1993

The development and construction of a model environmental study area

Samuel Joseph Patalano

Follow this and additional works at: https://scholarworks.lib.csusb.edu/etd-project

Part of the Environmental Education Commons

Recommended Citation
https://scholarworks.lib.csusb.edu/etd-project/827
THE DEVELOPMENT AND CONSTRUCTION OF A
MODEL ENVIRONMENTAL STUDY AREA

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education
Environmental Education Option

by
Samual Joseph Patalano
June 1993
THE DEVELOPMENT AND CONSTRUCTION OF A
MODEL ENVIRONMENTAL STUDY AREA

A Project
Presented to the
Faculty of
California State University,
San Bernardino

by
Samual Joseph Patalano
June 1993

Approved by:

Dr. Darleen Stoner First Reader

Dr. Janet Woerner Second Reader

6-1-93 Date

6-2-93 Date
Abstract

The planning for and the progression of work toward the establishment of an on-site, outdoor environmental science study area at an elementary school are described. Details of the steps taken to accomplish this goal, as well as a drawing of the area and its components are provided. Strategies used to raise funds for the project are reviewed, and a list of curriculum and resources that are appropriate for use within the area is included.
Acknowledgements

Thanks to:

Dr. Darleen Stoner for her assistance and support throughout the Master's Program,

Mrs. Lynne Patalano for saving me from myself and giving me back to the children.
Table of Contents

Abstract ............................................................................................................................... iii

Acknowledgments ............................................................................................................. iv

Introduction ....................................................................................................................... 1

Review of the Literature ................................................................................................... 4

Goals and Objectives ....................................................................................................... 14

Procedure for Establishing an Environmental Study Area ........................................... 17

Implications for Educators ............................................................................................... 32

References ......................................................................................................................... 34

Appendix A ....................................................................................................................... 36

Plot Plan of the Model Environmental Study Area ....................................................... 37

Appendix B ......................................................................................................................... 38

Sample Student Survey .................................................................................................... 39

Appendix C ......................................................................................................................... 41

School Board Proposal for the M.E.S.A. Project ......................................................... 42

Appendix D ......................................................................................................................... 44

California Education Initiative Fund Grant Application ............................................. 45

Appendix E ......................................................................................................................... 49

List of Curriculum for Use in the M.E.S.A. ................................................................. 50
Introduction

Thanks to a great deal of scientific investigation we, as a species, have finally come to some very overdue and crucial realizations about our environment and the way that it works. As a result of this we now find ourselves in a worldwide environmental crisis that calls for immediate action concerning the way we live our lives and interact with the planet. Vast changes in attitude and behavior must be made as soon as possible if we are to save what is left of the natural resources and biodiversity that now exist on the Earth.

In order to accomplish this considerable goal our educational system must enable our young people to develop an environmental ethic and attitudes that will pervade every facet of their lives, and allow them to begin to act responsibly when dealing with our natural world. Teachers at all grade levels need to provide learning experiences that support the understanding that people are intimately connected to all the physical and biotic components of the earth, and depend on them for the things we need to survive.
Based on my teaching experience, I believe that for this to occur much needs to change about the way we teach our children. Beginning in Kindergarten, and continuing through high school, science and environmental education need to move from their traditional spot near the rear of our educational agenda to the central focus of the teaching curriculum. Rather than treating these subjects as lesser disciplines to be addressed when time permits, they need to be integrated into the curriculum and utilized for instruction in all areas of education whenever possible.

The goal of this project is to provide the opportunity for the teachers at my school site, North Ridge Elementary School, to teach their students about the environment by providing them with an on-site, outdoor study area. By creating the Model Environmental Study Area (MESA), a fenced area of our campus designed to include a pond, garden, composting bin, weather station, native species display, and student research area, and by supporting its use with appropriate curriculum and teacher inserviceing, I intend to make teaching and experiencing hands-on environmental science readily accessible to the teachers and their classes on a daily basis.
The MESA will provide the staff with the materials and space necessary to implement a vast array of outstanding lessons directed specifically at experiential learning which promotes the development of conservation attitudes and behaviors. Many of these lessons are now impossible to teach, or are less than effective in their impact, due to the lack of an appropriate setting from which to instruct. As the different components of the MESA are developed (the area will be built in stages as funding permits) they will be gradually incorporated into the school's overall curriculum. This will result in more and more of the day's lessons in all the various disciplines being directed and reflected through the MESA. Eventually I hope to see the discipline of science, as it relates to the environment, become the focus of instruction at North Ridge, and for this school to become an example to be emulated by other schools in our district and elsewhere.
Review of the Literature

In order to support the development of an on-site outdoor study area at North Ridge Elementary School to be used for teaching environmental education, research was reviewed to answer the following questions:

1. What are the current educational policies held by federal and local governmental agencies, as well as school district officials, concerning the role of environmental education in public school curriculum?

2. What recommendations do educational research professionals make with regard to how and when environmental education should be taught in order to have the greatest impact on creating long term attitudes and behaviors related to the environment?

3. Does teaching environmental education outdoors rather than in the classroom make a significant difference in the development of students' attitudes and behaviors toward the environment and education in general?
4. How must teachers be prepared in order to teach environmental education competently and effectively outdoors? The results of this review are organized into subsections that respond to each of the above questions.

**Current Policies on Environmental Education**

The federal government has recently shown its support for, and expectation of, the public school systems of the United States to begin the integration of environmental education into curriculum by passing The National Environmental Education Act in 1990. Section 2 of this Act established the following comprehensive policy:

> It is the policy of the United States to establish and support a program of education on the environment, for students and personnel working with students, through activities in schools, institutions of higher education, and related educational activities, and to encourage post secondary students to pursue careers related to the environment (Marcinkowski, 1991, p. 7).

Reflecting this mandate for our students to receive more instruction in environmentally related topics, a recent statewide survey of California public school administrators and California education county directors conducted by Braverman and Rilla (1991)
concluded that agricultural literacy should be incorporated into science and social studies classes during the late elementary and middle school grades.

California school district administrators identified toxins in the environment and water quality to be two particularly important topics that need to be addressed. They also felt that students need this kind of education in order to participate as citizens in a democratic society.

Strategies for Teaching Environmental Education Effectively

As the need for increased education concerning the environment has been established, the question of the most effective way to deliver such a program must be addressed. Since the desired outcomes for students are not only knowledge and critical thinking skills, but also positive environmental attitudes, both the cognitive and the affective domains must be addressed when choosing educational strategies (Lozzi, 1989). Lozzi (1990), after making a comprehensive review of published literature, made several recommendations concerning environmental education. His first recommendation was to integrate the study of environmental
education into the existing curriculum at all educational levels with a focus on the affective domain. He suggested that at the Kindergarten through the third grade level, environmental emphasis should be focused on the immediate environment within and surrounding the classroom. Later, during the fourth through sixth grades, environmental study should take students into a larger field of study, perhaps to include the neighborhood and nearby community. Next he recommended that students should engage in outdoor experiences whenever possible. Specifically, he suggested walking tours around the school grounds with opportunities for the students to observe and discuss their likes and dislikes concerning their campus. Finally, Lozzi stated that the more sensory experiences that can be involved in the learning process the better. Touch, taste, smell, hearing, and sight can all contribute significantly to learning within the affective domain.

These recommendations clearly call for hands-on outdoor activities which involve all the senses and touch the emotional as well as the cognitive aspects of children. This opinion is echoed by the recently adopted Science Framework for California Public
Schools (California Department of Education, 1990) which called for major reform in the pedagogy of science instruction by California teachers. According to this framework, grade school teachers are expected to have students spend up to 40% of their science instruction period engaged in hands-on activities. These activities, as well as the other materials presented in classroom, should reflect real life experiences, and should consist of a variety of printed and audio-visual materials in addition to the science text (if one is being used). Furthermore, assessment should be modified in format and style to test for learning at a variety of thought levels, not just recall and comprehension, as has often been the case in the past. Journals, practical application of learned information, and portfolio assessment are all mentioned as alternatives to traditional testing.

According to research (Miller, 1975), the majority of a child's basic attitudes concerning environmental conservation and pollution are formulated between the ages of seven and twelve. In fact, it has been found that the level of concern about the environment and pollution grow steadily in students throughout these primary years,
and it is therefore apparent that this time represents a crucial period during which instruction concerning the environment is essential. Studies (Bryant & Hungerford, 1977) have demonstrated that students as young as six years of age can form concepts concerning the issues that impact their environment, and that these concepts can lead to some well developed environmentally responsible behaviors on the part of the students involved.

In two separate studies, Jaus (1982, 1984) tested the effect of environmental education instruction on children's attitudes toward the environment and their retention of those attitudes once established. The outcome of these efforts provides strong evidence that the teaching of environmental education at the elementary level is effective in producing highly positive attitudes toward the environment and that these positive attitudes are retained over time. He was further able to show that students who began with only slightly positive attitudes toward the environment prior to being exposed to any environmental education, were found to have strongly positive attitudes after only ten hours of classroom instruction on this topic.
Environmental Education Taught Outdoors

In a review of the literature on outdoor experiences by Crompton and Sellars (1981) it was found that the outdoors provides a more stimulating learning environment for relevant fields of study than the school classroom, given certain minimal criterion regarding length of experience and subject matter taught. Specifically, it was found that when the subject being taught outdoors was closely associated with the environment and was taught for a length of time in excess of five days, attitudes towards the learning experience were consistently more positive than those of the students taught the same material indoors.

In a separate study (Harvey, 1976) dealing with school site outdoor experiences, it was noted that most teachers use the outdoors as an educational tool less than three times a year. In addition to this it was found that when students were asked to observe and examine the vegetation on their school landscape they became more aware of it both in terms of its location and name. Concurrent student testing indicated an increase in their pastoralism (shepherd like attitude toward nature) and a
corresponding decrease in scores for human dominance toward nature.

Two educational programs which currently incorporate a dedicated outdoor area in their environmental education curriculum were reviewed in the literature. Kimbark Elementary School, in San Bernardino, operates as an environmental education magnet school, and incorporates an outdoor study area as a major portion of its Kindergarten through sixth grade curriculum. As a result of this program, and its emphasis on daily hands-on student involvement in the outdoors, student attendance as well as standardized test scores are among the highest in the district. Observers have also noted the high quality of science work done by the students, the positive environmental attitudes reflected in their writing, and the overall enthusiasm of the students at this unique school (Stoner & Overbey, 1989). Another program with a strong outdoor component designed into its science curriculum is J. W. Fair Middle School in Santa Cruz, California. Their Life Lab Program (Nelson, 1988) was developed to allow middle school students to grow their own vegetables while studying plants. This program was used by all the teachers at the
school and had three common goals: to teach practical applications of different subjects such as science and math; to show how the subjects interrelated; and to reinforce students' measuring, data collecting, and graphing. Implementation of this program has resulted not only in increased dedication by the students to their science classes, but increased involvement by the parents and the local community with the students learning about the environment.

Preparing Teachers to Teach Environmental Education

Research by Jaus (1978) indicates that, in general, teachers want to teach environmental education but simply lack the knowledge base to feel comfortable teaching it. Without adequate and consistent support both through demonstration and curricular support, it was shown that elementary school teachers tend not to access and/or utilize environmental education materials or curriculum. Furthermore, it was demonstrated within this study that once teachers receive inservice training on this topic they become more enthusiastic about teaching environmental education, and their own personal attitudes toward environmental topics tend to become more positive.
These findings were reflected in a study done by Ham and Sewing (1987-88) which identified, through personal interviews with elementary school teachers, the barriers that they perceive to be the most important in preventing them from teaching environmental education in Palouse-region public schools. The barrier identified most often in this study was lack of time both in the school day and for preparation, however lack of appropriate materials and personal competence were both found to be barriers by a large percentage of the study group. In addition, many of the teachers interviewed mistakenly believed that environmental education is only appropriate to teach within, or as an extension of their science curriculum. These teachers tended to focus their lessons almost entirely on the cognitive elements of the topic, overlooking the affective aspects such as appreciation of the environment altogether.
Goals and Objectives

The overall goal of this project was to complete the planning for, and document the progress toward, the establishment of an area on campus dedicated to the study of environmental science at North Ridge Elementary School. This Model Environmental Study Area (MESA) will provide the teachers and students at North Ridge with the space and tools needed to fully implement a comprehensive, hands-on environmental education program on site and outdoors. This planned area will measure approximately 6000 square feet and will contain within it a pond, a garden area with tools for student use, a compost pile, weather station, and a study area with tables, sinks, and running water. The entire area will be fenced and locked to ensure student safety and area security.

My initial objective within this project was to acquire both the consent and backing of not only my site colleagues and administrator, but the school district office and Board of Education. This was accomplished by first compiling data and opinions concerning this project from North Ridge staff and students using
survey and interview tools created and administered by my fifth grade students with my assistance. The results of this work was presented to the student body and staff in their classrooms by my students in the form of an environmental impact report. This report was also sent to the Board of Education of the Moreno Valley Unified School District, together with detailed drawings of the proposed area and its components to aid in their evaluation of the project's merit.

Once this first objective was accomplished, I next attempted to generate funding to finance the construction and outfitting of the MESA. To accomplish this objective I applied for grant money for the project, and solicited local businesses and utility companies for financial assistance and technical expertise. This effort was supplemented with programs designed to create funding for the project organized by the North Ridge School Booster Club.

My final objective was to provide the staff of North Ridge with a selection of environmental science curriculum that would be appropriate for teaching within the MESA. These lessons would provide teachers not familiar with outdoor education a selection of
instructional strategies and lessons that are easy to teach and take full advantage of the outdoor environment.
Procedure for Establishing an Environmental Study Area

Background Information

North Ridge, a Kindergarten through fifth grade "magnet school" which focuses its curriculum around science, mathematics, and technology, is located in Moreno Valley, California. It is the only "science magnet school" in the County of Riverside and thus is constantly being toured by individuals interested in how a state-of-the-art science program is operated.

Upon start-up in 1990, the teachers, most of whom were selected due to their expertise in the areas of focus, were provided extra funds to purchase the materials to create a model environment for the teaching of hands-on science and mathematics. The physical plant was enhanced, mostly through grant money, by the addition of computers, laser disk players, video-cassette recorders, and big screen televisions in each classroom, resulting in a truly unique classroom teaching environment. The staff then wrote site specific curriculum designed to take full advantage of the facility. This curriculum is centered around the subjects of mathematics and
science, and incorporates a large variety of technologies in both the
delivery of instruction by teachers and the production of work by
students.

The Model Environmental Study Area (MESA) project is an
extension of that effort aimed specifically at hands-on outdoor
activities which utilize the study area, and teach children how to
appreciate and care for their environment. By providing such an area
at North Ridge, a great deal of outstanding outdoor science and math
curriculum that cannot be properly taught in the classroom is made
available to the teachers and students on a daily basis.

Components of the Model Environmental Study Area

The MESA project will exist on approximately 6000 square
feet near the back of the school grounds currently covered with
lawn. The space is roughly the shape of a triangle with the
hypotenuse of approximately 180 feet facing north toward the black
top area (see Appendix A). When completed the area will contain a
pond covering about 950 square feet, a garden which will consume
another 2000 square feet, a large composting pile, a native species
demonstration garden of approximately 300 square feet, a weather
station, a storage container for storing and protecting materials and tools, and an area with tables and a sink for the students to use as a study center. The area will be landscaped with various trees, vines, and shrubs. All maintenance within the MESA will be the responsibility of the staff and students of the school, as specified by the District Office Maintenance Department.

The Pond

The pond will be large enough to maintain a biologically diverse population throughout the year. The bottom of the pond will vary in depth from one foot at the edge to three feet in the center, and will hold approximately 16,000 gallons of water when full. The pond bottom will be made up of a 20 mil plastic liner over which 2 inches of sand will be spread. Once the water circulation plumbing and skimmers are in place, cement will be pumped over the sand and pipe, forming the bottom of the pond. The pond design was donated by a landscape architect who prefers to remain anonymous.

The electrically powered (a generator will be used initially) compressor will push air through a mechanism in the center of the pond which will cause oxygenation of the water to occur as it rises,
while also forcing the water to be circulated through the grid of 2 inch PVC pipe at the bottom of the pond. This process will help to clean the pond water and will provide a filtering system for the small particulate matter in the water. Evaporation will be compensated for by addition of fresh water on a daily basis in order to keep the pond's circulating system operating properly.

Soil will be placed on the pond bottom near the shore in order to provide a place for water dwelling plants to thrive while being accessible to the students for collecting samples to study. The pond will periodically be inoculated with various forms of plant and animal life which will be studied and monitored by the students and faculty of North Ridge. Various other tests will be performed on a periodic basis including pH level, bacterial, and algae levels in the pond. Assistance with this testing has been promised by experts from Eastern Municipal Water District at no charge to the school.

The Garden

Year round gardening will be maintained by the students of North Ridge under the supervision of the teaching staff. The entire
garden will be divided into areas that will then be allocated to each of the classrooms for their use. All of the classroom teachers will be responsible for the maintenance of their own plot and will be provided a key for area access. Teachers may opt not to participate in this portion of the project, in which case another teacher may choose to enlarge the area that he or she cultivates. Flowers, spices, and vegetables will be grown seasonally to be used by the teachers in the classrooms.

The Compost Pile

Organic waste, suitable for composting, that is generated in the MESA, or anywhere else on campus (the cafeteria, classrooms etc.) will be put into a three stage composting bin to be constructed by the staff, students, and parents at North Ridge. When the decomposition process has been completed, the resulting compost will be returned to the garden and landscaping areas to improve and replenish the soil.

The Weather Station

The weather station will consist of a portable unit containing a variety of meteorological measuring devices to include an
anemometer, barometer, thermometer, hydrometer and rain gauge. This unit will be built by the author, and will be placed on a permanent stand within the MESA each morning and students will then take periodic measurements throughout the day. For security purposes this equipment will be returned to the classroom or the storage shed each evening.

Progress Toward Completion of the MESA

The following is a description of the steps that were taken to establish the Model Environmental Study Area (MESA) at North Ridge Elementary School. In every instance possible student involvement was emphasized in order to maximize their participation in, and education of, the process. Following each step is a brief description of how that particular task was accomplished, and any significant problems that were encountered during that particular phase of the project.

1. Selected the area at North Ridge to be used for the MESA.

   a. This choice was made through observation of student usage of the school grounds, landscaping considerations, and, with regard to concern for public safety and the threat of vandalism, its location
in relation to the street. The area chosen was used little by students, was at the back of the school site (away from the street), and is supplied with a constant supply of water as well as a one foot square drop drain leading directly to the street sewer.

2. Created a conceptual scale drawing for the MESA within the chosen area including each of the components (pond, garden, weather station, storage shed, compost pile, etc.) and their locations.

   a. Grading of the soil, existing sprinkler systems, and the actual size and shape of the proposed area were taken from the original blueprints of the school site. A copy of this drawing was then used as the basis for the MESA drawing which was completed on graph paper and included all of the various area components. A laminated color version of this drawing was used during the project presentations.

   b. A detailed drawing of the pond engineering was requested later in the approval process by the District Office during the risk management assessment of the project. Those drawings were provided as a donation by a landscape architect who preferred to remain anonymous due to potential liability concerns.
3. Created a budget proposal to include all of the approximate costs of the project from creation through long term maintenance, as well as a list of possible fund raising strategies to be used to fund the project.

   a. This was accomplished by requesting, and subsequently receiving estimates from local contractors for the building portions of the project. Prices for the tools, instruments, and materials were collected from a number of sources including catalogues and local vendors. Funding of the project was provided through an aluminum can recycling program, as well as traditional fundraising activities including candy sales, car washes etc. Donations of monies and/or materials were also taken into consideration.

4. Gained the consent and approval of the administrative staff at North Ridge to dedicate a sizable piece of our school site to be used as an environmental study area, and to incorporate this area concept into the current site plan and curriculum.

   a. Administrative approval was granted from my principal by providing a written description of the project, along with a brief verbal presentation, and a drawing of the proposed area. She agreed.
to the project with the following stipulations:

i) Gain approval of the project from the staff and students on site.

ii) Gain approval of the project from the Moreno Valley Unified School District Office and Board of Education.

iii) Fund the project entirely from non-site based funds.

iv) All decisions concerning the project made must include administrative knowledge and consent.

v) A library of appropriate curriculum that can be utilized in the MESA must be provided for staff use.

5. Gained the consent and approval of the teaching staff at North Ridge to not only give up the use of approximately 6000 square feet of the school playground, but to begin seriously considering the utilization of this area to study science, given specific inserviceing for such instruction.

a. Consent of the staff was granted by providing a presentation to them during a regular staff meeting. At this presentation drawings and a written description of the project were provided to each teacher. Concerns regarding the resultant shrinking
of playground space, the exact location of the MESA on our site, and the cost for building and maintenance were discussed. A unanimous vote to approve the project was recorded.

6. Gained the consent of North Ridge students for the conversion of part of their playground to an area for the study of science.

   a. In order to convince the students (and further assure the staff) that this project would not significantly impact the play space on the playground, and would instead be of considerable benefit to the school, an Environmental Impact Report (EIR) was compiled by the students of my fifth grade class. This survey consisted of roping off the area intended for use for a one week period during which videotaping, live interviews, and written surveys (Appendix B) were collected by the fifth grade students. These data were then compiled to be used for the following purposes:

      i) To demonstrate to the students that the space proposed for use was currently receiving little to no activity and would thus not impact their play routine.

      ii) To allow the students doing the EIR to be a part of
the process that would lead to the MESA, thus gaining pride and ownership in the project.

iii) To provide material for the fifth grade students to use during presentations to the rest of the student population about the current use of the space under question, and how the creation of the MESA would impact that area's use.

Once the report was completed, fifth grade students from the class that participated in the EIR study organized the materials and drawings, and prepared presentations to be given in each classroom of students at North Ridge. After these presentations were completed, students were asked to vote on whether or not they wished to have their play space or the environmental study area. Students overwhelmingly voted for the MESA project.

7. Gained approval of the project from the School District Office and the Board of Education. In order to accomplish this task, approval must first be gained from the District Office officials, and then the issue can be brought before the Board.

a. Plans were reviewed during a meeting at North Ridge by the Superintendent of Plant Operation for the District and the Head of
Plant Maintenance. After lengthy discussion and nearly six months of review by several individuals at the District Office, including those in the Risk Management Office, tentative approval was given with several stipulations, most regarding the safety of the students and the community that visit North Ridge. Those stipulations include:

i) The approval by the Director of Plant Maintenance for all permanent landscaping changes to be made in the area.

ii) The access gate of the area must remain locked at all times except when in use by the students and/or teachers at North Ridge. Furthermore, responsible individuals of the maintenance department must be provided keys for the lock to allow them access whenever they feel it necessary to enter the area.

iii) The individuals responsible at the District Office reserve the right to resume responsibility for the area if at any time or for any reason they feel it necessary to do so.

iv) Landscaping maintenance within the area is the sole responsibility of the staff and students at North Ridge and will not be attended to in any way by the District Maintenance Department.
v) Upon abandonment of the project, the area in question must be returned, at no cost to the District, to its original condition.

b. Approval by the Board of Education was gained by first writing a board proposal requesting their approval of the project (See Appendix C). Next, the fifth grade students from North Ridge presented the results of the data collected during the EIR to the Board in a regular meeting. This presentation, in conjunction with the modified plans approved by the District Office, convinced the Board to approve the project.

8. Generated funds to pay for the building and maintenance of the Model Environmental Study Area.

a. A California Educational Initiative Fund grant was written requesting funding of the MESA project (see Appendix D). The grant was not funded.

b. The fifth grade class, in cooperation with the school's Booster Club, established a school-wide fundraising program which included the recycling of both aluminum cans and plastic shopping bags. Weekly collections of these materials have provided a slow,
but steady, supply of funds to be utilized for maintenance of the area once it is established.

c. The North Ridge Booster Club has adopted the MESA project as its year long goal, donating all proceeds from the various events that they sponsor to the building of the pond.

d. Local utility companies have been successfully solicited for donations. These include Southern California Edison matching the donations of parents of students at our school who are employed by SCE, and Eastern Municipal Water District providing funds to build the fence surrounding the MESA.

e. Local garden and landscaping centers have been solicited by the students of the fifth grade through a letter writing campaign asking for support of the MESA project. Responses have been few, but those responding have been very positive and are willing to donate a variety of different items to the project, such as plants, fertilizers, and composting material.

f. Parents of the students at North Ridge have been asked to help in whatever way they are able. Response to this request has provided construction expertise, miscellaneous materials, and
plants. At the time of the writing of this project nearly $4,000.00 has been collected in this effort, as well as professional drawings and a variety of materials.

Current projections for the completion of this project are optimistically set for the 1993-94 school year. However, considering the fact that progress is based almost entirely on the collecting of funds for purchase of the necessary materials and services, specific dates for completion cannot be set with any certainty.

9. A list of suggested curriculum to be used in the MESA has been established and provided to the site principal for purchase (see Appendix E). This curriculum will be placed in the school's professional library for use by the teachers on site.
Implications for Educators

When completed, the MESA project will provide the teachers and students of North Ridge with a natural outdoor laboratory designed specifically for the teaching of environmental science through hands-on, cooperative activities. Along with the space to teach, a library of supporting materials and curriculum will be provided to assist those teachers that are not familiar with outdoor environmental education. These curriculum guides will be kept in the professional library maintained on site. In addition, the MESA will, with the help of the North Ridge students and teachers, support a complex and diverse population of living organisms.

Because the MESA will be the responsibility of all of the students of North Ridge, they will not only learn how to care for living things, but will hopefully gain a respect and understanding of the complexity and interdependence of all living things on the Earth. Over time this may lead to the development of an environmental ethic within the students that they can take with them into their adult lives. By constantly providing opportunities for both students
and teachers to observe and interact with nature on the school grounds, this area will become a resource for a variety of teaching strategies beyond the scope of indoor classroom environmental science.
References


Appendix A

Plot Plan of the Model Environmental Study Area
Appendix B

Sample Student Survey
This survey is going to help Mr. Patalano and his class build the Model Environmental Study Area at North Ridge School. The area will have a pond and will be located in the grassy area behind the basketball courts. There will be a garden and a weather station built around the pond. We, the students of 1990-1991, hope you like the idea of building an environmental study area and would appreciate it very much if you would answer the following questions.

1. Do you want to have a pond at North Ridge? 

2. What plants and animals would you like to see in the pond?

3. Would you like to put a garden in the pond area? 

4. When we build the garden, what vegetables and fruits would you like to have in it? 

5. Would you like a weather station in the pond area?
6. What do you think you could learn in the environmental study area?

7. How do you feel about having your playground room taken up by the pond and the surrounding study area?

Thank you,
Mr. Patalano's Class
Appendix C

School Board Proposal for the M.E.S.A. Project
TO: Gail Houghton  
Assistant Superintendent of Instruction  
Elementary Education  

FROM: Sam Patalano  
Fifth Grade Teacher  
North Ridge Magnet School  

SUBJECT: Environmental Study Area  

In keeping with the goals outlined in the North Ridge School Plan I wish to propose the dedication of approximately five thousand (5000) square feet of the grass area of our campus to the study of our natural environment. This area will be used by both students and teachers to conduct experiments, to teach and learn first hand about such subjects as life, earth, and water science, to recycle and compost waste material, to study and record the local weather, and to grow flowers and vegetables for our own use and enjoyment. By creating this kind of a learning center, students and teachers will be provided a unique opportunity to experience and understand how science and nature operate together, and how they are truly connected in the shaping of our fragile environment.

The Environmental Study Area will be created by installing an eight foot chain link fence across the far south corner of our playground connecting the two existing fences and enclosing a triangular shaped space that currently is infrequently used by students during their recreational periods. An informal survey was conducted during the Spring of 1991 asking the students and teachers if they felt that this was a valuable use of the area. The overwhelming majority responded favorably to this usage of the playground area in question. The fence enclosing the Area will
include two adjacent six foot gates providing plenty of room for vehicles to enter easily in case of emergency. These gates will remain locked at all times except when being used by the North Ridge staff.

Initially, the Study Area will contain a garden area, weather station, recycling center, compost pile, shallow pond for water and plant studies, and tables and benches for the students' use. All financial responsibility for the initial installation of the Environmental Study Area, as well as the ongoing utilization and maintenance of all the materials and tools within it will be the responsibility of North Ridge School. Furthermore, the grounds within the Environmental Study Area will be maintained by the North Ridge staff, students, and parents and will no longer be the responsibility of the M.V.U.S.D. Maintenance Department.

The staff and students of North Ridge look forward to the acceptance of this proposal and the start of a whole new area for study at our school. We feel strongly that it is just these kinds of active, participatory, and science-centered programs that our school is responsible to provide as the elementary science magnet school in our district.

cc: Superintendent Robert C. Lee
    Dr. Linda Wisher
APPLICATION GUIDELINES

Accompanying this application form is a letter to the principal. It contains important information about the CEIF program. Please read it carefully before completing the application.

To complete this application, please use only spaces provided. Do not attach additional materials or reduce the size of print. This will cause the grant application to be disqualified.

CEIF will accept only ONE application per school. Remember to include signatures from the principal and the district superintendent. Additional copies of this application form may be obtained by calling your district office or CEIF (415) 953-3175.

The completed application must be returned to CEIF postmarked no later than November 18, 1991.

Please address all questions and correspondence to:

Joanne El-Gohary, Administrator
California Educational Initiatives Fund
Department #3246
Bank of America Center
Box 37000
San Francisco, CA 94137
I. SCHOOL INFORMATION

North Ridge Magnet School
Complete Name of School

25101 Kalmia Avenue
Mailing Address

Moreno Valley, CA 92557
City Zip Code

(714) 485-5874
(Area Code) Phone Number

Sam Patalano
Program Leader's Name

(714) 485-5874
Program Leader's Phone Number

Moreno Valley Unified School District
School District

13911 Perris Boulevard
District Mailing Address

Moreno Valley, CA 92553
City Zip Code

Darlene Dolan
Principal's Signature

Darlene Dolan
Principal's Name (Please print)

Dr. Gail Houghton
Superintendent's Signature

Superintendent's Name (Please print)

TARGET AUDIENCE

Number of students, parents, teachers, administrators, and others (i.e., members of the community) participating in the program:

# of Students 900

# of Parents 900

# of Teachers 30

# of Administrators 2

# of Others All other schools in district.

DURATION OF PROGRAM (Funds will be disbursed in April/May 1992)

Beginning date: June 1992

Ending date: June 1993

PROGRAM COST

Amount Requested: $ 9,616.00

Amount from Other Sources (if applicable): $ 9,616.00*

*Anticipated donations of labor and materials, as well as live contributions may represent equal matching funds.
II. PROGRAM INFORMATION

TITLE OF PROGRAM: Model Environmental Study Center

A. Briefly describe the proposed program.
We wish to create an outdoor study area on our school site that includes a garden area, pond, weather station, compost pile and the tools necessary to maintain them. Accessible to all our staff and students, and supported by appropriate curriculum, this area would give everyone at North Ridge a small corner of the Earth to care for, be proud of, and call their own. Further, by providing a place at school where our kids can spend time every day studying, nurturing, and being responsible for living things, we as teachers can guide and support the growth of their personal ethics in dealing with our fragile environment.

B. State program objectives.
To create an area that facilitates the teaching of hands-on science, social studies, and math for all students and staff.
To develop a sense of responsibility and school community through on-going participation in a school-wide project.
To encourage parents, community, and business to become a part of educational process through their donation of time, material and expertise.
To model environmental education curriculum and teaching for other schools in our district and throughout the county.

C. Describe benefit of program to students and how it will address current issues or challenges facing your school.
North Ridge is the only designated math, science magnet school in Riverside County. As such we are visited often and are expected to model science education at its best. One of our challenges is to instill in young people understanding and care for our environment. We believe an outdoor study area, dedicated to this task, is an essential part of a model science program. In addition, students and parents who have chosen to participate in our program expect and deserve to have enriched experiences that reinforce curriculum. By showing visiting teachers and administrators that a program such as this can be created and run successfully, we hope to encourage them to consider similar programs at their home schools and district.

D. Who has been involved in developing the program?
This program has been developed by the staff at North Ridge lead by myself and a fifth grade teaching colleague who shares my personal interests in the environment, hands-on science teaching, and innovation. Our students have conducted an Environmental Impact Report on the proposed area, lobbied for its approval by the Board of Education, and have mapped, measured and modeled it.

E. Describe how the program will build collaboration among teachers, parents, administrators and the community.
Teachers, parents, administrators, and the community will all be invited to assist the students in the construction of the study area. Materials, skills, and support will be organized by the project leaders, but the actual creation of the study area will be accomplished in barn raising style with everyone pitching in to lend the kids a hand.
III. PLEASE PROVIDE AN ITEMIZED BUDGET FOR THIS PROGRAM

<table>
<thead>
<tr>
<th>Materials</th>
<th>Unit Cost</th>
<th>No. to Purchase</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fence Installation</td>
<td>$1,870.00</td>
<td>1</td>
<td>$1,870.00</td>
</tr>
<tr>
<td>Shed Kit</td>
<td>$1,640.00</td>
<td>1</td>
<td>$1,640.00</td>
</tr>
<tr>
<td>Cement (shed)</td>
<td>$96.00</td>
<td>1</td>
<td>$96.00</td>
</tr>
<tr>
<td>Cement (bin &amp; station)</td>
<td>$72.00</td>
<td>1</td>
<td>$72.00</td>
</tr>
<tr>
<td>Lumber (bin &amp; station)</td>
<td>$275.00</td>
<td>1</td>
<td>$275.00</td>
</tr>
<tr>
<td>Nails/Misc.</td>
<td>$200.00</td>
<td>1</td>
<td>$200.00</td>
</tr>
<tr>
<td>Cement (pond bottom)</td>
<td>$583.00</td>
<td>1</td>
<td>$583.00</td>
</tr>
<tr>
<td>Plumbing Supplies</td>
<td>$225.00</td>
<td>1</td>
<td>$225.00</td>
</tr>
<tr>
<td>Plumbing Labor</td>
<td>$300.00</td>
<td>1</td>
<td>$300.00</td>
</tr>
<tr>
<td>Back Hoe Service</td>
<td>$250.00</td>
<td>1</td>
<td>$250.00</td>
</tr>
<tr>
<td>Rototiller</td>
<td>$536.00</td>
<td>1</td>
<td>$536.00</td>
</tr>
<tr>
<td>Chipper/Shredder</td>
<td>$668.00</td>
<td>1</td>
<td>$668.00</td>
</tr>
<tr>
<td>Hand Spade</td>
<td>$10.00</td>
<td>16</td>
<td>$160.00</td>
</tr>
<tr>
<td>Cultivator/Hoe</td>
<td>$10.00</td>
<td>16</td>
<td>$160.00</td>
</tr>
<tr>
<td>Steel Rake</td>
<td>$14.00</td>
<td>10</td>
<td>$140.00</td>
</tr>
<tr>
<td>Water Hose</td>
<td>$24.00</td>
<td>4</td>
<td>$96.00</td>
</tr>
<tr>
<td>Hammer</td>
<td>$15.00</td>
<td>5</td>
<td>$75.00</td>
</tr>
<tr>
<td>Tape Measure</td>
<td>$15.00</td>
<td>10</td>
<td>$150.00</td>
</tr>
<tr>
<td>Wheelbarrows</td>
<td>$80.00</td>
<td>1</td>
<td>$80.00</td>
</tr>
<tr>
<td>Curriculum Support</td>
<td>$2,000.00</td>
<td>1</td>
<td>$2,000.00</td>
</tr>
</tbody>
</table>

TOTAL ........................................ $9,616.00

Anticipated donations of labor and materials, as well as live contributions may represent equal matching funds.

IV. PLEASE DESCRIBE YOUR PLAN FOR EVALUATION

We feel that our program will stimulate both parental involvement in and community support for environmental education. To measure this growth we will maintain logs of parent volunteers, site visitations, and business contributions. Input from these sectors will be solicited using surveys to gain feedback from their experiences and their suggestions for enriching the project.

We believe the project will encourage increased hands-on science instruction by our staff. This increase will be documented through a lot of classroom use of the facility and the building of a portfolio of lesson plans associated with its use.

We expect to see student evaluation evolve from standardized, content specific tests to open-ended, authentic assessment. This process will be tracked by compiling a portfolio of student tests and the results of those tests.

Finally, to measure the increased awareness of our students to environmental issues and study, we will build a collection of the journals, projects, research, literature, and art created from their experiences in the center.
Appendix E

List of Curriculum for Use in the M.E.S.A.
List of Curriculum
for use in the
Model Environmental Study Area

1. Title: California Outdoor Curriculum Guide
   Author: Darleen K. Stoner & Olga N. Clymire
   Publisher: San Diego County Office of Education
   Copyright: 1989

2. Title: Project Wild (Elementary
   Publisher: Western Regional Environmental Education Council
   Copyright: 1983

3. Title: Project Wild Aquatic
   Publisher: Western Regional Environmental Education Council
   Copyright: 1987

4. Title: Wild School Sites: A Guide to Preparing for Habitat
   Improvement Projects on School Grounds
   Author: Paul Schiff & Dr. Cindi Smith-Walters
   Publisher: Western Regional Environmental Education Council
   Copyright: 1993

5. Title: Project Learning Tree
   Publisher: Western Regional Environmental Education Council
   Copyright: 1988

6. Title: Living Lightly in the City
   Author: Maura O'Connor
   Publisher: Schlitz Audubon Center
   Copyright: 1986

7. Title: Teaching Outdoor Training in the Environment
   Author: Los Angeles Unified School District
   Publisher: Student Auxiliary Services Branch
Copyright: 1981

8. Title: Naturescope Environmental Education Activities Series  
   Publisher: National Wildlife Federation  
   Copyright: Periodical

9. Title: Tips and Tricks in Outdoor Education  
   Author: Dr. Malcolm D. Swan  
   Publisher: The Interstate Printers and Publishers, Inc.  
   Copyright: 1987

10. Title: Botany for All Ages  
    Author: Jorie Hunken and the New England Wild Flower Society  
    Publisher: The Global Pequot Press  
    Copyright: 1989

11. Title: Hands on Nature  
    Author: Jenepher Lingelbach  
    Publisher: Vermont Institute of Natural Science  
    Copyright: 1986

12. Title: Hug a Tree  
    Author: R. E. Rockwell, E.A. Sherwood, & R. A. Williams  
    Publisher: Gryphon House Inc.  
    Copyright: 1983

13. Title: Teaching Kids to Love the Earth  
    Author: Marina Lachecki Herman et al.  
    Publisher: Pfeiffer-Hamilton Publishers  
    Copyright: 1991

14. Title: Ten Minute Field Trips  
    Author: Helen Ross Russell  
    Publisher: J. G. Ferguson Publishing Company  
    Copyright: 1973

15. Title: The Stream Scene: Watersheds, Wildlife, and People
16. **Title:** Handbook of Nature Study  
**Author:** Anna Botsford Comstock, B.S., L.H.D.  
**Publisher:** Cornell University Press  
**Copyright:** 1967

17. **Title:** The California State Environmental Education Guide  
**Publisher:** Alameda County Office of Education  
**Copyright:** 1988

18. **Title:** Outdoor Biology Instructional Strategies  
**Author:** Lawrence Hall of Science  
**Publisher:** Delta Education  
**Copyright:** 1979-82