

April 24, 2001

Ms. Sona Chambers  
The Captain Planet Foundation  
One CNN Center, 6 North  
Atlanta, Georgia 30303

Dear Ms. Chambers,

I am writing to you because your organization, the Captain Planet Foundation, has sponsored environmental projects undertaken by various schools throughout the world. Additionally, I feel that I have a project that fits with your mission statement that "through environmental education, children can achieve a better understanding and appreciation for the world in which they live."

I would like to propose a solution to the problem of the lack of environmental education provided in New Jersey public schools. Today's elementary school students are not aware of the myriad of environmental problems that New Jersey and the rest of the world face. Examples of local issues that the students are not aware of include urban sprawl, beach pollution, and air pollution. It is important that these problems are brought to their attention. Students are able to learn and understand information about the environment at a young age, and can be taught that their actions have a direct impact on their surroundings around them. Their increased knowledge will lead to long-term benefits for the environment.

My plan involves sending volunteer students from nearby Cook College into the Lord Stirling School to teach the students about environmental matters. They will learn through a combination of field trips, class discussions, and hands-on activities. The effectiveness of the program will be determined in part with the aid of the North American Association for Environmental Education guidelines, and if the program is effective it can then spread to other neighboring elementary schools.

I hope that you find my proposal to be an acceptable and feasible solution to the problem of the lack of environmental education. It has the potential to point the educational system on the right track to providing elementary and secondary school students with a comprehensive environmental education program. If you have any questions, then please contact me at (732)-555-7209. Thank you for your time and attention to my request, and I look forward to hearing from you in the future.

Sincerely,

Jill K. McCarthy

# **Environmental Education in Elementary Schools**

**A program for the students of  
Lord Stirling Elementary School  
New Brunswick, New Jersey**

**Submitted by: Jill K. McCarthy**

**Submitted on: April 26, 2001**

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## **ABSTRACT**

There is a lack of environmental education taught in elementary schools throughout the nation. Students should be taught at a young age that they have a direct impact on the environment as well as the environment having a direct impact on them. They are capable of comprehending environmental matters at a young age, as evidenced in numerous studies. A good example of this is the Bryant and Hungerford study which concluded that kindergarten students are capable of linking environmental problems to their own daily lives. A solution to this problem is the establishment of a program at the Lord Stirling Elementary School in New Brunswick, New Jersey in which volunteers from Cook College will teach environmental lessons to the students there. New Jersey was chosen in part because of the wide array of environmental problems it faces, such as Superfund sites and beach pollution. Cook College was chosen because it has a strong environmental focus and the students who attend have a solid background in the sciences. The Lord Stirling School was chosen because of its proximity to the Cook campus (a five minute walk), and also, due to its urban nature, the students have little exposure to what would be considered the natural environment. The effectiveness of this program will be determined in part by the guidelines set by the North American Association for Environmental Education, and if it is proven effective, the program can easily expand to other schools. Ideally, increasing the children's knowledge about the environment will have a positive effect on their attitude towards the environment, which will in turn affect their behavior. They will consider their everyday actions more carefully and understand that everything they do has an impact on the environment. This program will have a positive effect on the students as confident citizens and will ultimately benefit the environment in the long run.

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## Introduction

Environmental education is currently not a part of our country's elementary school curriculum. Environmental issues directly affect each individual, and the action of each individual directly affects the environment. It is important for people to learn this at a young age. This makes elementary school an ideal place to introduce children to local, national, and global issues that relate to the environment.

I initially want to focus on a school in the state of New Jersey. New Jersey has the highest population density in the country and is also the first industrialized state (Morren 78), so as such it experiences many environmental problems. A partial listing of these problems include urban sprawl (Baehr), the largest number (110) of Superfund sites in the country (Morren 112), air pollution (ozone in particular, according to the Ozone Action Partnership website), and beach pollution (Hill). All of these issues have a direct impact on the residents of New Jersey, and younger students are no exception. They should be aware of what is going on around them, which will in turn have beneficial effects for both the students and the environment.

I propose to implement a pilot program at Lord Stirling Elementary School in New Brunswick, New Jersey, in which college students from nearby Cook College (part of Rutgers University) will volunteer to go into each classroom and instruct the students in environmental matters. Cook College is a land-grant institution and as such, the students who attend are exposed to and acquire a strong environmental background. The elementary school is a short five-minute walk away from the campus.

The Lord Stirling School is an urban school (see Appendix A for a picture of the school). Most of the students who attend the school live in apartments, so they do not even have front lawns, let alone any type of exposure to the environment as it is commonly defined. When the students of a fifth grade class were asked to name things they do in their daily lives that affect the environment, they were unable to provide any responses (interview with Mrs. Robinson's class, 3/30/01) (see Appendix B for a picture of the class). The volunteers will raise the awareness of the students to matters that they had never before considered or heard of, even though these issues have a direct impact on their lives.

If the program is effective in increasing the knowledge and awareness of the students, it can then spread to other schools in the area. The breakdown of relevant student populations (NJ Dep. of Education website) is as follows -

<b>School/District</b>	<b>Number of Students</b>
<b>Lord Stirling Elementary School</b>	<b>311</b>
<b>New Brunswick City School District</b>	<b>3530</b>
<b>Middlesex County Schools</b>	<b>105245</b>
<b>New Jersey Schools</b>	<b>1289211</b>

All of the students at the Lord Stirling School will be a part of the program. New Brunswick City, the school district that Lord Stirling is a part of, is also home to seven other elementary schools. If the program is effective in the Lord Stirling School, it can then move to the other elementary schools and, at some later date, also to the intermediate and high schools. After the program reaches the New Brunswick City students, it could then move on to the Middlesex County schools and schools in the rest of the state. The effectiveness of the program

will be assessed with the aid of an environmental education effectiveness survey created by the North American Association for Environmental Education.

The initial costs of the program will be minimal, as it is run by volunteers. The primary costs that need to be funded are for the classroom supplies. Other costs include the recruitment and training of the volunteers. The benefits of this program will far outweigh the costs incurred.

## **Literature Review**

Environmental education programs follow the knowledge-attitude-behavior change model first proposed by Matthews and Riley (1995), which asserts that an increase in knowledge leads to a change in attitude, which then influences behavior. Numerous studies have been done on children who have experienced environmental education units, and the results have shown that these students can understand the concepts they are presented with and have more positive attitudes towards the environment than their classmates who did not receive the same lessons.

Bryant and Hungerford (1977) evaluated the effects of a one-month kindergarten unit on the environment and pollution problems. At its conclusion, students were found to be able to develop concepts concerning environmental issues. In addition, they were also able to say things that they themselves could do to help alleviate environmental problems, and were able to differentiate the things they could do from things that older people, such as their parents, could do. The fact that kindergarten students are capable of linking environmental problems to their own daily lives, even after a brief one-month program, shows that students are never too young to care about and comprehend environmental issues.

Jaus (1984) conducted a two-year longitudinal study on the impacts of environmental education on third grade students, with a follow-up when they were fifth graders. The study concluded that the students who did receive the environmental education as third graders had significantly more positive attitudes towards the environment as fifth graders than their peers who did not. This study supported the beliefs that minimal instruction in environmental education is effective in producing highly positive attitudes toward the environment in elementary school children, and that these positive attitudes are retained over time.

Hellden (2000) also presented a longitudinal study of the development of students' scientific conceptions regarding ecological processes. These processes included conditions for life, decomposition, and the role of the flower in plant reproduction. The study focused on twenty-three students who were interviewed eleven times between the ages of nine and fifteen, and were interviewed again at the ages of fifteen and nineteen. The study concluded that conceptions developed at an early age were important for future conceptual development, so an early introduction of certain scientific concepts could aid students in more fully understanding ecological processes. This conclusion could easily be extrapolated to say that an early introduction to environmental issues could aid students in better understanding the environment around them.

Hungerford and Ramsey (1989) tested the effects of a formal environmental education program on the environmental behavior of seventh graders. The study evaluates the effectiveness of the program using several key components and provides information on pre-/post tests that were given to assess the impact of the environmental program. The study concluded that the program was indeed successful in increasing the students' environmental awareness.

### *Existing Programs*

There are a number of states (not including New Jersey) that have different types of environmental education programs in place. In Wyoming, teachers from most of the 49 school districts organized themselves and developed a curriculum guide called "Wild Wonderful Wyoming". The teachers involved also trained their peers how to use the guide. In Wisconsin, it is mandatory that all teacher candidates in science and social studies receive instruction in the

conservation of natural resources. It is also mandatory that conservation education be taught in every public school (Ruskey).

Ten states (Arizona, California, Florida, Iowa, Maryland, Ohio, Pennsylvania, Wisconsin, Arkansas, and Missouri) have established environmental education trust funds for raising money from public and private sources. Some of this money comes from pollution fines, license-plate sales, and private donations (Ruskey).

In Oregon, a one-year Environmental Learning for Families (ELF) program is being established. The program is sponsored by the EPA and consists of trained teachers instructing families in environmental matters. A focus will be placed on environmental activities. The families will be from the thirteen elementary schools and at least fifty families are expected to participate (<http://www.col-ed.org/elf/elfabstract.html>).

It should be noted that a number of other states besides the ones discussed also have innovative environmental education programs in place. However, my search for environmental education in New Jersey yielded little information. New Jersey should move to join these other states in their efforts, and the Lord Stirling program will be a good place to start.

### *Curriculum*

Dr. Ronald B. Childress wrote a paper (1978) detailing environmental education programs that existed in public elementary and secondary schools. The information he included was obtained by sending surveys to the participating schools. Among the things he focused on were program justifications, objectives, factors influencing content selection, sources of content and instructional materials, instructional strategies, and curriculum development constraints. I am presenting this paper so it can serve as a framework for my plan, which is detailed in the following Proposal section.

The primary justifications for the existence of the programs that were most often noted were "Ecological", "Conservationist", and "Educational". The definition of the Ecological justification is that "if 'everything is connected to everything else', we need to learn to respect the relationships of interdependent social and biological systems. Environmental education supports such understandings." (Childress 5). The Conservationist justification is defined as "students must be taught the wise use and development of the Earth's limited supply of natural resources" (Childress 4). The Educational justification is defined as "traditionally, education has served to equip citizens with the knowledge and understanding needed to make decisions and take action. Environmental education is a key to solving society's pressing environmental problems." (Childress 5). The justification least noted is "Religious".

Out of the eighteen objectives presented on the survey, the two that were most reported to be primary objectives were "to become knowledgeable concerning their total environment" and to "develop an appreciation for their environmental resources" (Childress 6).

For matters related to course content, teachers working in the program had the most influence. Content was primarily based on the personal and social needs of the students, student interest, teacher interest, local environmental problems and concerns, and beliefs based on how students learn. The least important influence was reported to be the availability of a state-adopted test book.

Biology was the subject reported as the most used source of content and subject matter. Materials developed by the teaching staffs were the primary sources of instructional materials in the majority of the programs, while a published textbook representing a single discipline was not a source of instructional materials. The instructional strategies most often used were reported as small group projects, class discussions, and field trip/community resource visits.

The most often observed curriculum development constraints were lack of funding and not enough time to develop curricula, closely followed by inadequate teacher training. These will not be problems faced by my program, as will be discussed later in my proposal.

# Proposal

My proposed solution entails the development of a pilot program at the Lord Stirling Elementary School, a public school in New Brunswick, New Jersey. Volunteer college students from nearby Cook College (part of Rutgers University) will teach environmental concepts and problems to the students there. The lessons will consist of many hands-on activities, field trips, and group discussions. If the program is successful, it could then expand to other schools throughout the state.

There will be volunteers for every class in every grade, K-8. The classes at Lord Stirling range in size from nine to eighteen students. Initially, the volunteers will enter the classroom once a week for an eighty minute lesson (the length of a normal class period). This lesson will be held during a science period, because upon viewing the school's performance results for the fourth and eighth grade assessment tests (obtained from the NJ Dep. of Education website), the students scored higher in the science category than in English or math.

The program will operate out of the Douglass Project building, located on Bishop Street. The building houses the Outreach project as well, which is another student volunteer program. I have already spoken to the coordinator, Christine Dyer, about sharing parts of the facility. The building is at most a five minute walk from the school (see map, Appendix C).

## *Justifications and Objectives*

The justification for my proposed project will be a combination of the Ecological, Educational, and Conservationist justifications. Students will learn that everything is interconnected and that their actions have a direct impact on the world around them, given that all of our resources are limited. This will give them the knowledge needed to develop a positive environmental attitude and to take action in preserving the environment.

The objectives of environmental education programs that were listed in the Childress study are certainly objectives of my project, as well as one that I will add that follows my paradigm - students will develop a positive attitude towards the environment that will persist over time, and this will elicit positive behavior changes that will benefit the environment in the long term.

## *Volunteers*

The only requirement needed to be met in order to volunteer is that the student attend Cook College. My program will rely on the college student volunteers to provide the course content, and Cook College is a school that has a strong environmental focus. In addition, all of the students at Cook have a solid background in the sciences, as it is a part of everyone's curriculum. Students will not receive academic credits for their participation in the program; it is strictly volunteer work.

There will be three to four volunteers per class, for grades K-8. There are twenty different classrooms at Lord Stirling, and are broken down as follows (interview with C. Dyer, 2/23/01) -

<b>Grade Level</b>	<b>Classrooms</b>
<b>k</b>	<b>3</b>
<b>1</b>	<b>3</b>
<b>2</b>	<b>3</b>
<b>3</b>	<b>3</b>
<b>4</b>	<b>3</b>
<b>5</b>	<b>2</b>
<b>6</b>	<b>1</b>
<b>7</b>	<b>1</b>
<b>8</b>	<b>1</b>

The number of student volunteers needed to include all of the classes in the program is between sixty and eighty.

Recruitment of the students will be accomplished by the posting of fliers around the Cook campus. Fliers will be placed in the residence halls and apartments, and in places like the student center, recreation center, dining hall, and mail room. An ad will also be placed in the Green Print, the student newspaper of the campus.

All volunteers will attend an initial training whose purposes are to teach them how to create an effective lesson plan, help them decide what they would like to teach in each grade (so the lessons are somewhat uniform), and instruct them in the different types of student learning styles. The training is also where the students can meet the other volunteers who are in their group. Several team-building activities will be held so the volunteers become more comfortable with their group members. In addition, participants will be walked over to the Lord Stirling School so they can see where it is and so they will also be able to meet their classroom teacher. The training will be run by one of the Cook/Douglass faculty members who is involved with the CASE program (an experience-based education program) and who will be aided by Christine Dyer and myself.

#### *Curriculum/Content*

The curriculum of my proposed program will focus on local environmental problems and concerns (like lack of open space and litter), which can then be used as a microcosm for other, more large-scale environmental problems. Depending on the grade level, community problems will be extrapolated to problems faced by New Jersey, the rest of the country, and the world as a whole. Throughout these lessons, an emphasis will be placed on how the actions of the individual students have a direct impact on their surroundings, and on encouraging them to think of things that they and others can do to help the environment. Both current and past events will also be discussed with the students.

The volunteer students will already have an interest in environmental issues, and will present the topics they choose to discuss in such a way that the students will find them to be interesting. In addition, beliefs based on how students learn will also play a part in the program content. All learning styles will be catered to through the combination of brief lecture, group discussion, experiments, and field trips that will be used.

The subject of biology will also be an important reference for my program, as will ecology. These are useful subjects because they teach how environmental systems work and interact with one another. However, they will not dominate the educational program, as its focus is not to fill the students' heads with an excessive number of facts, but to set them on the path to thinking and reasoning things out for themselves. Environmental issues will be the subject of most discussions, and material dealing with sociology, politics, and economics will be introduced as well (depending on the grade level).

As in the schools surveyed in the Childress report, group work, class discussions, and field trips will be the most employed instructional strategies. Group work and class discussions are important because they foster the exchange of ideas, and encourage the students to actively learn, rather than being lectured to and absorbing bits of fact and the ideas of other people. Field trips are also essential, so the students can see what they are learning about. Currently, the students at Lord Stirling Elementary School have one science-related field trip per year (interview with C. Dyer, 2/23/01), and it is not necessarily environmentally related. Environmental field trips that the students could take are to the local Helyar Woods and Rutgers Gardens, the Cook College Farm, the local water treatment plant, recycling plant, or the energy generator on Busch campus. These trips would all be free, and many are within walking distance from the school. All students at Lord Stirling fill out "walking permission slips" at the beginning of the year, so they already have their parents' permission to take walking field trips. There could also be trips to other parts of the state, like to a Green Acres area, the Pine Barrens, wildlife preserve, or bird sanctuary.

The problems mentioned in the Childress paper (lack of funding, inadequate training) will not be problems faced by my proposed project. The volunteer college students already have a background in environmental issues, as that is the focus of Cook College. They will also be trained before entering the classroom, and will have their lesson plans pre-approved by the program supervisor and classroom teacher. Funding should not be a problem, either. The program is very cost-effective because it relies on the efforts of volunteers, and the majority of the field trips will not cost anything. The main thing that needs funding is the supplies that will be needed in order to conduct hands-on experiments with the students, and also for group-work projects.

#### *Expansion of the Program*

I would ultimately like to see the program at Lord Stirling expand to other elementary schools in the district, county, state, and possibly even beyond. There are seven other elementary schools in the New Brunswick City school district, with the Paul Robeson School being the closest to the Cook College campus (with the exception of Lord Stirling). As the program expands, the volunteers will need transportation to and from the schools not within walking distance. The Cook College Student Life van will be available for this purpose and will be operated by volunteers who have completed the required defensive driving course.

In order for the program to move to other schools, the Lord Stirling pilot program must first be proven to be effective. The North American Association for Environmental Education has established a system for determining the effectiveness of environmental education programs. They have developed a set of criteria that fall under one of four categories, and each criteria describes what each student could be expected to know at the fourth, eighth, and twelfth grade levels. I will give several examples for the fourth and eighth grades, but exclude grade twelve because Lord Stirling only houses K-8. Appendix D includes the complete NAAEE checklists with all the criteria listed. The student volunteers, with the help of the classroom teachers, will be responsible for completing the checklists.

#### **Personal and Civic Responsibility**

- grade four - students should be able to develop simple explanations that address their questions about the environment.
- grade eight - students should be able to synthesize their observations and findings into coherent explanations.

### **Skills for Understanding and Addressing Environmental Issues**

- grade four - students should be familiar with some local environmental issues and understand that people in other places experience environmental issues as well.
- grade eight - students should be familiar with a range of environmental issues at scales that range from local to national to global. They understand that people in other places around the world share many of the issues they are concerned about locally.
- grade four - students should understand that people depend on, change, and are affected by the environment.
- grade eight - students should understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.

### **Knowledge of Environmental Processes and Systems**

- grade four - students should be able to examine and express their own views on environmental issues.
- grade eight - students should be able to identify, clarify, and justify their views on environmental issues and alternative ways to address them.

### **Questioning and Analysis Skills**

- grade four - students should be able to understand the basic rights and responsibilities of citizenship.
- grade eight - students should understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.

I think that all of the criteria mentioned above and those included in Appendix D are essential for the expansion of the program. The ability of the students to meet the goals that have been set for them will give the program credibility, and will also make possible sponsors more eager to provide project funding.

## **Budget**

The initial expenses needed to establish this program are not very costly. The following figures were determined with the help of Christine Dyer, the head of the Douglass Project Outreach Program.

The Cook College volunteers are, of course, free. There will be an initial training which will cost approximately \$700 total. Included in this cost is the folders and assorted handouts that will be distributed to each volunteer, food (since the training will last the afternoon), and any materials necessary for the team-building activities that we will have planned.

Recruitment costs include the fliers and Green Print article. One hundred fliers will be posted around campus, at \$0.06 a copy for a total of \$6.00. The Green Print ad will cost \$60, so total recruitment costs are \$66.

The biggest expense will be the supplies, which will cost around \$2,000. This money

could be used to set up accounts at places such as Carolina Biological (a science materials supply company), A.C. Moore (a craft shop), and Edward's Supermarkets. The latter two places are local establishments. Also, if a group of volunteers choose to do an experiment for which they require additional supplies, they will be reimbursed from the supply fund. Therefore, the total price will be as follows -

<b>Expenditures</b>	<b>Price</b>
<b>Cook College Volunteers</b>	<b>free</b>
<b>Recruitment costs</b>	
<b>- fliers</b>	<b>\$6.00</b>
<b>-Green Print ad</b>	<b>\$60</b>
<b>Initial training</b>	<b>\$700</b>
<b>Supplies</b>	<b>\$2,000</b>
<b>Total</b>	<b>\$2,766</b>

## **Discussion**

The introduction of environmental education to elementary schools will lead to positive experiences for the students involved and will also provide far-reaching benefits for the environment. The knowledge - attitude - behavior change paradigm is a strong one in the field of environmental education, and numerous studies have been done that prove students exposed to environmental education have their awareness raised and have a more positive environmental attitude.

The Lord Stirling Elementary School in New Brunswick, New Jersey is an ideal place to initiate the pilot program due to the environmental problems faced by the state of New Jersey and also the urban nature of the school. The fact that Cook College is only a five minute walk away is yet another reason why the Lord Stirling School is an obvious choice. The students of Cook College all have a sense of environmental awareness and a strong base in the sciences, so they are the ideal volunteers to work at the school.

When the proposal is looked at as a whole, it is clear that the cooperative efforts necessary to implement the program are far less than the environmental benefits that will be derived from it. The program could easily spread to other schools as well, with only minimal increases in costs incurred along the way. It is time for New Jersey to join other states around

the country and introduce its own innovative environmental education initiatives, and this program is the place to start. In conclusion, the proposed environmental education program at Lord Stirling Elementary School will have a positive impact on the students' environmental attitudes and behavior, thus leading to long-term benefits for our environment.

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# **Appendix A**