerned with substantive moral matters of justice, rights, autonomy and individuation. In their moral reasoning, they tend to rely on abstract principles and to seek universality of scope. Women, by contrast, are more often concerned with substantive moral matters of care, personal relationships and avoiding hurt to others. They tend to avoid abstract principles and universalist pretensions and to focus instead on contextual detail and interpersonal emotional responsiveness (M. Friedman, 2000).

The students in third grade are generally found to be at the Concrete Operational Stage, which is characterized by logical thinking about the concrete world and the ability to understand rules of physical reality. The concrete operational stage is the third stage in Piaget's theory. This stage typically occurs between the ages of 7 and 12. During this stage, the child begins to reason logically, and organize thoughts coherently. During this stage, the child begins to move out of the Objective Morality or Moral Realism stage of moral reasoning (valuing the letter of the law above the purpose of the law). They are moving towards the more advanced form of moral reasoning, called Subjective Morality or Autonomous Morality, where they consider the motives and intentions behind actions, and not simply the outcome. This stage is also characterized by a loss of egocentric thinking. Shauna Adams defines Egocentrism as the inability to simultaneously take into

account his or her own view of things with the perspective of someone else. Egocentrism leads children to project their own thoughts and wishes onto others.

Children's Conception of Environment

In a study by Loughland and colleagues, school children's answers to the question 'I think the word/term environment means…' were analyzed. Six distinct conceptions were isolated, ranging from least sophisticated 'environment as a place' to the most inclusive and expansive 'environment and people in a relationship of mutual sustainability.' It was found that the main qualitative difference among the conceptions was: understanding the environment as an object or as a relation between people and the environment; Also, significantly, the least sophisticated and the most sophisticated conceptions were found across the entire sample at all levels of primary and secondary education. This study found that, in general, the majority of young people see the environment as 'something out there' – a place, possibly including living plants and animals, but essentially separate from themselves (T. Loughland, et al., 2002). Only a minority (about one in eight) sees the environment from a relational point of view—something, which supports and enhances their living, and which in turn requires their care and support. [4]

What is Narrative?

For the purposes this study, I will be using the words 'narrative' and 'story' interchangeably. A narrative or story, in its broadest sense, is anything told or recounted; more narrowly, something told or recounted in the form of a causally linked set of events. Establishing that something is a part of a whole and, usually, that something is the cause of something else creates narrative meaning. To say what something means is to say how it is related or connected to something else. To ask the meaning of an event is to ask how it contributed to the story in which it occurs. It is the connections or relations between events (S. Denning, 2000).

> Narrative is *"a mode of thinking, a structure for organizing our knowledge, and a vehicle in the process of education, particularly in science education." (*Jerome Bruner, *The Culture of Education,* 1996*)*

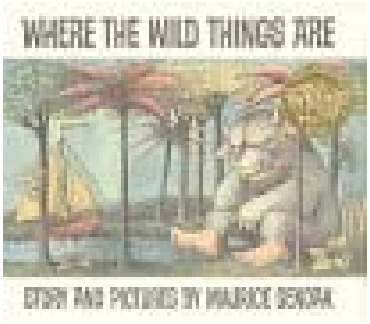
Why use narrative as the tool in developing this ethic?

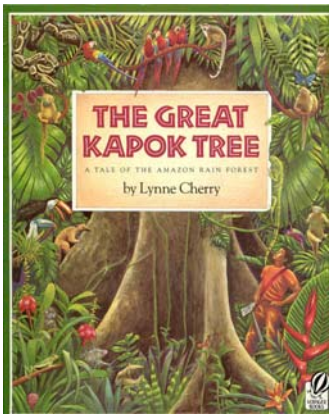
Stories are the way in which we first experience and make sense of the world. Humans are *"storytelling organisms who, individually and socially, lead storied lives. The study of narrative, therefore, is the study of the way humans experience the world"* (Connelly and Clandinin, 1990). A 1998 study by Gabriella Paprotna found that Children of pre-school age most frequently understand and define ecological concepts by story telling. It makes sense then to use the child's natural way of thinking to convey, understand and express more complex ideas about the environment. Establishing that something is a part of a whole and, usually, that something is the cause of something else creates narrative meaning.

> *"Stories fill our lives in the way that water fills the lives of fish. Stories are so all pervasive that we practically cease to be aware of them."* (S. Denning)

Children's Stories

In “The Uses of Enchantment,” Bruno Bettelheim explores the meaning and importance of fairy tales in a child’s development and maturity. He shows the crucial role that imagination and stories (fairy tales) play in creating meaning and understanding for the child. Too often children are expected to ‘grow-up’ and understand reality, when the real value and intelligence lies in the creative power of the imagination. (Bettelheim, 1977) Just as Maurice Sendak speaks to the wild places in our hearts, and Harold’s purple crayon carries us far and wide, environmental stories play an equally important role in child development.





The following curriculum was developed based on these principles of environmental education, environmental ethics and the use of narrative. Several tools were used in assessing the student response, as expressed in the methodology.

Methodology

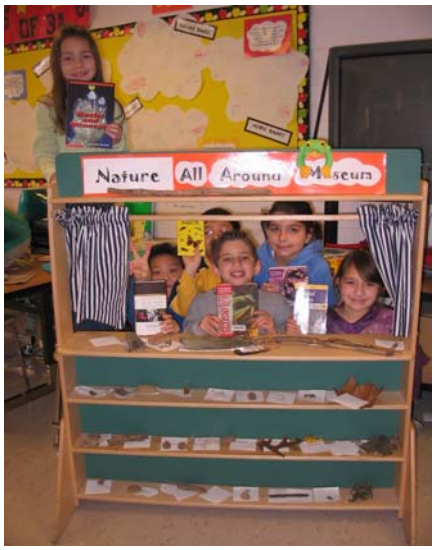
CENTRAL RESEARCH QUESTION

This was a descriptive, qualitative study, in which I asked the question: Does a very narrative-based environmental education curriculum lead to some nascent development of an environmental ethic in third graders?

In order to examine this question, I developed and taught a three-week curriculum integrating science, literature, art and performance. The study took place at Maple Glenn Elementary School in Upper Dublin, Pennsylvania.[5] The unit lasted from January 6 to January 23, 2004.

PARTICIPANTS

The participants were the third grade, section 3A, at Maple Glenn Elementary School in Upper Dublin, Pennsylvania. There were twenty-one students who participated in the unit I designed on 'environmental storytelling.' The 9 girls and 12 boys were all either age 8 or 9, and came from a middle-upper class suburban neighborhood. Eighteen of the twenty-one students were Caucasian, and three were Asian. Despite the gender-based dichotomy in moral development theory, the students mostly fell into Piaget's Concrete Operational Stage of development.



DESIGNING THE CURRICULUM

My stated goal for the three week curriculum was as follows: By building on an innate appreciation for nature, the child will begin to develop the concept of being in a relationship with the environment, and possibly, a mutually sustainable one.

The first part of the curriculum was intended to peak the student's interest and gain their attention by going outside and discussing nature,[6] as well as give them some background. For the remainder of the time, we focused on the narrative framework, the idea of characters, setting, problem and resolution in creating a story.

Storytelling Time!!

The stories I read and used as the basis for the curriculum were carefully chosen for their environmental and/or ethical themes.[7] The basic structure of each chosen story presented a different habitat, set of characters in the natural world, and plot. The plot included an environmental problem or issue and a resolution to this problem. The stories themes reflect the five themes found within the working definition of an environmental ethic. (See Figure 3)

> *"It is important that learning experiences allow students to become the creators of knowledge rather that the consumers of knowledge created by others."* (G. Smith, 2002)

Figure 3: Five Themes within a Working Definition of an Environmental Ethic

Five themes or concepts within the working definition of an environmental ethic:
:

2. Humans and wildlife share environments: The value of the environment to both people and animals
    a. Physical space (homes, habitat, land)
    b. Resources (food, water, air)
3. Interdependence of all things: Each part is integral to the survival of all
4. Ways in which we affect, change, develop, destroy, and alter the environment
5. How we can make a positive difference
6. Existence Value of the Environment or an Ethic of Care

These stories were read and discussed, reinforcing the narrative framework as well as gauging the student's moral compass. The curriculum was designed to use stories and discussion in order to teach by example instead of instruct.[8] As the culmination of this unit, the students developed, wrote and performed their own stories, based on the three weeks of storytelling, activities and discussion. This was not only a method of assessment, but also away to allow the students to come to their own conclusions.[9] The students performed the stories in separate performances for each of the two other third grade sections. Each third grade section was asked after the performances to individually write what the word 'environment' means.
(See Appendix A for the curriculum's day-by-day sequence of activities.)

DATA COLLECTION AND ANALYSIS

Qualitative Data Collection

I gathered qualitative data[10] through observation, written assignments and informal interviews. I observed and noted the children's voices, reactions and behavior, during activities and discussions throughout the curriculum. I tape recorded the class discussions and took notes on the student's behavior during activities and following each of the eleven classes. I also analyzed their written assignments, which included the students' responses to a pre and post-test (a story and sentence completion task), their self-written stories and the audience's response to those stories. Finally, I used the teacher, Mrs. Blenheim's observations, as a source of data, (see figure 4).

Figure 4: Main Data Collection Tasks

- Pre-Post Test:
  -Sentence Completion Task: What does the Word 'Environment' Mean?
  -Story Completion Task
- Students' Self-Written Stories
- Audience Response To Students' Story Performances
- Martin Luther King Jr. Day Worksheet Assignment: Teacher's Observations

Data Analysis: What I was looking for

The data was analyzed by compiling and coding class notes; coding student writing samples and conferring with the observing classroom teacher. This analysis was based on evidence of an environmental ethic in the students, as defined in figure 1. The narrative framework includes a setting, characters, problem and resolution as the four main components of a story used in analyzing and coding the student's self-written stories. Some of the guidelines used in coding for environmental concepts included Pennsylvania's Academic Standards for Environment and Ecology as well as Project 2061's National Guidelines for Excellence in Environmental Education. See figure 5 for Pennsylvania's Standards for Environment and Ecology: Grade Four.

> *"Contrary to ancient myth, wisdom does not burst forth fully developed like Athena out of Zeus's head; it is built up, small step by small step, from most irrational beginnings."*
>
> Bruno Bettelheim

Figure 5: Pennsylvania's Academic Standards for Environment and Ecology: Humans and the Environment, Grade Four

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:

A. Identify the biological requirements of humans.
- Explain how a dynamically changing environment provides for sustainability of living systems
- Identify several ways that people use natural resources.

B. Know that environmental conditions influence where and how people live.
- Identify how regional natural resources influence what people use.
- Explain the influence of climate on how and where people live.

C. Explain how human activities may change the environment.
- Identify everyday human activities and how they affect the environment.
- Identify examples of how human activities within a community affect the natural environment.

D. Know the importance of natural resources in daily life.
- Identify items used in daily life that come from natural resources.
- Identify ways to conserve our natural resources.
- Identify major land uses in the community.

The level at which the students understood key concepts was assessed based on Bloom's Taxonomy of Learning Objectives. In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning. Bloom's taxonomy of educational objectives presents six levels of thinking: knowledge, comprehension, application, analysis, synthesis and evaluation. Each level not only asks more of our thinking skills, but also includes the previous levels as subsets of the new level (Houghton, 2003). (See Appendix H for a more comprehensive summary of Bloom's Taxonomy)

It is important to point out here that, like much learning, the change I am talking about is a continuous process. There is no on and off switch that produces an environmental ethic, instead, I was looking for changes in development and growth along a continuum. The participants' names have been changed in the following discussion.

Findings and Discussion

The following sections present and discuss key findings from each of the main data collection tasks. Again, the activities were as follows:

- Pre-Post Test:
  -Sentence Completion Task: What does the Word 'Environment' Mean?
  -Story Completion Task
- Students' Self-Written Stories
- Audience Response To Students' Story Performances
- Martin Luther King Jr. Day Worksheet Assignment: Teacher's Observations

Sentence Completion Task: What does the Word 'Environment' Mean?

On the first day of class, and again, three weeks later,[11] the students were asked, while at their desks, to finish the sentence "I think the word 'environment' means…" This task of defining the word environment was based on a study by Loughland and colleagues (2002).[12] Only one student, when asked, had not heard of the word environment.[13] As Table 1 reflects, students initially defined the word environment through a list of nouns or objects. After three weeks, marked definitional changes in ten of the twenty-one students were found. The following students show changes in understanding of the word environment, its importance, and our responsibility to it:

Table 1: Definitions of the Word Environment: with Change

NAME	PRE TEST	POST TEST
Sebastian	Environment means that we live in houses: houses, trees, animals, bushes, apples, plants, people, me, grass, world, air	Environment means making the world a better place and help animals, plants, and people stay alive
Skylar	The planet Earth is the only planet that has environments that things can live in. What pops into my head when I think environment: science, plants, earth day, health/polluted, dirt, green, grow	I think environment means a place where animals and people can live where there is no pollution, no cutting trees, and no hunting and poaching
Izzy	I think the environment is Upper Dublin, where we live: Our world, cleaning trash, Earth Day, America, parks, land, Upper Dublin, grass, where we live	Environment: where we live, Ex: save the environment
Ella	Environment means nature and home. Environment: plants (trees, bushes, flowers – stamen, stigma, piston, rose, sunflower, petal), soil, animals (beavers, bears, birds, fish), sun, bugs, water, nature walk	I think environment is life important and should stay healthy. (clean)

Although several student's responses changed from pre to post test, the results of five, were ambiguous. For example, Oliver and Sierra show this type of change:

Table 2: Definitions of the Word Environment: with Ambiguous Change

NAME	PRE TEST 1/6/04	POST TEST 1/21/04
Oliver	An environment is a habitat, place, home, forest	The environment is the all around us
Sierra	Environment means nature: sun, berries, birds, trees, nature walk, animals, plants, bugs, trails	I think environment is life for living things in the world

Seven students showed no significant change, as shown by Juliette and Riley:

Table 3: Definitions of the Word Environment: with No Significant Change

NAME	PRE TEST 1/6/04	POST TEST 1/21/04
Juliette	I think the word environment means a place where you live, a habitat, nature or a home	The environment is a place you live in, your home, or a habitat
Riley	I think it means stuff around you like forests, people, houses and animals. Jungle, flowers and trees, rivers and lakes	I think the word environment means things around you like trees, homes, animals, people, water, and lots of other things

Cate's definition went away from the inclusion of people:

Table 4: Cate's Definitions of the Word Environment

Cate	Environment means things that are on the world. Me, houses, sky, land, air, animals, bugs, now, states, trees, people, clouds, then, grass, school, ocean, mud, world	Environment means to me outside, animals, snow, sun, leaves and flowers. Environment is a home of many animals

(See Appendix B for complete results of the Sentence Completion Task)

Story Completion Task

On the first day of class, the students and I sat together on the green rug. "I am going to tell you a story," I said. "But this story is special because you get to choose the ending." The students listened attentively as I told a story about a brother and sister who live in a house and place much like their own and love to play outside throughout the seasons. The problem (or conflict) of the story was ultimately up to them to resolve.

The children in the story were afraid of one thing. When I asked what that might be, there were responses like "the woods/forest by the yard, a bulldog next door, and an animal." Perhaps the students were relating this to their own lives, and things they, themselves, are or have been afraid of (which was my goal in making it familiar). When I finally explained that the children were afraid of bees, I asked whether any of the students had ever been stung, which elicited an enthusiastic response of "oh yes" and "ouch!" and "I'm scared of bees too!" I explained (after they settled down) that the yard in the story was full of bees – everywhere! The children couldn't play in their yard because of the bees, and this was the dilemma.

Once everyone understood the scenario, it was time for the completion task. The story had four possible solutions. I chose four endings, ranked from most ecologically responsible to least. Ecologically responsible means here, acting in a way that's best for the bees, children and the rest of the environment. The four endings, in order from most ecologically responsible to least, are seen in figure 6, below.

Figure 6: Story Completion Task: Four Possible Endings

1. Plant a bee and butterfly garden on one side of the yard, and play on the other side. (This option allows both the bees and children to use the yard (share space), and it endorses the pollinating role of the bees and butterflies in the ecosystem.)

2. Do something else - inside - like watch TV or read. (This option doesn't let the children benefit - play outside, but it does allow the bees to continue to fill their niche in the environment. Though it isn't much of a compromise, it still, possibly, shows respect for living things.)

3. Catch the bees, put them in a jar or terrarium inside, and make them your pets. (This option shows the removal of the bees from the ecosystem, and they cannot, therefore, fulfill their role. It this choice also shows no understanding of the need for natural habitat.)

4. Spray the bees – dead. (This option is somewhat clearly the least of a compromise or understanding of the concept of being in a mutually sustainable relationship with the environment.)

The students then ranked all four endings from best--what you think is best to do, to worst--what you think is the worst thing to do. The students also had the option of putting down an alternate ending/solution. It was made very clear that this was simply the student's own opinion, and that there was no right or wrong answer.

Three weeks later, the students were told a very similar story about a problem with bee overpopulation. They were given the same four endings to rank in order from best thing to do to worst thing to do, in their own opinion. Again, they could put an alternate ending, in addition to the four given options.

In analyzing the results pre and post, I compared the order in which the students ranked the solutions to the pre-decided "moral" or "ethical" order, in order to help gauge their moral compass. In order to make this test useful, I assumed that the closer the student's rankings were to this order, the stronger their ethic of care. I then compared their responses on the pre-test to those on the post-test, looking for changes in the students'

resolution of the problem. I took the answers they gave as alternate solutions strongly into consideration when looking at the changes over time.

Twelve out of the eighteen students who completed the story completion task showed significant changes in their response from the pre to the post-test. Eleven out of those twelve responses were more aligned with the "ideal" ranking in the post-test than the pre test. Six students showed no change at all, though one maintained the same "ideal" answer from pre to post.

Four of the students suggested moving the bees to another home in a forest or park habitat as an alternate ending. This suggestion shows an understanding of the need for space and resources of both bees and people. In this compromise everyone lives. It is a good representation (example) of the type of problem solving abilities that this curriculum hopes to foster.

Skylar presents one of the clearest cases of positive change in response. He begins with the attitude of killing the bees, "*call an exterminator*" and ranks the endings in the following order: spray the bees, plant a garden, catch them, and do something else. In the post-test he ranks them in the pre-determined order: plant a garden, do something else, catch them to make pets, and spray the bees. He also mentions as an alternative answer, instead of killing the bees, to "*catch them*." Both parts of this story completion task show Skylar gaining a clearer understanding of an environmental "ethic of care."
(See Appendix D for complete results of the Story Completion Task)

DISCUSSION OF PRE-POST TEST

It is important to point out here that, although no single set of data is indicative of the development of an environmental ethic, as a whole, the compilation of data show an overall development in several students' environmental ethic

In the pre-post exercises, many of the noted changes were small, or responses were ambiguous. For example, what does it mean when a student says: *"I think the word environment means nice." Or "I think environment is life for living things in the world."* Some students began with a strong ethic and did not change much. Other students changed the order of only one answer, from which no conclusive data can be drawn.

To explore possible import of the pre-post test activity, I would have liked to perform in-depth interviews with each student in order to get a better understanding of their conceptions and what, if anything, had changed about their perceptions of the topic.

It is important not to inflate the significance of the story completion task. There are so many variables affecting the child's preference. The child may have been told before that television is bad, and that may automatically put number two at the bottom of the list. Also, each child may, most likely, interpret each response differently. Finally, through a desire to be consistent, the child may not have changed their response from the pre to the post-test.

STUDENTS' SELF-WRITTEN STORIES

The culmination of this story-based curriculum was the students' performances of their self-written stories. They worked in groups of three and wrote stories, using the character, setting, problem, and resolution framework.

The children were told, on the second day of class, that they were going to be writing and performing their own stories. After that we read and analyzed each story within the context of characters, setting, problem and resolution. We talked about characters, such as animals, people, plants, wind, and sun. We explored different habitats and places, or "settings." We brainstormed conflicts, dilemmas and problems that we had encountered in the curriculum stories and those the children already knew. When it came time for the students to write their own stories they were prepared with examples and themes from the narratives we had discussed.

The students were split into seven groups of three. Mrs. Blenheim made every effort to form groups of equal ability.[14] They worked in their groups, coming up with ideas completely on their own. They brainstormed on story framework worksheets, which had spaces for characters setting problem and solution. Much of this work went on simultaneous to other parts of the curriculum. The students worked on their stories for about a week and a half.

The stories became plays as they created puppets, masks, backdrops and scripts. One week, art class was devoted to these projects and several indoor recesses as well. On the last day of class, the students performed all seven plays three times, once for each of the other third grade sections and for their first grade buddies as well.

(See appendix E for the complete student's stories)

Figure 7: The Students' Stories

1. *Saving the Rainforest*
2. *Rainforest in Danger*
3. *Three J's in Africa*
4. *Arctic Adventure: Oil Spills in the Ocean*
5. *Botswana Fire*
6. *Fix the City*
7. *Help the Butterflies!*

The stories, written by the students, reflected the five themes, or components of an environmental ethic (see figure 8), which were used in selecting the curriculum stories.

Figure 8: Environmental Ethic--Five Themes

1. Humans and wildlife share environments
2. Interdependence of all things
3. Ways in which we affect, change, develop, destroy, and alter the environment
4. How we can make a positive difference
5. Existence Value of the Environment

Theme One:

Humans and wildlife share environments: The value of the environment to people and animals, both physical space (homes, habitat, land) and resources (food, water, air)

Some of the stories showed an understanding that humans and wildlife share environments, physical space and resources. This is an important concept in understanding the ways we affect and depend on one another. Two groups pointed out that animals make homes in trees, and people use these same trees to make homes, so the cutting of trees leaves the animals homeless, as well as the fact that "without the trees, the animals would have no food." In many of these scenarios the people and the animals are conflicting over the shared use of space and resources. Interestingly enough, the children often pointed to the animals and trees (not humans) as the true and rightful inhabitants of the natural space.

As humans, the environment is necessary for all of our survival needs. The students reflected some of their knowledge of this theme when they said that people use the wood from trees to build houses, that people make jewelry from animal parts (horns, tusks), and that trees help clean the air for us to breath.

Theme Two:

Interdependence of all things: Each part is integral to the survival of all

One of the main themes throughout the curriculum was the interdependence of all things. In several of the stories that were read to the students, we saw that when one aspect of the environment is altered, it in turn affects the entire ecosystem and that each part is integral to the whole. The student's stories reflected this concept in several ways. Jenny, Charlie and Stephen, in *Rainforest in Danger*, showed a general grasp of the greater effects of an action, saying: "cutting the trees kills the whole environment." In *Three J's in Africa*, the three J's tell us "Killing an animal can hurt the environment." The sequence of events in *Arctic Adventure: Oil Spills in the Ocean*, presents a clear statement of the interconnectedness of all things, as exemplified in the food chain. Students wrote, "Oil

spills in the ocean killing half the small fish, which caused the bigger fish to barely have enough food, so a quarter of the bigger fish died, so the seals did not have enough to eat, so half the seals died, and the polar bears did not have enough food because there were not too many seals." And finally, in *Botswana Fire,* as all of the animals are affected by the fire, each animal has a role in helping to stop it. The stories reflected some understanding of the concept of interdependence.

Theme Three:

Ways in which we affect, change, develop, destroy, and alter the environment

The student's stories showed an understanding of many ways in which people affect, change, develop, destroy and alter the environment. Men chop down trees, and animals lose their homes and food because of it. People bring in "noisy, loud, destructive, foreign" construction machines. It seems that the animals are happy and the rainforest is peaceful, until people came. People don't listen to the rules and this causes permanent damage. Poachers kill animals for jewelry, and "today there are not many African elephants and rhinos left." Oil spills effect all the aquatic life, while cars and factories pollute, and the people change the landscape over time from lots of trees to a city that "needs fixing."

Theme Four:

How we can make a positive difference

In each story, generated by the students, there had to be a problem, hence the depictions of a detrimental relationship between people and the environment. However, the area to draw attention to is this next concept: How we can make a positive difference. According to the Center for Environmental Philosophy's definition, environmental citizenship is defined by, 1: an idea that we are an integral part of our environment, 2: recognition that our future depends on how we care for our ecosystems, and 3: a sense of

responsibility that leads to action on behalf of the environment (CEP…year). This seems to be what the students are illustrating in their stories.

In *Saving the Rainforest*, the people understand that taking away the animals' food and home is wrong, when the animals told the men they'd lose their homes and food w/out the trees, the men understood and stopped cutting (showing compassion). They then helped the animals make signs with rules that said not to cut down trees. They resolve this story with "the animals made sure no one cut the trees again, so no one cut down trees again." This simple message shows this group's understanding that, of course this is wrong, and that people and animals will take action when something is wrong. In *Rainforest in Danger*, it was up to the police, the enforcers of right and wrong, to make sure the "killing of the whole environment" ceases.

Another way that people help the environment in *Three J's in Africa* is through the unsuccessful (due to poaching) attempt at a protected wildlife refuge. In *Arctic Adventure: Oil Spills in the Ocean*, the people patched up the boat, cleaned up the water and fixed the problem. The moral of *Botswana Fire* is "It's better to work as a team than by yourself." By using teamwork the characters solve a problem. This message to save each other and help one another is a key component in solving environmental problems in general.

Planting trees comes up as a solution in *Fix the City*. The kids take action, by cleaning out the old dump and making a park there. Because of "the kid's" actions, "the environment is up and running and there are more trees than ever that remind us of the past." This story says that people can fix the problems. The last approach, important and often difficult to remember, was expressed in *Help the Butterflies!* They say to let the wild creatures be, don't cage or catch them, simply appreciate them where they are.

Theme Five*:*

Existence Value of the Environment or an Ethic of Care

All of the stories expressed the sentiment that the environment is beautiful and has value simply for its existence. They also showed the desire to preserve and care for the natural world as it is. For example, in all of the stories that included animals, especially those about the rainforest, saving the animals, or the animal's survival, was very important. "Hurting" the animals was bad and "saving" them was good. In all stories where trees were being cut, the destruction and harming of the trees was a problem/bad. Some other ideas were that "The rainforest is beautiful" and "Trees are beautiful." In "Oil spills in the Ocean," the people cleaned up the oil and patched up the boat all so that the animals could be safe again. Finally, in *Help the butterflies!*, two children catch two butterflies and keep them as pets. One butterfly escapes, but the other does not make it and flies to butterfly heaven. The moral of the story shows the value of beauty, spirit and a natural habitat. "Never catch a butterfly or any wild creature no matter how beautiful it is."

THIRD GRADE AUDIENCE RESPONSE TO STUDENTS' STORY PERFORMANCES

Following the productions, the third grade audience members were asked to individually write what the word environment means to them. This task was meant to mirror the sentence completion task done in the pre-post test. Before the show, the audience members were told that Mrs. Blenheim's class had been studying the environment, and these performances were plays that they wrote about the environment. Several of the other third graders had never heard the word environment, and were writing based on what they had just seen. In other words, these students were "primed" to redefine the word environment, based on what they were about to see.

Mrs. Blenheim's class (3A)'s definitions from the pre-test are strikingly different from the other sections (3B and 3C)'s definitions. The other two sections had no previous instruction or formal education about the environment and had approximately the same curriculum as 3A's class.

While section 3A's pre-test sentence completion tasks show almost no evidence of a relational description of the environment, a majority of the other two sections (3B and 3C) definitions of 'environment' defined the word environment from a relational point of view—something, which supports and enhances their living, and which in turn requires their care and support. This sort of definition usually only occurs in about one in eight children (Loughland et al., 2002).

The following definitions (figure 9) are evidence, to me, of the environmental ethic present in the students of 3A's stories
(See Appendix C for a complete list of all section's definitions, including 3A's pre test)

Figure 9: Other Third Grade Definitions of the Word Environment.

> The word environment means your surroundings and how you and them care for each other.
>
> Environment means helping others and making the world a better place.
>
> I think the word environment means…take care of your home and don't destroy others'.
>
> I think the word environment means to keep the world clean, not kill animals, not cut down trees, also to make the environment healthy.
>
> I think the word "environment" means a home for everyone, and taking care of our environment.

Because the three sections had similar backgrounds, and the definitions of 3B and 3C showed relational views and a sense of environmental stewardship (more aligned with our definition of an environmental ethic), while 3A's pre test did not, it could be hypothesized that the audiences were influenced by the moral content of section 3A's stories, in defining the word environment.

Is this Evidence for Learning?

As previously mentioned, according to Bloom's Taxonomy of Educational Objectives, the student's stories reflected the ability to use the curriculum's key concepts at no less than three different levels: knowledge level, comprehension level and application level.

At the knowledge level, the students were demonstrating observation and recall of information, knowledge of major ideas, places, and a mastery of the subject matter. The settings they used (habitats - rainforest, meadow, ocean etc) of six of the plays reflected examples we had read or discussed in class, for example, the rainforest setting from the Great Kapok Tree. The students were mirroring, or reflecting back, information on the key topics. The scientific and ecological knowledge found in their stories and the themes that were mirrored in both the curriculum and student written stories, such as environmental degradation, environmental impact and facts about the environment, show this first stage of learning as well.

At the comprehension level, the students were able to understand and use this information in a new context. For example, in Fix the City, using New York City as a setting was an original idea. They still used many of the themes we had read, but applied them in new ways. Three J's in Africa also generalized to a new context, while still applying the same principles. The students were also able to predict consequences (another sign of the comprehension level). For example, in Arctic spills in the Ocean, the students predicted the effects that the oil killing the small fish would have on the entire ocean. They also predicted the human response to this destruction showing an ethic of care.

At the application level, the students showed the ability to think of original solutions to problems in new situations. In Fix the City, the kids decided to work together to plant trees in place of an old dump to help clean the air and "fix the city." By applying the concept of environmental stewardship and action to an original context, New York City, the students are using the methods, concepts and theories in a new situation. Another

example is Botswana Fire, in which the animals worked together, while the elephant went to get water (water storage capacity being his ecological niche), and they were able to prevent an ecological threat that we had not directly talked about.

Some of the students demonstrated the level of evaluation, characterized by the ability to compare and discriminate between ideas, assess values and make choices. In *Help the Butterflies!*, the students created their own moral "Never put a wild creature in a cage, no matter how beautiful it is." This shows the ability to compare and discriminate between concept of valuing something for its beauty and existence, and wanting to keep it or own it because you value it. Although we did not talk about it directly, the students predicted the death of a butterfly (though she had food and water), convincing us all of the value of freedom.

Level of Moral Development

As discussed in the background section, the students' simple understanding of right and wrong, good and bad reflects their stage of moral development. The students at this age are just moving out of the egocentric stage of thinking, developing the ability to simultaneously take into account their own view of things with the perspective of someone else, and beginning to see themselves within the larger world. They are moving towards the more advanced form of moral reasoning, called Subjective Morality or Autonomous Morality, where they consider the motives and intentions behind actions, and not simply the outcome. They are also beginning to reason logically, and organize thoughts coherently.

Use of the Narrative Framework

In order to express several of these morals, the students were using the narrative framework. In *Three J's in Africa*, they used this telling a story about behavior to show consequences by example. The theme in *Help the Butterflies!*, "Take a lesson from this my children," also expresses their natural tendency to show right and wrong through

storytelling. This supports the theory for narrative-based learning. It is important to note the student's varied background knowledge.[15]

MLK DAY "I HAVE A DREAM" WORKSHEET ACTIVITY: JANET BLENHEIM'S OBSERVATIONS

In conjunction with the celebration of Dr. Martin Luther King Jr. Day, which was Monday, January 19th, the students of section 3A's third grade teacher, Janet Blenheim, gave the children a worksheet activity based on the "I have a Dream…" speech. This activity fell within my third week with the students, though it occurred outside of our time together. The assignment was to write about your dreams for the future, an open-ended question modeled on Dr. MLK Jr. She does this activity every year with her students.

"The students usually say things like 'I want to be a famous baseball player,' or 'I hope to win a million dollars,'" Mrs. Blenheim told me, as she excitedly handed me the photocopies of seven out of the 21 student's worksheets.

One third of the class had included dreams for the future that showed a desire to "help" the environment in some way. These notions are signs of an environmental ethic.

Mrs. Blenheim stressed the importance of these results to me, as evidence for the children's internalization of the concepts that I had been teaching, and the curriculum's influence on their thinking (world view, schema?) "*This is real proof right here,"* she beamed *"this assignment had nothing to do with you."*

Several children showed, to differing degrees, the concept of being in a relationship with the environment, and one in which the individual and the environment help sustain each other's existence.

It is also interesting to note that Juliette, Izzy, and Ilana's dreams for the future use the problem, solution framework that the curriculum was based on. In her narrative, each speaker is part of the solution, mirroring the storytelling framework.

Izzy expressed a strong sense of morality, as well as a desire to help. She sees a current problem (between people and the environment), she has a vision for the future of peaceful coexistence, and she sees herself as part of the solution: "*One day man and beast will live peacefully together without harming each other. I will draw pictures of people cutting down trees and killing animals in sad colors to make people feel bad to see what some people have done."*

Juliette hopes *"to do great in science so I can get into a great school and study to be a marine biologist and help the endangered animals under the sea. I hope to encourage people to stop hurting and killing whales, dolphins, porpoises and mammals under the sea. I hope to save endangered animals from being extinct."* This statement, similar to Izzy's identifies a problem, solution scenario, in which she herself is part of the solution. This idea mirrors the storytelling framework that we used within the narrative-based curriculum.

Ilana believes learning to help the environment is very important, and includes it in her dream for helping others who need help. Ilana hopes to help the environment by teaching others: *"As a teacher for children who are poor, teach them how to make the world a better place and to help the environment. Teach them everything they need to know…"*

Although they don't clearly explain their specific reasoning behind it, both Owen and Riley encourage the planting of trees and plants (and flowers), as part of their dreams for the future. Riley said "*…Also I want to help the environment by planting more trees and plants…"* Owen stated, "*As president, I would ask the government to plant more trees and plants and flowers…"*

> *"As president, I would ask the government to plant more trees and plants and flowers…"* -Owen

Walter dreamed *"to explore on an island and study all kinds of old animals and new ones, and come back and share it with lots of elementary schools all over the world. Once they put some of the new animals in a book, I will go to the island to study more about them and become a famous explorer!"* This response somewhat reflects our discussion of animals when I shared pictures from Botswana with the class. It may also be Walter's natural desire to explore. The teaching aspect of his dream shows giving back (altruism) and his understanding of the importance of science and learning.

Sam's vision reflects the importance of discovery and that scientists help the environment. He hopes to help the environment one day as well. *"[I] dream to be a deep-sea diver…I will help the environment and discover things. People will be very happy…"*

DISCUSSION OF I HAVE A DREAM ACTIVITY

Janet Blenheim's Perspective

Mrs. Blenheim, the student's teacher, is a very experienced educator, familiar with change and development in third graders. This piece of data was her strongest testimony for the changes in her third graders. She said that the student's had changed; their environmental ethic, understandings and interest has grown.

Conclusions and Recommendations

As the international climate, most literally, calls for increased attention on environmental issues, effective environmental education in the Unites States is becoming a salient issue. Despite the barriers to environmental education in schools, there are recognizable benefits to integrating environmental education into existing curricula.

When the goal is environmental citizenry and action, environmental ethics permeates effective environmental education. This environmental ethic must begin to be developed at a young age, and throughout the school years. This research has shown that third graders can be receptive to and able to make something of these environmental concepts.

This study is evidence that an environmental education curriculum strong in narrative is a powerful tool in teaching children a specific environmental ethic. Although no one task or piece of data shows proof, the compilation of data and alignment of group trends suggest that development can occur.

As seen in Jerome Bruner's theory of a spiral curriculum, ideally, throughout the education system, children would continue to be exposed to these themes and concepts at higher and higher levels paralleling their moral and cognitive development.

This curriculum requires only stories, a few good books and the child's imagination. This makes it somewhat replicable. The classroom ethnography of this study was very specific, which is why it would be useful to see this sort of curriculum tried in classrooms of diverse backgrounds across the country and for that matter, the world.

This particular curriculum based research project illustrates the possibility that with a narrative based approach, in a short period of time; it is possible to see changes in what we call an environmental ethic.

And a quote to end on, from the renowned entomologist, Edward O. Wilson, On the Future of Saving Life on Earth:

> In the end… success or failure will come down to an ethical decision, one on which those now living will be defined and judged for all generations to come. I believe we will choose wisely (E.O. Wilson, 2002).

Appendix A

Environmental Storytelling Curriculum:
The Power of Narrative in Developing an Environmental Ethic
Erica Rogers
January 2004

1/6 – PRETEST:
Story and Sentence Completion Tasks: I told the class a story about a bee overpopulation problem in a backyard much like their own. The students were given four possible solutions or endings, which they ranked from what they thought was the best thing to do (what would they do if they could) to the worst thing to do. They ranked them and could also give an alternate solution. The responses showed much variation in the rankings.
On the other side of the paper…they individually defined and/or drew a concept map of the word environment. Only one girl had not heard it before. They had already done concept maps with the word courage. A wide range of responses.

1/7 – discussed chains – then food chains = energy chain
I read (with questions and exploration) "**Pass the Energy Please**"
Play the food chain game
Talk about characters
Where do people fit in? (They said: harm the environment, top of the food chain, chop trees, and help the environment)
Introduced end goal of creating their own stories

1/8 – OUTSIDE!
(They loved this part! "A child's sense of wonder" Rachel Carson)
First we talked about field guides and what kinds of characters we might find
Then, right out the door of the school. They found all sorts of specimens and innately picked up trash. We came inside and they identified and discussed with field guides – great researchers! It made it more real, more personalized for them. "Wildlife is everywhere…even your own backyard." Ran out of time before sharing…

Later that day they made a nature museum with all of the findings

1/9 – some nature observation sharing then…
I read "**Hey Little Ant**"
There is no solution – ethical dilemma of the boy squishing the ant or not.
They went to their desks and wrote an ending (very short) – 80 percent said don't squish
We shared endings and reasons…they have much background knowledge and are influenced by their peers
We discussed parts of a story – characters, setting, problem/dilemma and solution/ending
Next I read "**Agatha's Feather Bed**." They were very interested in where things come from…and don't really know…we shared the object boxes in a circle
Lastly I read "**Tuna fish Sandwiches**." They recognized the food chain, and remembered the planktons from the other day – bright.

1/12 – I read "**The Great Kapok Tree**"
"Why didn't the man chop down the tree?" Tommy asked…
We went through and put together a list of all the different animals and the reason they think the man shouldn't chop down the tree.
We went to look at another grade's rainforest display
I left some rainforest books with them to look at…

1/13 – Started out by looking at some cool markings on a stick…
I read "**Just a Dream**" by Van Allsburg

We discussed why changes were happening "in the future"
They made some connections – cause and effect – thought it was the boy's fault
We brainstormed a list of possible problems/dilemmas/conflicts in stories and life…like in the books we'd been reading and talking about
They came up with a wonderful list
Split up in groups of three (Mrs. B. had made the groups) and began thinking about their own story frameworks (the only guidelines were that it needed to have characters, a setting, a problem and solution)
I showed the CD of animal pictures from Botswana – another habitat (at Janet's request)

1/14 – little naturalists…(field guide stories and observations from home)
Split up into groups to finalize characters, setting, problem, and solution.
Then to art class…they made puppets, backdrops, masks etc.
[Settings: 1 Meadow, 1 Arctic Ocean, 2 Rainforest, 2 Africa/Botswana, 1 NY City]

Snow day!!

1/16 – Began with two **Aesop's fables** (North Wind and the Sun, The Boy who Cried Wolf)…what was the moral? Characters, problem, and resolution…they generally got it
Next, I read them "**The Lorax**" what was the moral? They were so into it and wanted to discuss more, but we had to move on to work on their own stories.
Many different modes of presentation, some wanted to put in their own morals…stayed longer

1/19 – no school

1/20 – Worked more to finalize stories
Played Art of Storytelling game – "When I was born…" (as an animal)
Discussed voices, sounds, body and words to tell…poor attention span, goofy

1/21 – Practiced stories, run through – great. (Stories are completely their own words and ideas)
POST TEST – first part of post-test are the actual individual stories they developed…look for signs of an environmental ethic
Bee story redo – with a few small changes…they ranked the endings again
-Slightly different rankings this time
And again "the environment is…" A sentence or two on the back – some much altered

1/23 – presentations of stories for other classes – great job!
(Asked other third grade sections what the word environment means – write a sentence)

List of Literature:

- Agatha's Feather bed: Not Just Another Wild Goose Story, Carmen Agra Deedy, Atlanta: Peachtree Publishers, 1991.
- Cherry, Lynne, The Great Kapok Tree: A Tale of the Amazon Rainforest. Voyager books Harcourt, Inc., San Diego, 1990.
- Hoose, Hey Little Ant. Tricycle Press, Berkeley, 1998.
- Barbara Shaw Mckinney, Pass the Energy Please!, Dawn Publications, Nevada City, 1999
- Dr. Seuss, The Lorax. Random House, New York, 1971.
- Tuna Fish Sandwiches, Patty Wolcott, Badger Books, Addison-Wesley, 1977.
- Van Allsburg, Chris, Just A Dream. Houghton Mifflin Company, Boston, 1970
- (We also used the Giving tree and the Lupine Lady outside workshop time)

Appendix B

Student's Definitions of the Word 'Environment': Pre and Post Test

NAME	PRE TEST 1/6/04	POST TEST 1/21/04	CHANGE?
Oliver	An environment is a habitat, place, home, forest	The environment is the all around us	some
Walter	Environment is city, school, a plan, experiment, a subject, doing, job, thing, planning something, places, guesses	I think environment means subject	some
Sam	The environment is the world around us		N/A
Sebastian	Environment means that we live in houses: houses, trees, animals, bushes, apples, plants, people, me, grass, world, air	Environment means making the world a better place and help animals, plants, and people stay alive	yes
Sierra	Environment means nature: sun, berries, birds, trees, nature walk, animals, plants, bugs, trails	I think environment is life for living things in the world	yes
Linus	I think environment means outside of houses, buildings and schools	I think the word environment means trees and plants and the outdoors	no
Juliette	I think the word environment means a place where you live, a habitat, nature or a home	The environment is a place you live in, your home, or a habitat	no
Kayla	I think environment means: neighborhood, a big amount of people that collect money (for the poor) and work together and a home	I think the environment means a big place	yes
Skylar	The planet earth is the only planet that has environments that things can live in. What pops into my head when I think environment: science, plants, earth day, health/polluted, dirt, green, grow	I think environment means a place where animals and people can live where there is no pollution, no cutting trees, and no hunting and poaching	yes
Riley	I think it means stuff around you like forests, people, houses and animals. Jungle, flowers and trees, rivers and lakes	I think the word environment means things around you like trees, homes, animals, people, water, and lots of other things	no
Owen	It's the things that cover the earth, planes of grass. Trees, bushes, clouds, forests, rocks, leaves, oceans, sky, sand, plains	The environment is a place of forests and oceans and cities	Some (habitats now)
Izzy	I think the environment is Upper Dublin, where we live: Our world,	Environment: where we live, Ex: save the environment	hmm

	cleaning trash, Earth Day, America, parks, land, Upper Dublin, grass, where we live		
Nate	Environment means proper habitat for animals	I think the word environment means a habitat for animals	no
Talbert	I think the environment would have habitats (dirt, trees, swamps, lakes, rivers), animals (reptiles, birds, bugs, fish), weather (sunny days)	I think the environment means habitats with animals	Not really
Ella	Environment means nature and home. Environment: plants (trees, bushes, flowers – stamen, stigma, piston, rose, sunflower, petal), soil, animals (beavers, bears, birds, fish), sun, bugs, water, nature walk	I think environment is life important and should stay healthy. (clean)	yes
Winton	I think the environment is a place where animals, trees, forests and people are. (also: Place where animals live, jungle, birds)	I think the environment is everything around us like trees, houses, people, leaves, flowers, animals, and grass	nah
Xavier	I think environment is a place where animals live – the sea, jungles (trees), houses, the forest (trees – nests)	I think environment means where animals live	nah
Cate	Environment means things that are on the world. Me, houses, sky, land, air, animals, bugs, now, states, trees, people, clouds, then, grass, school, ocean, mud, world	Environment means to me outside, animals, snow, sun, leaves and flowers. Environment is a home of many animals	Yes – but away from people
Joey	Environment: world, houses, flowers, air, property, trees, bushes, people, grass, nature, clouds		N/A
Ilana	Environment means things like outdoors. Living things. Like animals and bugs. Outdoors, water, land, animals, plants, sky, butterflies, trees, sand, grass, people, rocks, bugs, dirt, mud, ocean	I think the word environment means outdoors, where people and animals live, homes, nature, weather: snow, ice, rain, sun, trees, grass	A bit (people and animals together)

Appendix C

All third grade definitions of the word Environment without curriculum

Section 3A

NAME	First definition of environment
Oliver	An environment is a habitat, place, home, forest
Walter	Environment is city, school, a plan, experiment, a subject, doing, job, thing, planning something, places, guesses
Sam	The environment is the world around us
Sebastian	Environment means that we live in houses: houses, trees, animals, bushes, apples, plants, people, me, grass, world, air
Sierra	Environment means nature: sun, berries, birds, trees, nature walk, animals, plants, bugs, trails
Linus	I think environment means outside of houses, buildings and schools
Juliette	I think the word environment means a place where you live, a habitat, nature or a home
Kayla	I think environment means: neighborhood, a big amount of people that collect money (for the poor) and work together and a home
Skylar	The planet earth is the only planet that has environments that things can live in. What pops into my head when I think environment: science, plants, earth day, health/polluted, dirt, green, grow
Riley	I think it means stuff around you like forests, people, houses and animals. Jungle, flowers and trees, rivers and lakes
Owen	It's the things that cover the earth, planes of grass. Trees, bushes, clouds, forests, rocks, leaves, oceans, sky, sand, plains
Izzy	I think the environment is Upper Dublin, where we live: Our world, cleaning trash, Earth Day, America, parks, land, Upper Dublin, grass, where we live
Nate	Environment means proper habitat for animals
Talbert	I think the environment would have habitats (dirt, trees, swamps, lakes, rivers), animals (reptiles, birds, bugs, fish), weather (sunny days)
Ella	Environment means nature and home. Environment: plants (trees, bushes, flowers – stamen, stigma, piston, rose, sunflower, petal), soil, animals (beavers, bears, birds, fish), sun, bugs, water, nature walk
Winton	I think the environment is a place where animals, trees, forests and people are. (also: Place where animals live, jungle, birds)
Xavier	I think environment is a place where animals live – the sea, jungles (trees), houses, the forest (trees – nests)
Cate	Environment means things that are on the world. Me, houses, sky, land, air, animals, bugs, now, states, trees, people, clouds, then, grass, school, ocean, mud, world
Joey	Environment: world, houses, flowers, air, property, trees, bushes, people, grass, nature, clouds
Ilana	Environment means things like outdoors. Living things. Like animals and bugs. Outdoors, water, land, animals, plants, sky, butterflies, trees, sand, grass, people, rocks, bugs, dirt, mud, ocean

Appendix C continued

Section 3B:

Allison – I think the word environment means…take care of your home and don't destroy others'.

Lizzie – I think the word environment means to keep the world clean, not kill animals, not cut down trees, also to make the environment healthy.

Natalie – I think the word "environment" means…don't hurt nature, or the animals that live in it.

Jonathan – I think the word environment means "nice."

Rebecca – I think the word "environment" means is treat the environment like the environment is a person cause you treat people respectfully.

Michael – I think the word environment means beautiful outdoors and the animals space.

Shayna - I think the word "environment" means you should be nice to the environment around you.

Matt – I think the word "environment" means nature and we can help it by not cutting down trees.

Jingning - I think the word "environment" means a home for everyone, and taking care of our environment.

Jake – I think the word environment means nature, people and life.

Shane - I think the word "environment" means that there is animals and plants and I think if you cut down a tree you should plant a tree. Or more than one tree.

Tia - I think the word "environment" means all the things that keep the animals living.

Alex - I think the word "environment" means home. You could clean up trash, plant trees, don't pollute.

Arthur – I think the word "environment" means not to kill animals and don't hate other people or animals and things. "No chopping"

Celia - I think the word "environment" means property. I think we shouldn't waste food.

Meredith – I think the word environment means to take care of your environment inside or outside and not make an oil spill. "No Littering!"

Ross - I think the word "environment" means an outside place, and it should be prettier. There should be more trees and just better things to the world.

Zachary – I think the word environment means nature and animals and trees and everything.

Appendix C continued

Section 3C:

Alexander – The word environment means wild things.

Jane D. – The word environment means a group of living things.

Brooks – the word environment means trees.

Ari - The word environment means nature. “We are helping the environment, yay! (picture) do not cut trees”

Grace – The word environment means like how nature works.

J.D. - The word environment means all the jungle and forests and helping save them.

Brianna – Environment means helping others and making the world a better place.

Jake - The word environment means plants grow and animals roam.

Jack D – The word environment means temperature.

JJ - The word environment means things that surround you!

Gabby - The word environment means where animals and people live.

Dori - The word environment means a place.

Olivia - The word environment means plants and world.

Miranda - The word environment means to stop bad things to nature.

Angela - The word environment means all kinds of things in nature like…(pictures-people tree flower bush).

Richard - The word environment means a house.

Daniel - The word environment means world.

Taylor - The word environment means clean, area.

Nick - The word environment means your surroundings and how you and them care for each other.***wow

Chris - The word environment is wildlife and plants.

Erica - The word environment means wildlife.

Danny - The word environment means animals and plants growing and living freely.

Appendix D

Student's Story Completion Task (Bee Story Solutions Ranking): Pre and Post Test

Solutions key:
1=plant garden
2=do something else (TV, inside)
3=catch, make pets
4=spray the bees

NAME	PRE ORDER	ALT ENDING	POST ORDER	ALT ENDING	+, -, No change
Talbert	1-2-3-4	Collect honey from bees and feed to bear	1-2-3-4	Put in a jar and give the honey to a bear	Good (no)
Ilana	1-3-2-4	Let the bees be	1-2-3-4	No	+
Izzy	1-3-2-4	Clay hive w/ honey paint dark yellowish-brown	1-2-3-4	Clay queen bee& paint w/ honey & pollen, move bees to park	+
Xavier	1-3-4-2	No	1-2-3-4	No	+
Ella	1-3-2-4	Plant flowers in park and put caught bees there	1-2-3-4	Bring the bees to Robin's Park	+
Skylar	4-1-3-2	Call an exterminator	1-2-3-4	Catch them	+
Cate	1-4-2-3	M & D call bee catchers	1-2-4-3	Tell your parents	+
Kayla	1-4-3-2	Paint instead	2-3-1-4	Put them in a new home in the forest	+
Sebastian	4-3-1-2	Run away	4-1-2-3	No	+
Sierra	4-1-3-2	Yes	4-3-1-2	Catch them and put in the forest	+
Owen	1-4-2-3	Spray the nest	1-4-2-3	A box with flowers etc for them to eat	+
Winton	4-2-1-3	Play w/ bees	2-4-1-3	No	+
Walter	1-2-3-4	No	2-1-4-3	No	-
Juliette	1-3-4-2	Hive and honey	1-3-4-2	No	No
Linus	1-4-2-3	No	1-4-2-3	No	No
Nate	3-2-1-4	No	3-2-1-4	Catch and write a school report	No
Riley	4-1-3-2	No	4-1-3-2	No	No
Oliver	4-3-1-2	No	4-3-1-2	No	No
Joey	3-1-2-4	No	N/A		

Appendix E

Kid's Stories - The Scripts

Saving the Rainforest

There once was a rainforest. In the rainforest were snakes (everyone including audience, makes hissing noise), macaws (everyone, including audience, makes cawing noise), and monkeys (everyone, including audience, makes monkey noise). There were many beautiful colors in the rainforest. The trees were wonderful shades of green and red and brown. The animals also had beautiful colors.

One day a group of men came to cut down the trees in the rainforest. (Act out chopping) They were cutting down the trees because they wanted to use the wood to build new houses. The animals saw them cutting down their tree homes. They were very upset because without the trees, they would lose their homes and their food.

The animals knew that they had to do something to stop the men from cutting down the trees. They went to the men and told them that all of the animals in the rainforest would lose their homes and their food if they cut down the trees. The men understood and agreed not to cut down the trees. Then they helped the animals make signs that said not to cut down trees! The lizard, macaw and monkey made sure no one would cut down the trees again! From that day on, no one cut down the trees again.

Rainforest in Danger

Once upon a time, there was a beautiful rainforest!

It was filled with lovely flowers, trees with many shades of green and hanging vines, and tons of animals like (act out) parrots, jaguars, iguanas, tree frogs, snakes, and many more.

Everything was peaceful and all the animals were happy, but then, people came. These strangers brought in axes and hatchets and machines…….big, loud, construction machines. They started to cut down the beautiful trees with many shades of green and hanging vines. The animals were afraid, they ran away from the big, loud, construction machines and the hatchets and the axes and these strangers who were taking away their trees, their food, their homes!

A nice old man who lived nearby came and planted many more trees with many shades of green and hanging vines. He also talked to the loggers who had been cutting down the beautiful trees with many shades of green and hanging vines. "If you do that you're killing the whole environment," he said.

In the end the loggers never came back because the old man would get very angry, and tell the police they're killing the environment. After all the rainforest was back to normal again.

Three J's in Africa

Last week, I was guarding this beautiful wild life refuge, when a poacher came running past me. I said, Sir! Look at the sign. It says NO HUNTING ALLOWED! The man went right up to the African Elephant. HE killed the elephant and ran off with the tusks to make jewelry. "Yesssss!"

A couple days later…I was back at my post when a different man came running in and went right up to the rhino and killed it and ran off with the horns.

This kept happening for years and years, and today, there aren't many African Elephants and Rhinos left.

Moral: Killing an animal can hurt the environment

Oil Spills in the Ocean

One bright and sunny day, three small ships were sailing across the Arctic Ocean. One is the JVL, one is the VLJ and the other ship is the LJV. The ships were all doing fine, until they saw an iceberg. All the ships tried to get away, but the JVL did not make it. It crashed into the iceberg causing a big oil leak. It killed more than half the small fish so the bigger fish barely had enough food. So that caused a quarter of the bigger fish to die. And so there was not enough food for the seals. And since there was not enough food for the seals, half the seals died. So the polar bears did not have enough food, since there were not that many seals left. Then, sooner or later, the people got a patch for the boat, and they cleaned up the water so the animals could be safe again. The End.

Moral: If you hurt one thing you affect the whole environment

The Botswana Fire

Lighting bolt strikes…
Buddy: There's a fire, there's a fire!
Volter: It's really true. Really.
Spotty: Come, we are going to make a plan to put out the fire.
Ratty: I'm frightened. I want to go home.
Kevien: I have a plan!
Bob (elephant): I will go to the coolest river and get some water to put out the fire.
Buddy: Hurry up it's coming!
Volter: Go that way to safety.
Spotty: I will lead you to safety
Ratty: We are going to be saved!
Snake: come on you stupid don't start stalling.
Bob: I have the water
Buddy: My family is in danger!
Kevien: Fire Away
Bob: Ok sssssssssh
Ratty: Oh yeah! Oh yeah!
Kevien: Not at me!
Vulture: We rounded them up
Spotty: The fire is going away
Buddy: That's good. It's gone.
Bob: The fire's gone
Everybody: Yipeeeee!
Moral: It's better to work as a team than by yourself

Fix the City

Tree/Narrator: This story takes place in New York. A long time ago New York was beautiful. There were lots of trees and log cabins. Today it is a smoggy land of pollution with not many trees, but lots of cars.

One day, three kids were walking down the sidewalk of Madison Avenue. Their names were Joe, Tree, and Bob. (Bob is silly)

Joe: Man! I wish there wasn't so much smoke around here.

Bob: Yeah! Me three!

Tree: Maybe we can do something to make New York City a better place.

Bob: Yaah! That's a great idea!

Joe: Well, what will we do?

Bob: I don't know? (Shrugs)

Joe: How about we plant flowers!

Tree: No, How about we plant trees

Bob: Yeah – like your name! (They both laugh and point at her)

Tree: (sarcastic) yeah, like *that's* funny

Joe: Why would we do that?

Tree: Well, trees help clean the air.

Bob: Where will we plant the trees?

Tree: How 'bout central park?

Joe: But there's too many trees around

Bob: hmmmm

Tree: good point

Joe: Maybe we can ask the town to help us clean out the old dump downtown and make a little park

Bob: Good idea!

Tree/Narrator: The next Day at Central Park…

Bob: where do we get the trees?

Tree: I don't know?

Bob: Hey, here's an idea (starts tugging at the trunk of a tree)…come on guys help me! (He bumps his head from pulling so hard and falls over)…hey – what just happened?

Joe: The sky is falling

Bob: Oh – here's the problem (shows his forehead) is it bruised? (Starts tugging again) Come on, help me!

Tree/Narrator: Today, the air is clean and the environment is up and running, and there are more trees than ever that remind us of the past.

Help the Butterflies!

(Told By Monique)

Monique: Long, long ago my friend Teck and I had an experience that changed a lifetime.
Well, two children names Janet and Joe were out walking in the grassy green meadow filled with fragrant flowers and butterflies.
Janet: Joe, look at those beautiful butterflies.
Joe: Let's catch them and keep them as pets
Monique: They caught one and then another. Then they went back home and put the butterflies in a box.
They started thinking of names for their butterflies
Janet: How about Monique and Heather?
Monique: Said Janet
Joe: No
Monique: Said Joe
Joe: How about Teck and Harry?
Monique: Said Joe
Janet: No
Monique: Said Janet
Janet: How about Teck and Monique?
(They shake)
Monique: They both agreed on the names, so they named them Teck and Monique. So they got water, grass and leaves. The two children were feeding the butterflies. They started running out of food so they went to get more.

They accidentally left the lid open while they were getting the food. Teck turned around and Monique was dying! He saw his opportunity to escape! Teck carefully lifted Monique from the box and returned to their habitat in the beautiful meadow. But it was too late for Monique; her spirit flew to butterfly heaven.

The children, Joe and Janet returned and were astonished to find the box empty! They realized what had happened and never put a wild creature in a box again.

Moral: Never catch a butterfly or any wild creature in a box, no matter how beautiful it is.

Appendix F

Analysis of the stories written by the students:

1. Saving the Rainforest

Scientific/ecological Knowledge:
- Animals from rainforest – lizard, macaw, monkey…
- Trees and some idea of rainforest habitat

Eco Interdependence
- Animals make homes in the trees
- People use the wood from trees to build houses

Problem
- People (a group of men) chop down trees to do this
- The cutting of trees leaves the animals homeless
- Without the trees the animals would also have no food
- The animals were upset

Resolution
- Animals knew they had to do something
- Told the men they'd lose their homes and food w/out the trees
- Men understood (knowledge) and stopped cutting (compassion)
- Men helped animals make signs (rules) that said not to cut down trees
- Animals made sure (enforced?) no one cut the trees again!
- So no one cut down trees again (so simple)

Morals/messages Within
- It is good to save the animals (value animal's survival)
- It is bad to cut the trees (not necessarily for the trees sake)
- People understand taking away the animal's homes and food is wrong
- People and animals will take action when something is wrong
- Rules are abided by

2. Rainforest in Danger

Scientific/ecological Knowledge:
- Rainforest habitat: flowers, trees with many shades of green and hanging vines, and tons of animals like parrots, jaguars, iguanas, tree frogs, snakes and more

Eco Interdependence:
- Trees are the animal's homes
- Trees give the animals food
- Cutting the trees "kills the whole environment"

Problems:
- People bring in noisy foreign machines
- People use them to cut down the trees
- People taking away animal's trees, food, homes
- Animals were afraid (ran away)

Resolution:
- Nice old man who lives nearby (local!) came to help
- He planted more trees (like the ones there)
- He talked to the loggers and explained the interconnectedness (you're killing the whole environment)

- The loggers never came back b/c the old man would be angry and tell the police they're killing the environment (again – rules)
- Rainforest back to normal again (in the end)

Morals/messages Within:

- Rainforest is beautiful
- Trees are beautiful
- Animals happy, rainforest peaceful – until people came **
- People strangers to the rainforest
- Construction machines are bad (loud, destructive) – axes, hatchets, machines
- It is bad to cut trees
- It is bad to "kill the whole environment"
- Police will enforce the non-killing of the whole environment
- Rainforest is "normal" without people

3. Three J's in Africa

Scientific/ecological Knowledge:

- Place called Africa
- African Elephant and Rhino

Eco Interdependence:

- Idea of Wildlife refuge…human protection of wildlife
- People make jewelry from animal parts (horns, tusks)
- Killing an animal can hurt the environment

Problems:

- No hunting allowed but poachers are killing elephants and rhinos
- Poachers using the animals for jewelry

Resolution:

- It kept happening for years and years
- Today there are not many African elephants and rhinos left
- So learn from this

Morals/messages Within:

- "Killing an animal can hurt the environment"
- Permanent damage because people didn't listen to the rules
- Someone doesn't always fix it, rules don't always work
- Poaching is bad
- Used the narrative form to show consequences by example

4. Arctic Adventure: Oil Spills in the Ocean

Scientific/ecological Knowledge:

- Arctic ocean
- Iceberg
- Small fish, bigger fish, seals, polar bears

Eco Interdependence:

- Oil killed half the small fish
- Food chain: killing half the small fish caused the bigger fish to barely have enough food so a quarter of the bigger fish died
- The seals did not have enough to eat so half the seals died
- Polar bears dies not have enough food b/c not too many seals
- People fixed it

Problems:

- The JVL (ship) crashed into the iceberg and caused a big oil leak
- Fish died so whole food chain up to the polar bears was hurt (many died b/c not enough food)

Resolution:

- The people patched up the boat
- The people cleaned up the water
- They did it all so the animals could be safe again

Morals/messages Within:

- Damaging something has more effects than just harming what is damaged
- Interconnectedness of all things (food chain)
- People can fix it

5. Botswana Fire

Scientific/ecological Knowledge:

- Botswana – a dry habitat…fire
- Water puts out fire
- Some animals – elephant, vulture, snake…

Eco Interdependence:

- Each animal has a role
- The elephant can get water
- Work together (teamwork to solve a problem)
- The fire affects all the animals

Problems:

- There is a fire in Botswana…the animals are in danger

Resolution:

- Elephant brings water, puts out fire
- Everyone (all animals) are saved

Morals/messages Within:

- It's better to work as a team than by yourself
- "Come on you stupid, don't start stalling"
- Fire is bad
- Save each other, help one another

6. Fix the City

Scientific/ecological Knowledge:

- City basics – few trees
- History – there were log cabins and clean air and trees

Eco Interdependence:

- Trees help clean the air
- Cars and factories pollute
- Planting trees can help
- People can harm and help

Problems:

- Pollution, smog, tons of cars
- City needs fixing

Resolution:

- The kids take action
- Clean out the old dump and make a park
- "The environment is up and running and there are more trees than ever that remind us of the past"

Morals/messages Within:

- Kids can help
- People can fix the problems
- Trees are good
- City needs fixing

7. Help the Butterflies!

Scientific/ecological Knowledge:

- Meadow habitat
- Where butterflies live
- Gave the butterflies water, grass and leaves
- Butterflies cant live in a little box

Eco Interdependence:

- Animals need homes – need to live in their natural habitat

Problems:

- Children catch the butterflies
- Leave the lid open while getting more food

Resolution:

- Teck and Monique escape but it is too late for Monique – her spirit flies to butterfly heaven
- Joe and Janet realize what happened
- They never put a wild creature in a box again

Morals/messages Within:

- Never catch a butterfly or any wild creature/ never put a wild creature in a box no matter how beautiful it is – Che bello!!
- Wild creatures (butterflies) are beautiful
- Wild creatures belong in their habitat
- Take a lesson from this my children
- Catching creatures is bad
- Spiritual dimension (value of beauty spirit and the natural setting)

Appendix G

Key points in stories that I read *to* them:
Analysis of The Stories used in the Curriculum (Children's Books)

Looked at Scientific Information, Themes of Ecological Interdependence, Problem/Resolution and Morals or Messages within the story.

1. Just A Dream – Chris Van Allsburg

Eco Interdependence:
- Planting trees helps the environment

Problem:
- Boy dreams of terrible futures based on the unsustainable actions of today
- Littering
- Hotel on Mt Everest (value of beauty)
- Pollution
- Dumping/Waste

Resolution:
- Boy changed his ways, picked up trash, planted tree
- The future is a better place

Morals/Messages Within:
- Individual Action can make a difference/affect the future
- Old ways (no motor lawnmower) are good
- Plant Trees – Green is good
- Traffic/cars are bad
- Slow down

2. Agatha's Feather Bed – Carmen Agra Deedy

Ecological Interdependence:
- Nothing comes from nothing
- Everything comes from something
- Where all sorts of everyday goods come from…cotton, wool, linen, leather, silk, ivory, paper, rubber, fossil fuels etc…

Problem:
- The geese whose feathers were used to make Agatha's feather bed are cold and want their feathers back…

Resolution:
- Agatha makes them all warm coats with her long white hair…to last the winter until their coats grow back (like her hair)

Morals/Messages Within:
- Everything comes from something
- We need natural resources
- The things you do and use effect others…we are dependent on one another

3. Tuna fish Sandwiches – Patty Wolcott

Eco Interdependence:
- Food chain
- Where tuna fish comes from?

Problem:
- We start with little plankton…

Resolution:

- We make tuna fish sandwiches!

Morals/Messages Within:
The sandwich you eat on your plate originates in the ocean

4. The Great Kapok Tree – Lynne Cherry

Scientific/Ecological Knowledge and Eco-Interdependence:
Each animal and their plea not to cut down the Kapok tree…

- Jaguar – his food lives there
- Boy – All the life there (his home)
- 3 Toed Sloth – The value of beauty
- Tree Frog – Animal's homes
- Toucan (birds) – seen where people build and settle – clear the land – destruction of forest
- Tree Porcupine – Humans need oxygen – Trees Produce Oxygen
- Boa Constrictor – Ancestors (many generations have lived here)
- Bee and Butterfly – Pollinates the trees and flowers and his home is there – no more flowers and trees without him
- Monkeys – roots will die and nothing to hold the earth in place
- Anteater – The future – the children and the beauty of trees

Problem: The man wants to cut down the tree - all of the above reasons why it is a bad idea
Resolution: The man does not cut down the tree – he awakes with "new eyes"
Morals/Messages Within:
Tell someone and they will listen
All of the above messages from the animals

5. Pass the Energy Please – Barbara Shaw McKinney

Eco Interdependence, Scientific Knowledge:

- Phytoplankton, all species
- Food Chain
- Photosynthesis
- Decomposers
- Herbivores, Carnivores, Omnivores
- African Plain, Meadow, Arctic Ocean, Woodland
- Species and their needs
- Where humans interplay…

Plot: Explanation of the different roles each species has to play and what happens when the chain is broken…
Moral/Message: Each living creature has a role to play

6. The Lorax – Dr. Seuss

Problem: The once-ler's needs for thneeds are cutting down all the truffela trees…the animals are dying with out them – food & homes, there is air and water pollution – the last tree is cut and the land is no more
Resolution: Here is the last truffela seed – plant it and bring back the trees and then the others will return and we can right this wrong
Moral

- You can make a difference
- Business is bad (when you cut down all the trees)
- Must think to the future
- "I speak for the trees" - the trees and other creatures need to be heard as well

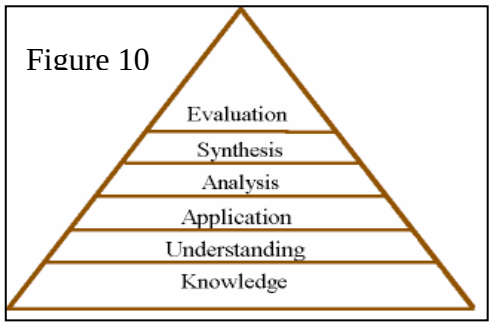
7. Hey Little Ant – Phillip and Hannah Hoose

Problem: The kid is about to step on the ant. His friends want him to. He and the ant go back and forth about it in conversation
Resolution: the ending is up to the reader to decide
Moral/Messages:

- Perspective is important – what if you were small and the ant so tall
- Each Creature has a life, role and responsibility
- Don't listen to everything your friends/family says
- Think for yourself
- Importance of "right and wrong"

Appendix H

Bloom's Taxonomy



This hierarchy (Figure 10) show's Bloom's taxonomy of educational objectives, from the lowest or simplest order (knowledge) to most complex (ability to evaluate):

Competence

Skills Demonstrated

Knowledge

* Observation and recall of information
* Knowledge of dates, events, places
* Knowledge of major ideas
* Mastery of subject matter
* *Question Cues:* list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.

Comprehension

* Understanding information
* Grasp meaning
* Translate knowledge into new context
* Interpret facts, compare, and contrast
* Order, group, and infer causes
* Predict consequences
* *Question Cues:* summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend

Application

* Use information
* Use methods, concepts, and theories in new situations
* Solve problems using required skills or knowledge
* *Questions Cues:* apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover

Analysis

* Seeing patterns
* Organization of parts
* Recognition of hidden meanings
* Identification of components
* *Question Cues:* analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer

Synthesis

* Use old ideas to create new ones
* Generalize from given facts
* Relate knowledge from several areas
* Predict, draw conclusions
* *Question Cues:* combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if, compose, formulate, prepare, generalize, rewrite

Evaluation

* Compare and discriminate between ideas
* Assess value of theories, presentations
* Make choices based on reasoned argument
* Verify value of evidence
* Recognize subjectivity
* *Question Cues* assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize

Adapted from: Bloom, B.S. (Ed.) (1956) Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain. New York ; Toronto: Longmans, Green.

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Footnotes

[1] Silent Spring is frequently identified as the catalyst for the environmental movement of the 1960sand 1970s, which differs from earlier conservation movements because it was far more widespread and popular, involving public values that stressed the quality of the human experience and hence of the human environment.

[2] Moral issues include thoughts, feelings, and actions toward self, other people and the environment.

[3] A Brief History of Environmental Ethics as an Academic Field: Environmental ethics is the discipline that studies the moral relationship of human beings to, and also the value and moral status of, the environment and its nonhuman contents.[3] The inspiration for environmental ethics was the first Earth Day in 1970 when environmentalists started urging philosophers who were involved with environmental groups to do something about environmental ethics. An intellectual climate had developed in the last few years of the 1960s in large part because of the publication of two papers in Science: Lynn White's "The Historical Roots of our Ecologic Crisis" (March 1967) and Garett Hardin's "The Tragedy of the Commons" (December 1968). Most influential with regard to this kind of thinking, however, was an essay in Aldo Leopold's A Sand County Almanac, "The Land Ethic," in which Leopold explicitly claimed that the roots of the ecological crisis were philosophical, (originally published in 1949, but widely available in 1970). Eugene C. Hargrove founded the journal Environmental Ethics in 1979. The name of the journal became the name of the field. (20) The 1990s began with the establishment of the International Society for Environmental Ethics, which now has members throughout the world. In 1992, a second philosophy journal dedicated to environmental ethics, Environmental Values, published its first issue in England. In 1996, a new journal was established at the University of Georgia, Ethics and the Environment, and in 1997, the International Association for Environmental Philosophy was created. (20)

[4] Loughland et al, recommended that educational programs be developed that acknowledge this variation in young peoples' understanding, and such programs should focus on helping students shift their awareness from the limited, objectified views to the more expansive, relational views (T. Loughland et al., 2002).

[5] I was fortunate enough to be permitted to teach Mrs. Blenheim's third grade class, section 3A.

[6] See discussion of a Child's Natural Curiosity

[7] When stories are carefully chosen, the characters and plots model positive lessons for environmental and cultural stewardship as well as social behavior. Stories also introduce environmental subjects and form crucial bridges connecting education disciplines and ways of experiencing the world (M. Caduto, 1998).

[8] Academic culture has been undergoing a shift in thinking from 'disseminating knowledge' to learner-focused models, which value 'making learning possible.' providing a context in which students can engage productively with subject matter (Gartner et al, 1996).

[9] G. Smith (2002) emphasizes the importance that learning experiences allow students to become the creators of knowledge, actively engaged in the curriculum, rather that the consumers of knowledge created by others.

[10] "With the increased recognition that Environmental Education has received since the controversial ICEE report, there has also been increasing acceptance of and interest in qualitative research within the field (Marcinkowsi, 2000[10])." Qualitative research has been extremely influential in understanding the sociology of education in a way that quantitative research cannot. There are compelling reasons for the selection of qualitative methodologies within the educational research arena *Kaplan* and Maxwell (1994), argue that the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified.

[11] The last day of class the students were asked to perform this task based on what we had done, read, and learned over the past three weeks.

[12] Based on Loughland's 2002 study, in analyzing this pre-post test, I was looking for relational descriptions of the word environment. See summary of Loughland's findings.

[13] After some help, she said she 'remembered.'

[14] There was at least one girl in each group. On average, the girls in the class were nine years old, while most boys were eight years old. The boys generally looked to the girls in their group for direction, and the girls took the lead.

[15] Some my have been instilled with an ethic of responsibility for the environment from a young age. Other narratives, people, contexts and factors may have influenced their stories.