

ENVIRONMENTAL EDUCATION

Review of a Solid Waste Education Program;
A Survey of Teachers' Perceptions

By

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AN APPLIED RESEARCH PROJECT (POLITICAL SCIENCE 5397) SUBMITTED TO
THE DEPARTMENT OF POLITICAL SCIENCE
SOUTHWEST TEXAS STATE UNIVERSITY
IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF PUBLIC ADMINISTRATION

(Spring 1994)

FACULTY APPROVAL:

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CHAPTER ONE

INTRODUCTION

Environmental Education

Since Earth Day 1970, concern has been growing about the future of the environment. Events like Earth Day symbolize and affirm the role that people play in environmental quality. Earth Day's message of environmental protection has become an educational goal. The educational system has been given the task of informing our children how important their involvement can be, and how being informed citizens will help them become effective participants in improving the quality of our environment.

As a means of informing children about the environment, the discipline of Environmental Education (EE) has gained much momentum in the educational community. An array of EE programs has been produced by individuals, state and federal agencies, environmental organizations, and institutions. EE materials are a means of achieving an environmentally literate citizenry through the traditional educational system and informal education avenues such as public awareness campaigns.

Throughout the materials, EE means different things to different educators. However, one generally accepted definition is:

Environmental education is an interdisciplinary process that promotes awareness, understanding, and responsible decisions regarding the living, non-living, and social components of humankind's relationship to the environment (TEEAC, 1992: 1).

The broad perspective of EE, as well as a concern for the whole environment, has given rise to many divisions within EE such as water education, wildlife education, air quality education, solid waste education, and others. Each maintains a focus on environmental stewardship.

For example, solid waste education addresses the problem of waste and its disposal alternatives. Improper waste disposal can overburden landfills, contaminate groundwater supplies and litter scenic landscapes. Children are inspired through solid waste education programs to take positive action to reduce waste and prevent pollution. EE materials that target solid waste emphasize awareness and knowledge of the problems surrounding waste disposal and promote responsible solid waste handling.

Educators bring EE materials to the classroom with the goal of instilling in their students positive environmental attitudes and habits like recycling and composting. For these materials to be effective, they must be easy for the teachers to use. Teachers want practical curricula that fit in with other teaching requirements. Developing useful curricula is necessary if teachers are to foster positive environmental education.

Research Purpose

The purpose of this research is three fold. First, the characteristics of Environmental Education will be described, with special attention to three determinants of a useful EE program. Second, the perceptions of the teachers trained in the

Texas Natural Resource Conservation Commission's Solid Waste Youth Education Program will be assessed. Third, based on the findings, recommendations for further curriculum development will be offered.

Since its inception in 1991, the Texas Natural Resource Conservation Commission (TNRCC) program has trained over 3,000 Texas teachers. These teachers have been provided an environmental education curriculum entitled "Visit the Triple R Ranch -- Reduce, Reuse, Recycle" that was developed for elementary classrooms. Teachers are encouraged to use the curriculum where appropriate, in science, social studies, language arts, mathematics, art and music. By exposing the children to environmental issues throughout their studies, the curriculum attempts to increase environmental awareness and inform students that their individual efforts are important.

A curriculum that is practical and useful is likely to be effective in educating students about the environment. Teachers face great challenges in selecting a curriculum that is suitable for their needs because so many curricula are being published. Therefore, understanding what makes a curriculum useful is essential for curriculum developers. Knowing how teachers are using the "Visit the Triple R Ranch -- Reduce, Reuse, Recycle" material is important for TNRCC's continued curriculum development program.

In a solid waste education program, curriculum developers emphasize environmental concepts such as recycling and composting

that easily attract young children. These concepts highlight the tremendous impact that people can have on the environment. Research shows that recycling is an excellent vehicle for teaching because children like hands-on activities. The TNRCC curriculum was ultimately designed to emphasize children's environmental efficacy. This study will provide information to the TNRCC as to how Texas teachers are teaching these concepts and using the solid waste youth education curriculum. Results will further aid TNRCC's curriculum development.

This study addresses only three of the many determinants of curriculum usefulness: hands-on activities, teacher training and infusion. This is a descriptive study, which does not test hypotheses, but rather attempts to describe how these three factors determine the usefulness of an environmental education curriculum. This study is a continuation of a project that began in May 1993 with the Community Education staff at the TNRCC. A teacher survey was prepared and distributed, with about a 7 percent response rate. There was no follow through on the survey, nor analysis of the data, due to lack of staff. The data from that survey will be used in this study.

Chapter Summaries

This applied research project is organized into six chapters, beginning with this introductory chapter. Chapter Two, Review of the Relevant Literature, examines the literature on Environmental Education and describes how three specific factors

influence EE curriculum usefulness. Chapter Three, Research Setting, describes the legal developments that have shaped EE. It also discusses the role of the Texas Natural Resource Conservation Commission in EE. Chapter Four, Research Methodology, discusses survey research, and its strengths and weaknesses. The survey instrument and the study population are also discussed. Chapter Five, Analysis, analyzes the results of the survey research. Analysis of the data is presented in tables with percentage distributions for each of the three described determinants. Chapter Six, Summary and Conclusions, summarizes the research with recommendations based on the findings for future curriculum development.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

This literature review serves three purposes. First, the goals, objectives and characteristics of an effective Environmental Education (EE) program will be described. Second, the solid waste education concepts of recycling, reducing, reusing, and composting, and their appropriateness for early environmental learning are discussed. Third, three determinants of a useful EE curriculum - hands-on activities, teacher training, and infusion - will be reviewed. The basic supposition in this study is that in order for an Environmental Education curriculum to be effective in educating students, it must be easy for the classroom teacher to use. Many factors point to the usefulness of a curriculum, but three of these are especially appropriate for the use of an EE curriculum. Understanding what makes a curriculum useful will help curriculum developers provide teachers with effective educational programs.

Environmental Education

Recently, Environmental Education (EE) has become a significant element of many education programs (Caduto, 1984: 30). Events such as Earth Day 1970 invigorated environmentalism. This movement sought to highlight environmental problems to the public and suggest possible remedies. Environmentalism has caused many

people to reflect upon their lives and to question the quality of the environment in which they live. The influence of environmentalism caused a major change in the way people view their relationship with the Earth. The goal of EE is to foster this new relationship in the classroom.

Since the rallying Earth Day of 1970, environmental concern has crystallized into action. Educational programs began incorporating environmental issues in the curricula because education is seen as a way of bringing about change. Public support for environmental protection and a growing national attention to the environment as a practical topic in curriculum development was evidenced during this formative period of the 1970s and 1980s. In a 1984 survey on public commitment to environmental issues and their role in education conducted at Carleton College, a large percentage of adults reported that they wanted to see environmental topics such as air quality, world hunger, water resources, and population growth included in the Kindergarten through twelfth grade curriculum (Brody, 1990: 25). Accompanying this growth of public awareness of environmental concerns was an increase in the number of environmental programs. Environmental organizations, state and federal agencies, and private corporations all aided this development by producing curricula. During this formative period, educators acknowledged that the environment was worthy of inclusion in the existing curricula, and hence, Environmental Education was recognized as a discipline.

Environmental Education has generally been described as a process aimed at producing a citizenry that is:

1. knowledgeable about the biophysical and sociocultural environments of which man is a part,
2. aware of environmental problems and management alternatives of use in solving those problems, and
3. motivated to act responsibly in developing diverse environments that are optimal for living a quality life (Lucko, Disinger, & Roth, 1982: 8).

Advocates of EE argue that because education is understood as a vehicle society uses to prepare its citizens to carry out their responsibilities, education must address environmental issues (Ramsey, Hungerford, and Volk, 1992: 35). EE must prepare individuals to be responsive to a rapidly changing technological world, to understand contemporary world problems, and to provide the skills needed to play an effective role in the improvement and maintenance of the environment.

EE Goals and Objectives

A general set of objectives for EE, which developed this citizenship action approach, was generated at an Intergovernmental Conference on Environmental Education in Tbilisi, Georgia, U.S.S.R. in 1977 (hereafter referred to as Tbilisi). Five categories of objectives addressed environmental knowledge, awareness, attitudes, skills, and participation. Written in broad terms, these objectives became goals for EE. Because difficulties might arise in attempting to assess needs relative to the Tbilisi objectives, a definitive set of goals was needed to operationalize the objectives. Using the Tbilisi objectives

as a model, such a set of goals was later articulated in "Goals for Curriculum Development in Environmental Education" by Volk, Hungerford, and Tomera (1984: 11). These goals, written by the EE theorists, were subjected to a rigorous validation by a jury of nationally recognized environmental educators and are interpretive of the more general Tbilisi objectives. The goals encompass the following four levels of cognitive knowledge and skills within a broad scope of environmental literacy:

LEVEL I: Ecological Foundations ... The knowledge of key concepts and allied ecological principles.

LEVEL II: The awareness of issues and human values ... The knowledge of how human activities may influence the relationship between quality of life and quality of the environment.

LEVEL III: The investigation and evaluation of issues and solutions ... The development of skills necessary for the actual investigation and evaluation of environmental issues and of the alternative solutions to those issues.

LEVEL IV: Citizenship action ... The development of those skills necessary for students to take appropriate environmental action.

Levels I and II, the lower levels, focus on conceptual awareness of ecological principles and environmental issues. Levels III and IV, the higher levels, include goals that deal with the development and application of skills required for investigating and evaluating environmental issues, and for acting in response to the issues. Putting these goals into action through curricula is critical for an effective EE program. A 1984 national survey of curriculum needs by Volk, Hungerford, and Tomera (1984: 10) assessed the accomplishment of EE goals in curricula as perceived by professional environmental educators. The findings revealed a consensus among the participants that the

EE goals were important ones, but they were not being met to a large extent in existing curricula. The researchers concluded that in general there was a somewhat greater degree of perceived accomplishment relative to the lower level goals than there was relative to the higher level goals. Hart (1981: 16) maintains that clarification of program components or characteristics could facilitate understanding of goals by making vague ideas more precise and intelligible.

Program Characteristics

The prescribed EE goals and objectives imply a number of discrete programmatic characteristics. Ideal EE programs can be described as:

action-oriented: involving students in the resolution of real environmental problems and issues;

continuous: part of all subject areas at all grade levels but not precluding specific curricula and instruction focused solely at EE;

experiential: using a diverse array of learning approaches and environments;

future-oriented: concerned about future as well as present generations;

globally oriented: considering the Earth as a single ecosystem;

holistic: dealing with the natural, man-made, technological, social, economic, political, cultural, moral, and aesthetic aspects of the environment;

interdisciplinary: drawing content from all subjects;

issue-oriented: dealing with issues having local, regional, national and international perspectives;

neutral: approaching issues and problems without bias, where the classroom is a forum where all points of view should be heard.

This clarification can make EE goals more concrete. In turn, this provides a more detailed guide to implementing EE programs.

Marcinkowski (1992: 6) asserts that environmental programs must employ the EE goals in their activities and materials used in teaching children. Concrete, understandable goals in curriculum development promote effective environmental programs for classroom use. Advancing scientific inquiry, investigation and responsible action are successful tools for making the environment an intelligible subject.

Environmental concepts provide the curriculum foundation to construct EE programs (Lucko, Disinger, and Roth, 1982: 8) and make the study of the environment appropriate for the classroom. Teachers and curriculum writers are faced with the arduous task of making subject content meaningful and relevant. Curriculum writers need to supply practical information addressing the role of the individual in environmental problems and alternatives and/or actions necessary to solve such problems (Gigliotti, 1990: 11). Developing curricula that focus on the environment and are based on current scientific information will make the study more relevant to student's lives (Brody and Koch, 1990: 16). Today's environmental problems present students with ready avenues to make EE meaningful.

Solid Waste Education

Pollution is one such environmental problem. A current "hot" topic for Environmental Education, pollution in the form of solid waste is an environmental issue that is appropriate for curriculum development. In a 1988 survey of public school teachers in Texas where environmental curriculum content was assessed, pollution was the subject given the most coverage concerning people's effect on the environment (Adams, Biddle, and Thomas, 1988: 22).

Solid waste disposal is a complex environmental issue. The U.S. Environmental Protection Agency estimates that Americans currently produce about 180 million tons of municipal solid waste a year which is enough to fill a convoy of garbage trucks stretching halfway to the moon (E.P.A., 1990: 1). Landfills which were once considered a solution to this garbage crisis are reaching capacity and presenting health and siting problems.

Waste management techniques such as recycling, reusing, reducing, and composting are components of environmental curriculum programs known as solid waste education. These programs have been implemented in response to an increasing need for public awareness and participation in dealing with the garbage crisis. The intent of a solid waste education program is to communicate to students, especially young ones, that everyone can become involved in better waste management. Indeed, they can easily change solid waste disposal habits in their families and communities. Solid waste education is a way to help students see

real-life, practical uses for the information they learn (Bumpous, 1993: 4). Teachers are in an excellent position to show younger students how solid waste problems relate to them and how they can contribute to a solution (E.P.A., 1990: 2).

Recycling is popular, and because it's so easy to do, is practiced widely. "Recycling's real big; in education today, the thing is action" (Poore, 1993: 26). As defined by the EPA,

recycling is an activity that uses waste in lieu of virgin material in the manufacturing of a new product. It is the process of collecting materials from the waste stream and separating them by type. When an item has outlived its usefulness, it can still be recycled instead of being thrown away.

Reducing is an activity that prevents waste before it is created. Purchase products that use minimal packaging or packaging that can be reused or recycled.

Reusing is avoiding the purchase of single-use items. It is the use of a product more than once in its same form for the same purpose or for different purposes. Many products and types of equipment can be reused.

Composting is the collection of decomposing organic material that can be used to enrich or improve the consistency of soil for growing.

Integrating these solid waste concepts in a waste management system allows for a variety of practices to safely handle waste.

Teaching these concepts calls for innovative and integrative curricula. In two elementary-level EE curricula developed in California, solid waste concepts provide the format for helping students gain environmental knowledge as well as responsibilities. The Wizard of Waste curriculum is a K-3 program which deals with understanding solid waste concepts, identifying recyclable solid waste, and analyzing and improving personal

habits. The Trash Monster, aimed at 5th and 6th graders, is more elaborate, concentrating on solid waste concepts, solid waste problems, solutions to solid waste problems, and personal solid waste practices. These curricula strive to awaken interest, provide information, teach problem-solving skills, provide decision-making practice, formulate a code of behavior, and involve students in action (Arenstein and Supple, 1981: 7).

In a 1990 study, Brody investigated how children understand pollution - including solid waste. His assessment incorporated science and the environment as well as children's learning styles. He found that science and environmental conceptual learning becomes meaningful as children acquire new knowledge and understanding of their world. The 4th graders in the study were sensory in their approach to the world. They had to see, feel, smell, or taste pollution for it to exist (Brody, 1990: 29). For example, this group believed that solid waste in dumps was safe. When asked about where trash in the garbage went each week, they responded, "to the dump." As long as the garbage could no longer be seen by the children, it was not a problem. Understanding how students learn about their world leads to an understanding of how EE programs can be used in facilitating knowledge, awareness, and problem-solving.

Early Environmental Learning

Pomerantz (1990: 16) contends that educational programs have their greatest influence during childhood, and the foundation of

environmental attitudes begins during this impressionable time. On the one hand, early childhood educators face great challenges in their scientific conceptualizing of EE and nurturing the responsible attributes in the young child. On the other hand, they are in great positions to influence attitudes and behaviors of young children (Wilson, 1993: 15). In order to influence, however, the elementary educator must incorporate a basic understanding of the environment with insight into the process of how a child comes to view and learn about his/her world.

Since EE is ultimately concerned with the child, an important step towards understanding how children learn about the environment is the coordination of a psychological view of the child with an ecological view of the world. For a young child, the process of establishing environmental harmony must begin with the self. Harmony within the child is achieved through feelings of security, self-worth, self-efficacy and well-being. This harmonious state prepares the foundation for the child to respect friends, family, neighbors, and the environment (Karmozyn, Scalise, and Trostle, 1993: 225). It is therefore helpful in curriculum development to consider human development with a specific focus on the processes whereby children construct an image of their world (Rejeski, 1982: 27).

Environmental educators should integrate a framework for organizing knowledge about the environment with a developmental framework for understanding how the child's knowledge of the environment changes, grows and is amended by experiences (Kar-

mozyn, Scalise, and Trostle, 1993: 225). Through sensory experiences with the natural environment, children learn more about themselves in relation to their world. Positive early experiences with the self, with others, and with the environment help form the foundation for the individual's later appreciation of the world. Showing respect and responsibility, sharing, decision-making, cooperating, problem-solving, and creating will ideally transfer from the self to others and to the world in a spiral-like fashion. With the ultimate goal of helping children discover their unique selves while simultaneously helping them discover their place in the world, educators can introduce sensory learning experiences (Karmozyn et al., 226). Establishing an early foundation of experiences and discoveries about nature helps the child to later understand broader and more complicated, abstract issues (Karmozyn et al., 228).

Useful Environmental Curriculum

A curriculum that is practical and useful is likely to be effective in educating students about environment issues. For an EE curriculum to be effective in producing a knowledgeable, aware, and responsible citizenry, it must first be useful for the teacher to implement in the classroom. Teachers face great challenges in selecting curricula that are suitable for their needs, due to the large numbers of materials available.

Hands-On Activities

For the young child, a practical environmental curriculum considers the readiness of the child. When young children explore the natural world, they begin to learn about themselves in relation to their world. Engaging in concrete, sensory experiences establishes a foundation for a pro-active role in solving complex and challenging problems. Individual and group activities, carefully planned and implemented, encourage children's progression from a state of centration to that of deccentration from self-preoccupation to other-centeredness and, finally, to global appreciation (Karmozyn et al., 229).

When children are introduced to scientific concepts, a general pattern of experience and sequence emerges which precedes the ability to abstract. Research concludes that science should be taught a few hours per week over several years instead of concentrated into one year. Concrete experiences such as hands-on activities with science phenomena should precede introduction of terminology. Scientific concepts are then derived from experience, with children acquiring knowledge of a concept from their hands-on observation. Once concepts are established, they should be symbolized and those symbols related to each concept. These more complicated relationships should be constructed over time (Aldridge, 1992: 14). As experience occurs with the activities, the concepts form in the child's mind. Thus, scientific concepts can help structure the child's understanding of the natural world.

Numerous educational programs exist that are designed to communicate basic scientific and environmental concepts to elementary school children. Among the well-known ones are Project WILD, Project Learning Tree, NatureScope, Think Earth, and Away with Waste. These programs have been studied by education researchers for their lesson content, and results indicate that a significant number include topics such as environmental management, responsible stewardship, and resource management (Pomerantz, 1990: 19).

Elementary schools also are implementing curricular transformation of environmental studies. In San Bernadino, California, the Kimbark Elementary School was selected as one of ten national exemplars in EE by the National Science Teachers Association Search for Excellence. Kimbark's model for success incorporates environmental education for students in an articulated, sequential program.

The objectives of Kimbark's K-6 environmental science program are to promote awareness, appreciation, understanding, and knowledge of the interrelationship between one's self and one's total environment. These objectives, while helping each student develop a cognitive and affective basis for making lifestyle decisions, also facilitate the development of basic skills and a positive self-image (Stoner and Oberbey, 1989: 146). Kimbark blends hands-on activities in an interdisciplinary application of environmental science. Kimbark's program also emphasizes regularly planned teacher training programs to provide

the teachers with the most up-to-date information. EE at Kimbark incorporates the latest innovations in effective teaching to provide the students an enthusiastic, interdisciplinary curriculum.

Teacher Training

Teacher training helps determine whether EE will be used in the classroom. Classroom teachers obtain instructional materials from a variety of sources and then adapt them as they see fit (Simmons, 1989: 16). Use of EE curriculum is often contingent upon teachers feeling comfortable with the material. Many teachers who are fearful of the intricacies of science may be afraid to even consider teaching environmental issues. Simmons (1989: 17) says that teachers must be shown that a strong science background is not a prerequisite for teaching EE. In their study of elementary solid waste programs, Arenstein and Supple (1981: 5) found that proper training in multi-disciplinary approaches will enable the teachers to be oriented towards environmental concerns. In addition, it is important that elementary teachers also be familiar with the processes of cognitive development which can also be addressed in training (Caduto, 1984: 31).

Inadequate teacher training can cause problems in implementing environmental curricula (Adams, Biddle, and Thomas, 1988: 19). In a 1988 report on the status of environmental science in Texas by Adams, Biddle, and Thomas (1988: 23), teachers and science curriculum supervisors who were surveyed reported that

more teacher training is needed for proper classroom implementation of environmental programs.

Volk, Hungerford, and Tomera (1984: 16) found in a 1984 national survey of curriculum needs that there is a major need for in-service teacher education. Members of environmental professional organizations were surveyed for their perceptions of environmental education curriculum needs. Results suggest that if classroom teachers were provided with goal-oriented curricula and with the in-service training which would permit them to utilize the curricula, their use of environmental curricula would be increased.

There is a clear mandate for improved teacher training in EE. It has been said that in the final analysis, teachers determine curriculum. Proper training can motivate teachers to become active contributors to their students' environmental literacy. Teacher workshops or training programs have been established in many areas, training teachers to use experiential techniques or to promote use of EE materials in the classroom.

Infusion

The Adams, Biddle, and Thomas environmental science study concluded that assistance is most needed in identifying available environmental materials, appropriate teacher training, and facilities, curricula, and successful EE programs amenable for infusion (1988: 24). Further, Stone (1989: 159) believes that EE teacher education programs that work should be designed and

implemented if the goal of infusing EE into all school curricula is to be realized. Infusion is a relatively simple process to understand but a rather complex process to accomplish. Simply stated, infusion refers to the integration of content and skills into existing courses, to focus on that content and/or skills without jeopardizing the integrity of the courses themselves. The EE teacher must analyze existing courses carefully for places where environmental content and associated skills can be incorporated (Ramsey, Hungerford, and Volk, 1992: 40).

Unlike those areas of study which have established niches in formal education programs, environmental education is by its nature interdisciplinary, virtually a part of every curriculum area (Lucko, Disinger, and Roth, 1982: 7). Neither EE nor any of its predecessors or variants has traditionally had a curricular home of its own. Therefore, individuals wishing to promote inclusion of environmental considerations have been faced with the necessity of finding appropriate niches in existing curricular environments (Disinger, 1989: 126). Making EE interdisciplinary is crucial because of an already crowded school curriculum. Arenstein and Supple hold that EE materials must be useful in teaching a variety of subjects, including basic skills (1981: 4).

Many EE programs have been implemented through the process of curriculum infusion. This strategy involves placing relevant environmental topics in existing subject offerings. A high percentage of topics are being assimilated into science; the

remainder are being dispersed into social studies, humanities, language arts, health education, math, and art (Rejeski, 1982: 27). This interdisciplinary approach provides activities which environmentalize concepts already taught in the elementary curriculum.

The rationale for infusing EE is compelling. By incorporating EE throughout the curriculum at every grade level, a more comprehensive treatment of environmental concerns can be accomplished. Such an approach also recognizes that environmental issues cut across traditional disciplinary lines, and that developing an environmentally responsible citizenry involves acquiring knowledge, attitudes, and skills beyond that of a simple understanding of scientific or ecological principles (Simmons, 1989: 15).

Texas teachers and curriculum supervisors affirmed in a 1988 survey that EE was infused into existing science courses, and given minimal attention in other standard curricula (Adams, Biddle, and Thomas, 1988: 20). If EE is committed to infusion, Simmons (1989: 17) states that a greater variety of curriculum materials clearly needs to be developed or adapted for use within non-science subject areas. When new curriculum development projects are begun, a primary goal should be developing activities especially for mathematics, art, music, and health. Infusion allows an "environmentalization" of the total school curriculum. It also offers other practical benefits for teachers facing crowded curriculum and time constraints. It takes only a

little extra time to use environmental issues and concerns to teach skills and concepts within the normal scope and sequence of subject areas (Simmons, 1989: 15).

Conclusion

Environmental Education is preparing children to be concerned about the quality of their environment. Producing stewards, not merely users, of the environment is the ultimate challenge for EE. If education is to meet this challenge, schools, teachers, and curriculum developers will be working together to implement environmental education.

The key to establishing a place for EE in schools resides with the classroom teacher (Stone, 1989: 159). Providing teachers with training, materials, and the assistance of curriculum developers to help them incorporate EE into their present curricula will advance environmental study. Understanding what makes a curriculum useful is essential for curriculum developers to assist teachers. Chapter three provides the legal framework in which EE receives its authority and describes the setting in which this research of EE curricula is accomplished.

CHAPTER THREE

RESEARCH SETTING

Legal Development

Since the 1970s when environmental concern grew, the process of environmental education has been shaped by significant legal developments. During the Nixon administration, environmental issues started receiving legal attention. It is the purpose of this chapter to describe these developments. As the major environmental agency in Texas, the Texas Natural Resource Conservation Commission eagerly supports EE initiatives. Its role in this process is also described in this chapter.

In March 1969, an Executive Order established the president's Environmental Quality Council to begin dealing with these issues. Congress stopped funding for the council and provided for the present Council on Environmental Quality in the National Environmental Policy Act, which was signed into law in January 1970. Later in 1970, the Environmental Education Act was signed into law by President Nixon. Considered a new approach to learning, environmental education was intended to incorporate learning about the environment into the American system of education. This pioneering legislation received only token funding, and was repealed in 1982. Federal leadership in environmental education was lacking and never did emerge as an effective national force (Cook, 1982: 5).

Some activity, however, was stirred up by the Office of Environmental Education created in the U.S. Office of Education. The executive editor of The Journal of Environmental Education wrote in 1982 that "in spite of its deficiencies, it did stimulate more activity and attention to environmental education than would have occurred without it" (Cook, 1982: 4). Other federal agencies became involved in the process of EE during this time. The Extension Education Program in the Department of Agriculture, the Federal Interagency Committee on Education, the Forest Service and Soil Conservation Service were all noted for their efforts in promoting EE (Cook, 1982: 5).

During the next decade, however, there was a noticeable gap in federal support for EE. Not until 1990 did federal action resume with the U.S. Senate Committee on Environment and Public Works. Influential testimony was presented to the committee on the merits of federal support for EE (Marcinkowski, 1990: 7), and the legislation that resulted represented a renewal of federal commitment to EE. In November 1990, President Bush signed into law the new National Environmental Education Act.

The Act established the Office of Environmental Education (OEE) within the Environmental Protection Agency. The OEE was directed by the Act to work with the Department of Education, the Federal Interagency Committee on Education, and with other federal agencies, including federal natural resource management agencies, to ensure the effective coordination of programs related to environmental education (Marcinkowski, 1990: 8). The

OEE has been called upon to lead the federal government's environmental education and training initiatives and promote the dissemination of high-quality curricular materials. Specifically, the OEE is charged with seven types of activities (Marcinkowski, 1990: 8). These include:

- classroom training;
- demonstrations on how to design and conduct environmental field studies;
- development, dissemination, and evaluation of programs and curricula, including those designed to meet the needs of diverse ethnic and cultural groups;
- sponsorship of partnerships and networks;
- sponsorship of conferences, seminars, and forums for the advancement and development of the field;
- sponsorship of international exchanges of teachers and other environmental professionals; and
- maintenance or support of a library of environmental education documents, with both electronic and hard copy accessibility.

Also created in the Act was the National Environmental Education and Training Foundation (NEETF) as a charitable and non-profit corporation to support and assist the activities of the OEE. Its membership is largely separate from that of the office, except for the director. NEETF was established for three primary reasons (Marcinkowski, 1990: 9):

1. to extend the contribution of environmental education and training to meet critical environmental protection needs, both in this country and internationally;
2. to facilitate the cooperation, coordination, and contribution of public and private resources to create an environmentally advanced educational system; and
3. to foster an open and effective partnership among federal, state, and local government, business, industry,

academic institutions, community-based environmental groups, and international organizations.

The federal commitments witnessed in the Act are impressive, says Marcinkowski, consulting editor of the Journal of Environmental Education. Still, there is reason for caution amid the optimism over the Act. Marcinkowski asserts, "one must be careful to distinguish between an authorized and appropriated level of federal funding." Appropriations for the 1970 EE Act ranged from \$1 million to \$3 million per year, despite the far greater sums that were authorized. In this Act, the current federal deficit must be considered when anticipating the appropriated funding (Marcinkowski, 1990: 9).

The spirit of this Act calls for enhanced cooperation and coordination in the field. States, as well as the federal government, have continued to define their role in coordinating EE. At the 1991 Science Summit in Houston, Barbara Link, president of the NEETF said that states were beginning to see the necessity of elevating the status of environmental education, citing Texas, Wisconsin, Florida, Arizona and Kentucky as forerunners (LeFevre, 1993: 3).

Through Senate Bill 1340 passed in 1991, Texas joined other states in institutionalizing environmental education. Known as the "Omnibus Recycling Bill", this legislation directs the Commissioner of Education to "foster the development and dissemination of educational activities and materials which will assist Texas public school students, teachers, and administrators in the perception, appreciation, and understanding of environmental

principles and problems" (S.B. 1340, Chapter 303, Section 11.53 (a)). To accomplish this, the Commissioner is given the following activities:

- (1) encourage the integration of environmental topics into the regular curriculum, where appropriate;
- (2) encourage the Central Education Agency to coordinate state, federal, and other funding sources to develop and disseminate to school districts instructional materials for use in environmental education, with special concern given to the ecological systems of Texas and the ways human beings depend on and interact with the systems;
- (3) encourage the Central Education Agency to coordinate state, federal, and other available funding sources to develop and deliver teacher inservice programs, including summer seminars and institutes, on various aspects of environmental pollution and conservation;
- (4) collect, analyze, evaluate, and disseminate to school districts information about environmental curriculum materials, validated projects, and other successful programs;
- (5) solicit, receive, and expend funds which may become available through federal grants under any national environmental education programs or from other public or private sources;
- (6) prepare an annual status report on environmental education activities and deliver it to the legislature and the governor on or before September 1 of each year (S.B. 1340, Chapter 303, Section 11.53).

The Texas Environmental Education Advisory Committee (TEEAC) was created by S.B. 1340 to assist the commissioner in these activities (S.B. 1340, Chapter 303, Section 11.53 (b)). TEEAC is currently composed of forty members representing a wide range of public and private education and environmental organizations, including teacher associations, business and industry, universities, and state natural resource agencies. There is action pending on changing the composition of TEEAC, possibly reducing

the number of members. The Commissioner is considering recommendations from the Committee.

The responsibility of TEEAC is to identify valid EE materials, instruct teachers on their use, and assist in the distribution of the materials to classrooms throughout the state (TEEAC Status Report, 1993: 1). "TEEAC's goal is to ensure that Texas students understand that cultural, economic, social, technological, and political factors all determine our attitudes and actions toward the environment" (TEEAC, 1993: 23). TEEAC is particularly concerned that EE be integrated into all subject areas taught in Texas schools.

TNRCC's Role

The Texas Natural Resource Conservation Commission (TNRCC) entered the scene of environmental education through the passage of Senate Bill 2 by the 72nd Legislature. Effective September 1, 1993, S.B. 2 merged the Texas Water Commission and the Texas Air Control Board to create the TNRCC, taking also several of the programs of the Texas Department of Health, including the solid waste program.

In 1992, the Texas Water Commission (TWC) announced it would provide start-up funding for the newly formed TEEAC. TWC Commissioner Peggy Garner said, "establishing that foundation of understanding and sensitivity for the environment at a young age is extremely crucial. The work by the Advisory Committee will be very important for ensuring quality environmental education and

the Texas Water Commission will support this effort in every possible way" (TWC News Release, 1992: 30).

In addition to supporting the work of the Advisory Committee, TNRCC continues its commitment to environmental education through the solid waste curriculum Visit the Triple R Ranch - Reduce/Reuse/Recycle. Sue Bumpous, currently an Education Program Specialist for TNRCC, detailed the program history and results in a March, 1993 memo. She wrote that an Advisory Council for the Texas Department of Health prepared plans for the curriculum in August, 1990, and published a request for proposals. A proposal was selected from Keep Texas Beautiful, Inc., which planned to use an existing national program, "Waste in Place", developed by Keep America Beautiful, and to add a supplement of Texas-specific materials. These materials, combined as "Texas Waste in Place", were correlated to the Texas Education Agency's "Essential Elements for Education" which describe areas of the official curriculum that teachers are required to cover.

To ensure its use, the program was designed for teachers who had received specific training in solid waste issues. In January, 1992, the first 42 Training Specialists were recruited and received their in-depth instruction. To recruit teachers to attend the training, publicity posters were created and distributed at teacher conferences. The solid waste education program is designed for elementary teachers in Texas, and funding is provided by the TNRCC for one teacher per school to attend

training. The "one teacher per school" rule ensures geographic diversity in distribution, so that the program is not isolated in only one part of the state. The 42 original Training Specialists were also recruited in part based on their geographic diversity to conduct training sessions for elementary schools in their regions.

The original goal was to train 2,000 teachers during the program's first year. At the end of the year, only 500 were trained. However, a large cash infusion resulted in an additional 1,300 teachers being trained in a 4-month period. An additional 1,300 were trained in the following year and a half. The solid waste education program continues to be a primary concern for the Texas Natural Resource Conservation Commission. Preparing students to become involved in better management of solid waste is an important message in the curriculum. TNRCC's role in solid waste education can have a demonstrable effect on Texas waste disposal problems. Chapter four examines the research strategy used to study the usefulness of the TNRCC solid waste curriculum, and the survey instrument used to measure the perceptions of Texas teachers about that curriculum.

CHAPTER FOUR

RESEARCH METHODOLOGY

This applied research project is a descriptive study utilizing survey research for data collection. In this chapter, the methodology of survey research will be discussed, along with its strengths and weaknesses. Also, a discussion of the survey instrument and the study population will be included.

Survey Research

Survey research is perhaps the most frequently used mode of observation in the social sciences (Babbie, 1989: 236). For the researcher, a survey is a measurement and collection of relevant data. As a means of collecting data, surveys are an effective way to measure attitudes and orientations in a large population (Babbie, 1989: 237).

Surveys can be useful in descriptive studies where individuals are the unit of analysis. The attitudes and orientations of the individuals can be easily recorded with the use of a survey questionnaire. Properly structured questions can probe into individuals' attitudes, and produce relevant data for research.

Like other modes of observation in social scientific research, surveys have special strengths and weaknesses. It is important to know these in determining whether survey research is

appropriate to the research goals. The strengths and weaknesses of survey research according to Babbie are as follows:

Strengths

- useful in describing the characteristics of a large population
- flexible in amount of questions asked
- strong on reliability
- easy to replicate

Weaknesses

- standardization results in superficial coverage of topics
- inflexible due to design remaining unchanged
- weak on validity
- unable to measure social action.

For this study survey research is quite appropriate. The population of 3,034 teachers are individually surveyed for their perceptions of the curricula. The survey questions cover several areas of interest to TNRCC concerning its solid waste education program, and the results will provide relevant data for the agency's future curriculum development.

There are three main methods of administering survey questionnaires - self-administered typically by mail, interviews, and telephone (Babbie, 1989: 238). For self-administered surveys that are done by mail, Fowler points out certain advantages and disadvantages (Fowler, 1993: 66). They include:

advantages of mail procedures:

- relatively low cost
- can be accomplished with minimal staff and facilities
- provides access to widely dispersed samples and samples that for other reasons are difficult to reach by telephone or in person
- respondents have time to give thoughtful answers, to look up records, or to consult with others;

disadvantages of mail procedures:

- ineffectiveness of mail as way of enlisting cooperation (depending on group to be studied)

- various disadvantages of not having interviewer involved in data collections
- need for good mailing addresses for sample.

This study employed a self-administered questionnaire by mail to the teachers. This method allowed the teachers to provide thoughtful responses, to refer to lesson plans in their classrooms or at home, and to consult with other teachers in their units. However, this method does not correct for addresses if teachers have moved as Fowler points out.

Research Population

Through surveys it is possible to learn the attitudes of large populations like the 3,034 Texas teachers in the TNRCC Solid Waste Education program. These teachers are registered in the solid waste program and have received the combined curriculum. Each teacher who receives a TNRCC curriculum and training has valuable insight into its usage, and survey research provides a way of obtaining each teacher's perception.

Telephone surveys or interviews with these teachers would yield similar information but would be too costly and time consuming for this population. Also, teachers are difficult to reach by phone during the day. Survey research, Babbie claims, has advantages in terms of economy and the amount of data that can be collected (Babbie, 1989: 258).

Since teachers are the final determiners for what actually gets taught in the classroom, it is appropriate that their opinions about curricula are obtained. This study is a continua-

tion of one that was started by the Community Education staff at the TNRCC. A survey was prepared and mailed to each of the teachers in May 1993. At that point there were approximately 1,800 teachers who were registered and received a survey, and 172 teachers responded. A follow-up mailing was sent in January 1994 to the teachers who did not respond and to the teachers who had been trained since May 1993. A list of respondents from the first mail-out is maintained for the TNRCC Community Education staff.

Survey Instrument

The survey instrument (Appendix A) was designed to reveal the perceptions of the teachers registered in the TNRCC Solid Waste Education program about the curriculum provided them. The instrument, a self-administered questionnaire, questions teachers on several educational issues, mainly usage of the curriculum. Additionally, teachers are asked about the quality of the training, the advanced training program and its incentives, and the TENET computer network offered through the Texas Education Agency. The concepts studied in the project - hands-on activities, infusion, training - make up the core of the questionnaire. The following table presents the questionnaire items as they respond to these concepts:

TABLE 4.1

	Hands-On Activities	Infusion	Training
Survey Question #	10, 11, 12, 13, 14, 15	16	7

The instrument allows the respondents to provide information on open-ended questions such as grade level taught, subject taught, activities used and favored, and suggestions for improvement. Also, the survey included nominal and ordinal levels of measurement for the training, general use of the program, infusion of the curriculum, advanced training program, bonus money, and access to TENET. The format of the questionnaire assists the respondents with boxes for the nominal and ordinal questions, and ample space for the open-ended responses. Additionally, the questionnaire was prepared conveniently as a tri-fold, self-mailer with the return postage paid. In its original form, the questionnaire is 8 1/2" x 14", although Appendix A has been reduced for this report. In Chapter five the results of this survey are analyzed.

CHAPTER FIVE

ANALYSIS

This chapter discusses the survey results, response rate, and data summary. A comparison of the literature review and survey results will be included.

Response Rate

In May 1993, surveys were mailed to 1,800 Texas teachers. From those, 172 completed surveys were received. In January 1994, surveys were mailed to the non-respondents, and also to those registered in the program since the first mail-out. From the second mail-out 101 surveys were received. The population surveyed totalled 3,034 and the responses received were 273, for a response rate of 9 percent.

Survey Results

The TNRCC Solid Waste Education program serves many functions for Texas teachers. It offers up-to-date environmental information, educational workshops, and instructional materials. For its continued program development, the agency sought feedback from the teachers on improvements. The results from this study will assist TNRCC in the decisions affecting this program.

Hands-On Activities

The respondents reported their usage of the "Texas Waste in Place" by naming or describing the activities they had used since receiving their curriculum and/or training. Many teachers described the activity without providing the name of it, and so these responses were matched to the corresponding activity. Table 5.1 contains a summary of the activity usage for the TNRC Visit the Triple R Ranch - Reduce/Reuse/Recycle and the Keep America Beautiful, Inc. Waste in Place. Because the teachers use many activities, percentages do not sum to 100.

TABLE 5.1

Activity	Teachers Using % (n=273)	Teachers Favoring % (n=273)	Students Favoring % (n=273)
<u>Visit the Triple R Ranch - Reduce/Reuse/Recycle:</u>			
Clean the Stream At The Triple R Ranch	3.7	---	.4
Texascape: Our Natural Resources	1.8	.4	---
The Right Way to Take Care of the Right-Of-Way	1.8	---	---
What Goes Up Must Come Down	1.8	---	---
Hold'er, Pardner	3.3	.4	---
Texas Wreaths	9.9	4.8	4.4
Yellow Rose of Texas	9.9	2.9	1.5
A Visit to a Recycling Center	3.3	.7	.4
Earthworm Bunkhouses	9.9	2.6	2.9
Texas Microbes Eat Like Horses	5.9	---	.7
Texas Mega Compost	6.6	1.5	1.8
Spore Prints: Follow Those Tracks	6.6	.7	1.1
Personal Journal: My Visit to the Triple R Ranch	2.2	---	---
Plot Partners-Interaction	2.6	.4	.4

TABLE 5.1 continued

Activity	Teachers Using %	Teachers Favoring %	Students Favoring %
<u>Visit the Triple R Ranch - Reduce/Reuse/Recycle cont'd:</u>			
Decisions, Decisions, Decisions	2.9	.4	---
Texas Trash Trivia	15.8	2.6	2.6
A Texas Song About Unwanted Waste	8.1	.7	1.5
<u>Waste In Place:</u>			
Natural or Human-Made	2.9	.7	---
Keep It Beautiful	8.4	5.9	6.6
Litter Critter	4.4	1.1	.7
Take Pride	2.6	---	.7
Puppet Drama	3.3	.4	.7
Good Habits	1.5	---	---
Who Keeps America Beautiful?	4.8	1.1	1.1
Litter Value Bag	9.9	2.9	1.5
Keep Our Community Clean	.4	---	---
What's In My Trash Can?	5.5	.7	.4
Feels So Good	1.1	---	---
Wrap It Up	1.8	---	---
Let's Trade	2.6	.7	---
Reuse Box	2.6	.4	---
Tires To Swings	1.8	.4	---
Make It Smaller	4.0	.4	.4
Swap Day	3.3	.7	.4
The Stomp	3.3	.4	1.1
Metal Melts	2.2	.4	---
Making Paper	23.1	10.3	12.1
Recycling Plastic	4.0	1.8	---
Recyclables In My Home	4.8	1.5	---
Paper Trees	5.1	1.1	2.2
Turn Over A New Leaf	3.7	---	.7
Compost the Most	4.4	.4	.7
Burning Issues	1.5	.4	.4
Pollution Solution	3.3	.4	.4
Read the Label	3.7	---	---
Waste Garden	4.0	1.8	1.8
Trash Archaeologist	2.9	1.1	---
Garbage Pizza	36.3	23.8	19.4
When They're Gone, They're Gone	4.8	1.1	.4
Letters To Leaders	2.9	.4	---

TABLE 5.1 continued

Activity	Teachers Using %	Teachers Favoring %	Students Favoring %
<u>Waste in Place cont'd:</u>			
Living With Waste	1.1	---	---
Managing Waste In Glen City	1.5	.4	.4
<u>Others:</u>			
Games	2.2	---	1.1
Plastics coding by numbers	8.8	3.3	4.0
Recycle skit	.4	---	.4
Videos	2.2	.7	.7
Earth Day material	.4	---	---
Environmental Bulletins	.7	---	---
General Land Office material	.4	---	---
Bluebonnets	6.2	1.8	2.2
Apple Core	.4	.4	.4
Timeline	.7	---	.4
Household Hazardous Waste	.4	---	---
Bleach Bottle Rabbit	.4	---	---
Paper Hats	1.1	.4	---
All resources & activities	6.6	6.2	5.1

As found in the EE literature, a curriculum that contains hands-on activities is useful for teachers. Experiential learning occurs when children experience what they are being taught. Hands-on activities allow the children to experience the concepts they are trying to learn. Examples include making a worm habitat while learning about composting, and analyzing school waste while learning about pollution prevention. Karmozyn argues that children learn more about themselves in relation to their world through sensory experiences (Karmozyn, 1993: 225). Providing an alternative to textbooks and lectures often facilitates a child's comprehension. Building compost piles and creating recycling art projects are active ways to facilitate a

child's understanding of the concepts of waste management. The "Texas Waste in Place" curriculum is filled with hands-on activities that allow children to actively participate in something while learning about it.

TABLE 5.2

Ten Most Used Activities	
1.	Garbage Pizza (36.3%)
2.	Making Paper (23.1%)
3.	Trash Trivia (15.8%)
4.	Texas Wreaths (9.9%)
5.	Yellow Roses (9.9%)
6.	Earthworm Bunkhouses (9.9%)
7.	Litter Value Bag (9.9%)
8.	Plastics coding by # (8.8%)
9.	Keep It Beautiful (8.4%)
10.	Texas Song About Waste (8.1%)

The hands-on activities in the TNRCC Solid Waste Education curriculum encourage children's learning through active involvement. Among the activities used most by teachers as shown in Table 5.2, children participated in sorting trash for pizza toppings of metal, plastic, paper, glass, etc.; in cutting and shaping old newspaper for wreaths; in forming and painting aluminum cans for roses; and, in making an earthworm habitat for composting. Departing from textbooks allowed the children to experience what they are learning.

The data from Table 5.2 seem to suggest that in the most used activities, the usage is not significant - the greatest being Garbage Pizza 36.3 percent. Teachers were asked to recall the activities used and then report this in an open-ended

question. Had this question been formatted with a checklist for activities used, the result could have been different. In any case, the low usage could also be attributable to the lack of a curricular home for EE in the existing basic curriculum.

TABLE 5.3

Ten Most Favored Activities by Teachers	
1.	Garbage Pizza
2.	Making Paper
3.	Keep It Beautiful
4.	Texas Wreaths
5.	Plastics coding by #
6.	Yellow Roses
7.	Litter Value Bag
8.	Earthworm Bunkhouses
9.	Trash Trivia
10.	Recycling Plastics

TABLE 5.4

Ten Most Favored Activities by Students	
1.	Garbage Pizza
2.	Making Paper
3.	Keep It Beautiful
4.	Texas Wreaths
5.	Plastics coding by #
6.	Earthworm Bunkhouses
7.	Trash Trivia
8.	Paper Trees
9.	Bluebonnets
10.	Mega Compost

Tables 5.3 and 5.4 indicate the favorite activities as reported by the teachers. The arts and crafts activities such as Garbage Pizza, Making Paper, Texas Wreaths, and Yellow Roses are obviously favored by each group. These activities along with Earthworm Bunkhouses, Litter Value Bag, Plastics coding, Trash Trivia and Keep It Beautiful involve active participation by the children and are, therefore, favorites for their hands-on approach to learning. Many of these favored activities such as Garbage Pizza, Making Paper, Texas Wreaths, Yellow Roses, Paper Trees, and Bluebonnets turn trash objects into art. Children are encouraged through these activities to take what they ordinarily throw away and make something useful out of it.

Infusion

A curriculum that can be infused into other disciplines is also useful for teachers. Ramsey refers to infusion as the integration of content and skills into existing courses in order to focus on that content and/or skills without jeopardizing the integrity of the courses themselves (Ramsey, 1992: 40). Environmental Education is interdisciplinary, and can be incorporated in existing subject offerings. Infusion into science is most common, but other subject areas are appropriate and suggested. Environmental educators like Arenstein and Supple hold that EE materials must be usable to teach a variety of subjects, including basic skills (Arenstein, 1981: 4).

Texas teachers reporting their infusion practices are summarized in the following table:

TABLE 5.5

Curriculum Infusion	
Subject	% of Teachers Infusing (n = 273)
Science	77.7
Social Studies	41.8
Mathematics	26.0
Theater Arts	11.4
Language Arts	36.9

The data from Table 5.5 seem to suggest that the "Texas Waste in Place" program has not been infused equally within the curriculum but mostly into the science curriculum. There are a number of possible explanations for the lack of curricular infusion. One could be the number of science teachers in the study. From those teachers who reported in question #2 of the survey, science was the most reported (27 percent), except for those teaching all subjects (see Appendix B). Another possible explanation is that five of the most used activities as shown in Table 5.2 are categorized in the KAB's Waste in Place curriculum in science.

Table 5.6 displays the number of activities in each subject category for the KAB and TNRCC curriculum packages. The tabulation for each of these is based on the subject categorization published as part of the curriculum. Because most activities are categorized under more than one subject area, percentages often total more than 100 percent.

TABLE 5.6

Subject	KAB <u>Waste in Place</u> (n = 35)		TNRCC <u>Visit the Triple R Ranch</u> <u>Reduce/Reuse/Recycle</u> (n = 17)	
	n	%	n	%
Science	15	(42.9)	7	(41.2)
Social Studies	15	(42.9)	8	(47.1)
Language Arts	4	(11.4)	4	(23.5)
Mathematics	2	(5.7)	2	(11.8)
Art/Music	5	(14.3)	7	(41.2)

According to Simmons (1989: 15), the rationale for infusing environmental education is compelling: By incorporating EE throughout the total curriculum at every grade level, a more comprehensive treatment of environmental concerns can be accomplished. As Table 5.6 indicates, a significant portion of activities are science oriented. Simmons concluded (1989: 17) that "(i)f environmental education is committed to infusion, a greater variety of curriculum materials clearly needs to be developed or adapted for use within non-science subject areas. When new curriculum development projects are begun, a primary goal should be developing activities especially for mathematics, art, music, and health."

Training

Teacher training can also help to identify the applicability of the curriculum in the existing subjects. Proponents of training assert that inadequate teacher training can make curriculum integration within the classroom problematic (Adams, 1988: 19). Accompanying a curriculum with teacher training promotes its usefulness by helping the teacher gain a level of comfort with the material and its concepts. Therefore, the teacher is more likely to use the curriculum in the classroom.

The TNRCC Solid Waste Education program introduces teachers to environmental issues through its training program. Currently, Keep Texas Beautiful, Inc. is the contracting agent for these

training workshops. Designed to be highly motivating and informative, the workshops are day-long sessions with demonstrations of the curriculum activities and helpful tips for their successful use in the classroom. Table 5.7 summarizes the teachers responses to the workshops by an overwhelming recommendation.

TABLE 5.7

TNRCC Training (n = 271)		
	Recommended	Not Recommended
% of Teachers	97.79	2.21

Stone contends (1989: 159) that there is a definite need to more adequately prepare teachers to become involved as environmental educators. "EE teacher education programs that work must be designed and implemented if the goal of infusing EE into all school curricula is to be realized." The TNRCC training is obviously well received by the teachers, but we do not know how this training affects the usage of the activities.

If the training is as positive as the recommendation indicates, then why are the usage percentages of the activities not higher? For the KAB Waste in Place curriculum, the highest usage was 36.3 percent and the TNRCC Visit the Triple R Ranch - Reduce/Reuse/Recycle, 15.8 percent. If training is helping to prepare teachers to be effective in the classroom, use of environmental education materials should be enhanced by the

workshops. Lively demonstrations of the activities with finished products, preparation aids, and suggestions from experienced teachers will promote their usage. Ultimately, the workshops can highlight the real meaning for EE, making the study of the environment more relevant to students' daily lives. In chapter six the research findings will be summarized in a listing of study implications.

CHAPTER SIX

SUMMARY

In her historical perspective of environmental education published in the Texas Association for Environmental Education Newsletter, Dorothy Vaughan Chavez, Editor, writes

Environmental education has evolved through many of the same stages as that of a young child learning about his world. As curiosity and **discovery** in the young child's life leads to **awareness**, this awareness leads to growth in **knowledge**. As the child becomes older, **attitudes** and values are learned. **Skills** are developed along the way. Upon reaching the age of reasoning, the older child is able to think critically and to solve problems based on the cognitive and affective abilities developed to that point in life. As the young citizen grows, he or she takes over the role of **participant** in society and the world. Decisions are carried out and actions are taken to sustain and to improve life's quality and quantity. This never ending process fills a lifetime for the learner.

Ms. Chavez has captured the essence of environmental literacy. This process is undergone not only by the child, but the teacher as well. Developing an environmentally literate citizenry encompasses the child and the adult learner.

Teachers are, in the final analysis, the determiners of curriculum. If teachers are personally convinced that the environment is worthy of study, then their students will most likely have a greater chance to gain an environmental appreciation through their studies. Preparing the students for a lifetime of environmental learning is one of the many challenges faced by teachers, who themselves are probably still learning.

It is with this notion that teacher-friendly curriculum are advanced. What makes a curriculum friendly or useful for a teacher? What do teachers want and need? How can curriculum developers help teachers prepare students? These are a few of the questions that this study addresses. In its role of curriculum developer, the Texas Natural Resource Conservation Commission strives to provide Texas teachers with refined, innovative instructional tools. Its program "Texas Waste in Place" with the teacher training and the curricula, Visit the Triple R Ranch - Reduce/Reuse/Recycle and the Waste in Place from Keep America Beautiful, Inc., is designed to provide Texas teachers with the information necessary to do their jobs.

Teachers need instructional materials that are specifically designed to facilitate active learning. Teachers also need proper training in the use of such materials. A strong science background is not a prerequisite for teaching environmental education, and teachers can be assured of their competencies in the area of EE through effective teacher training. These competencies include selection and use of EE curricular programs that are designed to achieve the accepted goals, along with infusion tactics (Stone, 1989: 159).

Study Implications

There are several considerations that this study presents:

1. If the TNRCC, and also the KAB, curriculum are developed with elementary level students in mind, then the respondents in the 7th - 12th grades could possibly distort the activity usage conclusions. Since the

activities are designed for younger children, the middle and high school teachers may not be using them for that reason.

2. If the contracting agent is responsible for participant recruitment, then the KTB mailer is failing to reach enough teachers. Respondents who heard of the program through their school, via the principal, other teachers, and the administration account for a significant amount.
3. With such an overwhelming recommendation for the training, there appears to be barriers to the utilization of the curriculum that is presented in the workshops.
4. The use of activities selectively, or in combination with other material, suggests that the unit does not stand alone. The use of the two curricula together represented a significant response.
5. Infusion is an issue that research indicates that many EE programs face. With educational requirements such as the Essential Elements and now the TAAS test (Texas Academic Assessment of Skills) teachers must incorporate curricula according to their guidelines. Inclusion of TAAS language in the curriculum could ease the issue.
6. Teachers who take their curriculum back from the workshops to more than just their classroom account for a large portion of the students exposed. The teachers who have taught more than 50 students are significant. If one teacher is given approximately 22 students per year in a classroom, then some of the teachers have been very busy.
7. The bonus training program could possibly be more successful. There were many teachers who were aware of it, but for many reasons did not participate. Obviously, the ones who indicated they did share the program with 5 other teachers but did not get paid for it will be personally contacted as previously planned.
8. The use of TENET as an information tool could also be more helpful for teachers.
9. Many ideas for curriculum refinement can arise from the teachers comments. Acquisition of materials is a problem that could be relieved by soliciting help from parents to contribute their recycling goods. The teachers speak to possibilities like art exhibits for

the finished products, and fundraisers for the school using the artwork. In general, careful attention to their suggestions is certainly warranted.

APPENDIX A

SURVEY

Two surveys were mailed to Texas teachers in the TNRCC Solid Waste Education program. The survey on the following page was mailed in March 1993. The follow-up survey, mailed in January 1994, was identical except for changes in the agency's name and the return date.

NOTE TO SCHOOLS:

If the person from your school who originally attended this training is no longer employed at your campus, please check here ☐ and write in the name of your school and your school district here _____

Then return this survey to us by refolding the page so the business reply mail portion faces outward. Seal and mail.

Solid Waste Education Program Survey

The Texas Water Commission (TWC)

would like your input on our Solid Waste Education Program, which consists of the Keep America Beautiful "Waste in Place" activities and Texas-specific material called "Visit the Triple R

Ranch-Reduce/Reuse/Recycle." The two programs have been combined in a single notebook, called "Texas Waste in Place." Accord-

ing to our records, you've attended a training session and received a notebook under this program.



We want to make this program easy for you to use and fun and educational for your students. Please help us by taking a few minutes to complete this survey. Do it right now, while you're thinking about it. Then when you're finished, fold and seal it, and drop it in the mail (self-mailer is postage paid). Please return the survey by May 1, 1993. Thank you for helping us improve environmental education for all young Texans!

1. What grade level do you teach?
2. What subject do you teach?
3. How did you hear about the Texas Waste in Place training?
☐ teacher convention (which one? _____)
☐ mailer from Keep Texas Beautiful _____)

- ☐ from a friend
☐ school principal or superintendent assigned you to go
☐ other _____

4. When did you attend a training session on Texas Waste in Place? Date _____ City _____

5. How would you rate the knowledge and experience of the trainer?
☐ - poor ☐ - average ☐ - superior ☐ - outstanding

6. How would you rate the enthusiasm of the trainer?
☐ - poor ☐ - average ☐ - superior ☐ - outstanding

7. Would you recommend this training program to a fellow teacher?
☐ - yes ☐ - no

8. How have you used the program in your classroom? (check all that apply)
☐ use as a unit, progress through the suggested outline
☐ use only selected activities
☐ use the activities alone
☐ use the activities combined with other material (if using other activities, list sources of the other material: _____)

9. If you used only selected activities, from what section were they?
☐ Keep America Beautiful's Waste in Place Curriculum
☐ the Texas supplemental material
☐ both

10. Which activities did you use?

11. Which activity was your favorite and why?

12. Which activity was your least favorite and why?

13. Which activity was the students' favorite activity and why?

14. Which activity was the students' least favorite activity and why?

15. What are your suggestions for improving your least favorite activity?

16. In which subject area(s) did you use the lessons?
☐ science ☐ mathematics ☐ language arts
☐ social studies ☐ theater arts

17. How many students have you instructed in Texas Waste in Place activities? (total number, all classes combined)

18. Are you aware of the program that allows you to receive \$50 for training at least 5 more teachers?
☐ yes ☐ no

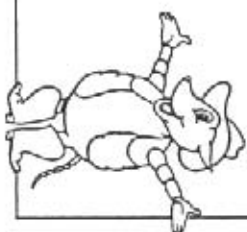
19. Have you trained other teachers in your school in Texas Waste in Place under the program that allows you to receive \$50 for training at least 5 more teachers?
☐ yes ☐ no

20. If so, have you received your bonus money for conducting these trainings?
☐ yes ☐ no

21. Please write any other comments you have about Texas Waste in Place or the training workshop.

22. Do you use the Texas Education Agency's TENET computer network to get information on new teaching techniques?
☐ yes ☐ no

23. Would you be interested in getting additional lessons for the Texas Waste in Place supplement on TENET?
☐ yes ☐ no



APPENDIX B

SURVEY RAW DATA

1. What grade level do you teach?*

Pre-Kindergarten.	8
Kindergarten.	31
1st	37
2nd	50
3rd	55
4th	72
5th	70
6th	36
7th	24
8th	17
9th	8
10th	10
11th	9
12th	10

* Some respondents teach more than one grade level.

2. What subject do you teach?*

All	138
Science	74
Math	26
Social Studies	23
Language Arts	17
Reading	13
Health	7
Gifted & Talented	6
Special Ed	6
English	3
PE	3
Spelling	3
Biology	3
Environmental Science	3
Art	2
Music	2
Life Skills	2
Natural History	1
ESOL	1
Ecology	1
Spanish	1
Agriculture	1
Home Economics	1

*Some respondents teach more than one subject.

3. How did you hear about the Texas Waste in Place training?

Teacher Convention	11
TOEA, CAST, TSTA, STAT	
KTB Mailer	62
Friend	24
Principal	82
Other	
Regional Service Centers	15
KTB Affiliates	10
School Administration	7
AAT	4
Newspaper	3
Flyers, Newsletters, Magazines	10
Workshops, meetings, in-service	15
Other teachers or associates	15
HEB	1
Chamber of Commerce	1

4. When did you attend a training session on Texas Waste in Place?

<u>Date</u>	<u>City</u>	<u>Trainer</u>
6/9/92	San Antonio	Andrea Foster
11/20/92	San Antonio	Andrea Foster
3/23/92	San Antonio	Andrea Foster
8/9/92	Austin	Krueger/Furtado
10/16/92	Austin	Barbara Krueger
10/30/92	Belton	Barbara Krueger
11/13/92	San Antonio	Barbara Krueger
6/21/92	Kilgore	Betty Fowler
11/6/92	Whitehouse	Betty Fowler
6/21/92	Lubbock	Bob & Patsy Boynton
9/18/92	Lubbock	Bob & Patsy Boynton
10/23/92	Amarillo	Carolyn Price
3/6/93	Amarillo	Carolyn Price
6/4/93	Amarillo	Carolyn Price
9/25/92	Denton	Cecile Carson
10/23/92	Plano	Cecile Carson
11/13/92	Houston	Cheryl Stephens
10/23/92	McAllen	Claudia Locher
11/13/92	Corpus Christi	Claudia Locher
12/11/92	San Antonio	Claudia Locher
6/4/92	Ft. Stockton	Cynthia Kaelin
11/13/92	Ft. Stockton	Cynthia Kaelin
5/15/92	El Paso	Grammer/Thurman
6/30/92	El Paso	Grammer/Thurman
6/18/93	El Paso	Grammer/Thurman
6/19/93	El Paso	Grammer/Thurman
11/13/92	Abilene	Deborah Jeter
3/6/93	Abilene	Deborah Jeter

9/25/92	Houston	Dee Hruska
11/4/92	Baytown	Dee Hruska
11/6/92	Pasadena	Dee Hruska
1/20/93	Dickinson	Dee Hruska
2/24/93	Houston	Dee Hruska
3/24/93	Houston	Dee Hruska
5/13/93	Houston	Dee Hruska
5/14/93	Houston	Dee Hruska
6/21/92	Midland	Donna Kelly
10/23/92	Midland	Donna Kelly
11/6/92	Dallas	Dodd/Carson
6/10/92	Garland	Gayla Dodd
11/20/92	Kemp	Gayla Dodd
2/27/93	Carthage	Gayla Dodd
6/23/92	Corpus Christi	Gladys May
6/24/92	Livingston	Gladys May
6/30/92	Huntsville	Gladys May
10/9/92	Corpus Christi	Gladys May
7/8/92	Freeport	Helen Ann Reed
11/13/92	Decatur	Isabel Stiber
11/15/92	Grand Prairie	Isabel Stiber
6/8/92	Fort Worth	Davis/Stiber
11/20/92	Fort Worth	Davis/Jones
6/28/92	Abilene	Hobbs/Jeter
12/4/93	Dallas	Hurt/Davis
8/9/92	Austin	Hurt/LeMoyne
6/14/92	Jacksonville	Woods/Leonard
6/15/92	Nacogdoches	Woods/Leonard
7/14/92	Greenville	Woods/Leonard
11/13/92	Wills Point	Woods/Leonard
11/20/92	Lufkin	Woods/Leonard
10/30/92	Dallas	Jeanie Jones
11/6/92	Carrollton	Jeanie Jones
	Midlothian	Jeff Hurt
	Dallas	Jeff Hurt
3/16/92	Dallas	Jeff Hurt
7/24/92	Dallas	Jeff Hurt
8/2/92	Halton City	Jeff Hurt
4/3/93	Houston	Jeff Hurt
4/10/93	Austin	Jeff Hurt
5/8/93	Deerwood	Jeff Hurt
9/18/93	Dallas	Jeff Hurt
11/6/93	Plano	Jeff Hurt
6/28/92	Dallas	Jo Davis
10/9/92	Fort Worth	Jo Davis
10/16/92	Marble Falls	Jo Davis
11/6/92	Irving	Jo Davis
11/13/92	Dallas	Jo Davis
2/16/93	Irving	Jo Davis
3/6/93	Wichita Falls	Jo Davis
5/1/93	Arlington	Jo Davis
6/8/93	Marshall	Jo Davis

10/2/93	Leakey	Jo Davis
11/6/92	Austin	Judy LeMoyné
4/10/92	Harlingen	Lupita Muniz
7/5/92	Brownsville	Lupita Muniz
6/9/93	Harlingen	Lupita Muniz
6/9/92	Amarillo	Sunderman/Price
10/2/92	Humble	Washington/Williams
10/16/92	Greenville	Washington
10/23/92	Houston	Washington
11/20/92	Houston	Washington
10/27/92	Bertram	Clymer
6/15/92	Silsbee	Williams/May
10/27/92	Beaumont	Rita Williams
6/2/93	Beaumont	Rita Williams
10/15/93	Houston	Rita Williams
10/2/92	New Braunfels	Robert Furtado
1/30/93	Laredo	Scott Wilkinson
5/1/92	Pearland	Cardwell/Bittick
6/15/92	Waco	Teemus Warner
10/23/92	Waco	Teemus Warner
10/2/92	Wharton	Terri Cardwell
10/23/92	Rosenberg	Terri Cardwell

5. How would you rate the knowledge and experience of the trainer?

Trainer	# of Respondents Ranking			
	Poor	Average	Superior	Outstanding
Foster		1	2	4
Krueger/Furtado				2
Krueger		2	4	2
Fowler			3	
Boynton		2	1	2
Price		1	3	
Carson			2	4
Stephens			1	1
Locher			5	6
Kaelin			2	2
Grammer/Thurman		2	2	7
Jeter			5	1
Hruska		3	10	4
Kelly			3	3
Dodd/Carson			1	1
Dodd		2	2	2
May	1	1	2	5
Reed			1	
Stiber		2	3	4
Davis/Stiber			2	2
Davis/Jones			2	
Hobbs/Jeter		2	3	
Hurt/Davis				2

Hurt/LeMoyne		1	2
Woods/Leonard	1	10	5
Jones		3	6
Hurt	1	6	24
Davis	2	9	10
LeMoyne			3
Muniz	1	5	4
Sunderman/ Price	1		1
Washington/Williams	2	2	1
Washington		2	1
Clymer	1	1	
Williams/May		1	
Williams		1	6
Furtado	1	1	4
Wilkinson			1
Cardwell/Bittick		2	3
Warner		2	4
Cardwell		1	1

6. How would you rate the enthusiasm of the trainer?

Trainer	# of Respondents Ranking			
	Poor	Average	Superior	Outstanding
Foster		1	1	5
Krueger/Furtado				2
Krueger			3	5
Fowler				1
Boynton	2		1	2
Price	1		2	1
Carson			1	5
Stephens				2
Locher			6	5
Kaelin				4
Grammer/Thurman	1		3	7
Jeter			3	
Hruska	1		9	7
Kelly			2	4
Dodd/Carson			1	1
Dodd		1	1	4
May	1		1	6
Reed			1	
Stiber		2	3	4
Davis/Stiber			1	3
Davis/Jones			2	
Hobbs/Jeter			2	3
Hurt/Davis				2
Hurt/LeMoyne				3
Woods/Leonard			10	6
Jones			3	6
Hurt			6	25

Davis	5	6	10
LeMoyne			3
Muniz		5	5
Sunderman/Price	2	1	1
Washington/Williams		1	2
Washington		1	2
Clymer	1	1	
Williams/May			1
Williams		1	6
Furtado	1	1	4
Wilkinson			1
Cardwell/Bittick		2	3
Warner		1	5
Cardwell			2

7. Would you recommend this training program to a fellow teacher?

Yes 265 No 6

8. How have you used the program in your classroom?
(check all that apply)

As a unit 41
 Only selected activities 162
 Activities alone 45
 Activities combined with other material . . 122
 EPA
 Soil & Water Conservation Service
 NSTA
 Windows on Science
 Weekly Reader
 Mobius
 Recycling books
 Major Rivers
 DLM Reading books
 Science guide
 Basal Reading
 Earth Day materials
 Science books
 Project Learning Tree
 CT2000 Newsletter
 Merrill Science book
 GLO Buy Recycled
 Teacher-written activities
 Earth unit
 Newspapers
 Mailbox magazine
 KTB material
Earthweek
 Good Apple Recycling
 Nature and Children

Project WILD
 NatureScope
Kids for Saving Earth
Target Earth
 Ecology activities
 Caretakers All
 children's storybooks
 Science Start
 WalMart
 Nature Recycling magazine
Rainforests
 Jason Project
The Wartville Wizard
Let's Find the Pollution Solution

9. If you used only selected activities, from what section were they?

Keep America Beautiful's Waste in Place Curriculum . . . 85
 Texas supplemental material 22
 both 137

10. Which activities did you use?

See below.

11. Which activity was your favorite and why?

See below.

12. Which activity was your least favorite and why?

See below.

13. Which activity was the students' favorite activity and why?

See below.

14. Which activity was the students' least favorite activity and why?

<u>Activity</u>	<u># of Respondents to Questions</u>				
	<u>10.</u>	<u>11.</u>	<u>12.</u>	<u>13.</u>	<u>14.</u>

Visit the Triple R Ranch - Reduce/Reuse/Recycle:

Clean the Stream At The Triple R Ranch	10		1	1	
Texascape: Our Natural Resources	5	1			
The Right Way to Take Care of the Right-Of-Way	5				
What Goes Up Must Come Down	5				
Hold'er, Pardner	9	1			

Texas Wreaths	27	13	1	12	4
Yellow Rose of Texas	27	8	4	4	1
A Visit to a Recycling Center	9	2		1	
Earthworm Bunkhouses	27	7	6	8	4
Texas Microbes Eat Like Horses	16		4	2	3
Texas Mega Compost	18	4	4	5	3
Spore Prints: Follow					
Those Tracks	18	2	4	3	3
Personal Journal: My Visit to					
the Triple R Ranch	6				1
Plot Partners-Interaction	7	1		1	1
Decisions, Decisions, Decisions	8	1	1		
Texas Trash Trivia	43	7	6	7	6
A Texas Song About Unwanted Waste	22	2		4	
<u>Waste In Place:</u>					
Natural or Human-Made	8	2	1		
Keep It Beautiful	23	16		18	
Litter Critter	12	3	1	2	
Take Pride	7			2	2
Puppet Drama	9	1		2	
Good Habits	4				
Who Keeps America Beautiful?	13	3		3	
Litter Value Bag	27	8		4	1
Keep Our Community Clean	1				
What's In My Trash Can?	15	2		1	
Feels So Good	3				
Wrap It Up	5				
Let's Trade	7	2	2		1
Reuse Box	7	1			
Tires To Swings	5	1			
Make It Smaller	11	1		1	
Swap Day	9	2		1	
The Stomp	9	1	1	3	
Metal Melts	6	1	1		
Making Paper	63	28	7	33	2
Recycling Plastic	11	5	1		1
Recyclables In My Home	13	4			
Paper Trees	14	3	2	6	1
Turn Over A New Leaf	10		4	2	3
Compost the Most	12	1	5	2	3
Burning Issues	4	1		1	1
Pollution Solution	9	1		1	
Read the Label	10		1		1
Waste Garden	11	5		5	
Trash Archaeologist	8	3			
Garbage Pizza	99	65	13	53	2
When They're Gone, They're Gone	13	3	1	1	1
Letters To Leaders	8	1			1
Living With Waste	3				
Managing Waste In Glen City	4	1		1	

Others:

Games	6			3	
Plastics coding by numbers	24	9	1	11	2
Recycle skit	1			1	
Videos	6	2		2	1
Earth Day material	1				
Environmental Bulletins	2				
General Land Office material	1				
Bluebonnets	17	5	3	6	
Apple Core	1	1		1	
Timeline	2			1	
Household Hazardous Waste	1				
Bleach Bottle Rabbit	1				
Paper Hats	3	1			
All resources & activities	18	17	4	14	1

15. What are your suggestions for improving your least favorite activity?

See Appendix C.

16. In which subject area(s) did you use the lessons?

Science	212
Social Studies	114
Mathematics	71
Theater Arts	31
Language Arts	101

17. How many students have you instructed in Texas Waste in Place activities? (total number, all classes combined)

Total students 18,591

<u>Students per teacher</u>	<u>teachers</u>
0 - 25	75
26 - 50	58
51 - 75	35
76 - 100	17
101 - 150	24
151 - 200	9
201 - 250	3
251 - 300	4
301 - 350	1
351 - 400	2
401 - 450	0
451 - 500	1
501+.	3

18. Are you aware of the program that allows you to receive \$50 for training at least 5 more teachers?

Yes 243 No 27

19. Have you trained other teachers in your school in Texas Waste in Place under the program that allows you to receive \$50 for training at least 5 more teachers?

Yes 57 No 213

20. If so, have you received your bonus money for conducting these trainings?

Yes 36 No 21

21. Please write any other comments you have about Texas Waste in Place or the training workshop.

See Appendix C.

22. Do you use the Texas Education Agency's TENET computer network to get information on new teaching techniques?

Yes 31 No 237

23. Would you be interested in getting additional lessons for the Texas Waste in Place supplement on TENET?

Yes 174 No 50

APPENDIX C

RESPONDENTS' COMMENTS

#11 Which activity was your favorite and why?

Bluebonnets.

They are real looking and fun.

Earthworm Bunkhouses.

The children got excited about how animals help and clean our environment.

Kids loved it.

Unique, interesting and practical.

Novel. Versatile and can be \$ raiser.

Teaches organics.

Garbage Pizza.

Very Visual.

So many opportunities to integrate subjects.

We made it quite involved by preparing circle graphs learning about decimals and percentages.

Special Ed. and other students are quite visual and benefit from the multisensory activity.

Kids seemed to remember more with that kind of activity.

Gives kids ideas of make-up of garbage.

Combined several concepts.

Created an awareness in students.

Super hands-on way to teach the kids how much of trash is wasted.

Awareness of types of trash.

Because it was easy to see the % of each waste.

It illustrated beautifully the types and quantities of trash and we cleaned up the school grounds at the same time.

Gets kids really involved.

Students made 4" individual ones and did an excellent job.

It was a great visual aid in material percentages.

Visual, incorporating pie graphing.

Good participation activity. Applied knowledge.

It's an excellent activity lesson that teaches good basic necessary info about the solid waste problem.

It's an excellent model of the trash we throw away everyday in our lives.

Glen City.

Planning it.

Keep It Beautiful.

Because all children were involved.

The children got so turned on by it. They want to do ecology everyday.

Tie in with science - fun.

Let's Trade.

Ease of use with high student enthusiasm, good economics correlation.

Litter Critter.

Very clear cut lesson - opens students eyes and makes them aware.

Litter Value Bag.

Easy to assemble and led to class discussion.

Kids have to think and justify their group's answers.

It made children think.

Because everyone can relate to it.

I like to see the reasoning involved in ranking the trash.

Paper Making.

The students are very conscious of paper recycling and do not waste paper. They give me back papers with a clean side so I could use the other.

Students enjoyed it.

Easy to show the process and its fun and educational.

Fascinating.

Hands-on and including art.

We began a paper recycling program at school this year.

We made it interdisciplinary.

I was fascinated by the easy process.

Provided tangible proof of validity.

Very hands on for all ages.

The kids learned so much and really had fun.

Paper Trees.

Students learned about the importance of recycling.

Plastics coding by numbers.

Kids had a blast.

Students worked in cooperative groups, were absorbed in the activity and gained knowledge.

Because we produce too much plastic garbage.

Children really enjoyed this. They learned new vocabulary that we used the rest of the year.

Kids felt they were learning and helping.

Plot Partners.

Hands-on activity that made them aware of their environment.

Pollution Solution.

Hands-on, relevant to the news.

Recyclables In My Home.

Gets whole family involved.

Modified to school trash can. Because of my students' expressions when I told them to each take something out of the trash can.

Recycling Plastics.

Made bluebonnets instead of plastic jewelry. Couldn't get jewelry to do right when I tried at home. Too hot for kids to handle.

Songs.

They were cute.

Swap Day.

Kids liked it.

Texas Wreaths.

It was fun for the kids.

Easy and great looking crafts.

The way such a simple project could look so great.

My class earned \$200 for science materials.

Easy, fun great way for kids to see concept.

Trash Archaeologist.

It encourages students to think about waste and its value to the environment. They must decide. Good cooperative learning.

Trash Trivia.

Students really enjoyed. All could participate.

Gave students some unusual facts.

Because of student participation and recall of data.

Allowed some fun competition while learning.

Waste Garden.

Helped students realize items don't decompose.

Because the children could see what happens in landfills.

Kids can actually see what biodegrades.

When They're Gone, They're Gone.

It had a complete lesson.

Yellow Rose.

The point made was that reusing is one of the three R's.

Because we were able to recycle aluminum cans.

#12 Which activity was your least favorite and why?

Bluebonnets.

Didn't work well with my age group.

Unable for the students to work independently.

Compost the Most.

So messy.

Earthworm Bunkhouses.

Too messy and smelly.

Garbage Pizza.

Sorry I cannot stand working with trash and food.

Required too much glue.

Too time consuming for class, and not age appropriate.

Difficulty with glue.

Because we had an accident with the glass.

It smells.

Lots of trouble.

Too involved.

Messy, but still worthwhile.

Because I teach so many and I felt it was too much of a
hassle to plan and do.

Let's Trade.

Children had no understanding at the end of the day.

They wanted to take their own items back.

Metal Melts.

Didn't do it because of safety reasons.

Paper Making.

Kids wanted to throw them away.

Was messy. I made mistake of doing during an evaluation.

Problems in getting all of the materials together.

Messy, did not have good results.

Hard with young children.

Paper Trees.

Not happy with trees.

Plastics coding by numbers.

Unsure of a few plastics. Not knowing all the answers.

Trash Trivia.

Too difficult for my special ed. kids.

Was 5th grade and a little above level.

Hard to control students.

Memorization.

Difficult for kindergartners to read by themselves.

No hands-on.

Yellow Roses.

Too hard for elementary.

Cans have sharp edges. Not good child activity.

Cans are too hard to cut.

Very difficult to do.

Loved the rose but it required too much advance preparation and caution.

#13 Which activity was the students' favorite activity and why?

Bluebonnets.

They liked the finished product.

Burning issues.

The students could see and smell the results.

Composting.

Outside activity.

Environmental Jeopardy.

Enjoyed the game atmosphere, felt they were in control,
and they knew most of the answers.

Garbage Pizza.

They each got to take their own home.

Hands-on.

They enjoyed cleaning up the grounds to collect the
garbage, and they understood it.

They had fun choosing from the trash piles.

Make them realize the importance of recycling.

Can relate to the pizza part.

They enjoyed gluing on the items on the class pizza.

They loved making something close to food.

Uniqueness.

Because they like to shock people when they saw their
pizzas.

They were all involved.

Keep It Beautiful.

They could eat it.

Fun.

A yummy way to learn about earthworms.

Litter critter.

Fun.

Getting creative opportunities with junk.

Newspaper tree.

It could be done easily at home with common materials.

Paper making.

They were able to be creative in colors, shapes and
later use.

Lots of hands-on.

They loved the mushy feeling in the water. They
couldn't believe they actually made paper.

They really felt like they were part of the recycling
process.

Resulting product is a good motivation.

They made Christmas ornaments.
They were amazed with being able to recycle paper from
our collection bin in the classroom and then use
their own recycled paper.
Unique, creative, fun.
Children have to be physically involved.
Fascinating.
They felt they were recyclers.

Plastics coding by numbers.
They learned new vocabulary.
Kids felt they were learning and helping.

Plot Partners.
Enjoyed working together in a discovery situation.

Recycling plastics.
Could make things such as earrings, pins, decorations.
Hands-on and allowed for lots of individual creativity.
Fun to observe how plastic changes in heat.

Texas Wreaths.
Fun, easy, successful project.
They produced a neat craft and then made paper-mache
paper, puppets, pinatas and got into the idea of
using their creativity instead of throwing.
Easy for slower kids, could make more complicated.
Decorated school lobby. Students got recognition.

Timeline.
They were very excited putting the timeline in the
right sequence.

Trash Trivia.
No penalty for guessing, fun.
Because I added all kinds of additional info as we went
through it. I use extension.

Waste Garden.
It was a hands-on activity and they enjoyed hunting for
the things they'd listed when they put them in
place bag.
Because it was the class science fair project and they
all were eager to see what happened in their
garden.
Because being outside working with nature is so
relaxing and the finished product and the feeling.

When They're Gone, They're Gone.
Very involving.

#14 Which activity was the students' least favorite activity and why?

Composting.

Activity where desks are made a mess and they must realize they are responsible for their own waste.

Messy and dirty.

It just didn't interest them.

Garbage Pizza.

Did as a team with nothing to take home.

Smells.

Letters to Leaders.

Did not hold attention.

Making paper ornaments.

They liked making it, but their items fell apart.

Paper Making.

Took too long.

Paper Trees.

They saw little use for the trees.

Personal Journal.

Took time to think.

Plot Partners.

Bad weather.

Recyclables In My Home.

Because some things in trash can are gross.

Songs.

Not a musical group.

Swap Day.

The idea of giving up something they love. Some children have a hard time sharing.

Take Pride.

It's corny.

Texas Wreaths.

Long.

Some students did not retain their attention to complete.

They looked horrible.

Trash Trivia.

Too complex, not a large previous knowledge base to
relate info to.

Nothing to do.

No activity or movement involved.

Difficult for kindergarten.

Trash pick-up.

We called it Yuk Patrol. They felt people should pick
up their own trash.

When They're Gone, They're Gone.

Because it was too abstract.

Yellow Rose of Texas.

Students didn't have much they could do themselves.

#15 What are your suggestions for improving your least favorite activity?

We needed more time.

Offer lower level trivia questions.

perhaps a 10-15 minute video would give them the info and show examples

having more fact cards

using items on hand

retraining

more data to explain activity

Include more pre-k activities.

I will do more preparation before hand and keep the pace fast.

changing to a different grade level

The garbage pizza takes a lot of time to prepare.

3rd graders can't work with cans.

I think it is just a little too abstract for 4th graders and would work better with older kids.

plan ahead

I'd like to see more activities.

Furthering my knowledge on plastics.

Use a smaller container and manage the smell better.

Better understanding.

More trash trivia outside and use some concrete examples.

I modified it to make a human gameboard with the children as the markers.

Do it outside.

Let third grade do it.

Wash all trash prior to putting it on, if possible, and clothespin your hoses.

Next time I will need better materials, such as screens, blocks, and a disposable blender.

I took the Yellow Rose of Texas a couple of steps further and designed other flower types.

To have a song to help reinforce the info.

Use it more - not just as a unit but many weeks. I bring the Sunday ads and we discuss - answers have changed.

Use hot glue gun next year instead of Elmer's.

Incorporate a visual, auditory, and hands-on activity in every lesson.

Make it simpler and invent an activity to go with it or a video.

Through art. I had the children to draw any environmental picture and trade with a friend.

Drop it.

Possibly play game as a whole group instead of individual groups.

My main problem in implementing activities is cost of gathering supplies. We are trying to build a supply of reusable materials.

Each one do their own small scale pizza.

There is no place in my required curriculum for these activities.

I'll choose a different activity next year.

Home room mother volunteers.

We incorporated many reuse activities with art.

Hope for better weather or have an alternative plan.

More structure.

Pizza was too involved. I now have simplified it - don't try to paste on marbles, etc. Don't make a salt dough crust - use cardboard instead.

#21. Please write any other comments

We were told at the training session we would each receive \$25.00 and would get to keep the yellow notebook. After school started, we were told no deal on the \$25.00. Only one of our teachers got to keep her \$25.00 and the yellow notebook. She did not share with the rest of our teachers who had attended. All the others returned our notebook except her.

I was in the hospital for 1 month and on maternity leave for 7 months. Can I still claim the bonus for extra training? It was completed in October 1993.

I was supposed to get materials mailed, but I never got them.

Texas Waste in Place is wonderful. I simply need to get my act together and sort through so much stuff with language arts to try to get done with all my EE's. I want to supplement my current curriculum more with it. I lent my curriculum guide to the elementary teachers because they can fit it in more readily with their curriculum.

I did not like the unproven comments about the ozone. Stick to the facts, we have enough to do without the ozone!

Excellent!

Next year I'll instruct 100 young people.

This was an excellent workshop. The presenter had an excellent presentation. I recommend a Laredo School principal to request this workshop for his teacher or summer workshops that he is in charge of. It was one of the most interesting ones I have attended.

Love it; I share it when I can.

I plan on using several activities during a special science week.

It's wonderful. Science teachers are looking for "lab experiences". Suggestions as to how to adopt present curriculum to lab settings might be welcomed. Great resource.

Wonderful.

The workshop and program are great.

Appreciate mailouts. Don't have time to read, but file for later. Was interesting, learned a lot, and loved free materials. Never got \$25.00.

Never received TEEAC sticker for AAT credit.

Wonderful curriculum.

My curriculum is so full it's hard to get another unit in.

Some activities are a waste of time/resources. What do you do with a garbage pizza or aluminum roses-throw them in the garbage.

This program was only about using garbage to make art. There was nothing about recycling or conservation, etc.

Not usable in ESOL required curriculum 9-12.

Benefitted so much from program. Teachers see results. So well organized. Vocabulary is good - goes with spelling classes too. I appreciate y'all and I know a lot of others do too.

The workshop made me more aware of importance for reusing and recycling. Workshop was great.

Great, organized, thorough, whole language.

Love the guide, love the ideas not shown in books.

This is a great program... I've shared it with my grade level and my student teacher.

Really liked both.

I'll conduct a training session this year.

It is great.

Great, I would recommend to anyone.

It's all great.

More middle and secondary ideas.

Excellent.

Loved it. I am retiring but will be glad to help others.

It would be beneficial to continue to receive updated materials, stats, and information.

It was great.

I think it is worthwhile.

Everyone really enjoys it.

Please explain TENET.

I plan on continuing my training this summer.

Was terrific.

Wonderful, wholelistic, workable.

Excellent. We'd like to start a recycle program at our school.

Very useful.

It's great and needed.

We need to train more and encourage its use.

Very enthusiastic.

I was told by trainers that I would receive \$25.00 for training that day. I have not received it.

Update conferences.

How do you get certified to teach TWIP?

This program is wonderful. It is very easy to use.

We held a Litter Free Picnic as part of the caretakers unit. The students loved it. Why don't you incorporate that into one of your lessons?

Both are great. Everything about the program is wonderful. I was unable to use it last year but I hope to use it this Spring. Thanks again for a wonderful workshop and the notebook. Please keep me informed.

I learned a lot through the training. I intend to ask for a training date for my campus.

Excellent, interesting, well-planned workshop.

Can adapt lessons for high school students. Anxious to take training in secondary curriculum.

I'd like to offer a workshop.

Very enjoyable.

Thank you, we need this.

It was fun.

A fun day - unexpected.

I sure enjoy the "Grassroots" newsletter.

It's great - I learned a lot.

I share ideas and materials with all the teachers without a formal workshop.

Super.

Excellent. Tried recycling with kids but couldn't find markets to sustain the recycling program.

The material gathered is excellent. The problem is getting busy teachers to look at it on their own.

Great job. Newsletter can be turned into lessons also.

My teachers wouldn't take the course due to lack of AAT credits.

Excellent resource. I wish there was another training session.

Facilitatorship should open to volunteers also. Many are well read on environmental issues, and have a concern that this not just be another resource but that the teachers and students understand why we are doing this.

Enjoyed program immensely, but wanted more info on how to actually implement recycling on campus.

Keep us updated with new info. Liked the training program a lot.

It's wonderful. Long overdue.

I really enjoyed the day.

Enjoyed the program.

It was an enlightening experience.

The materials and training could be excellent. I see much potential for it. I have not had time nor the desire to redo them.

I never received the TWIP. We were told it would be mailed but it never was.

I have not used the guide too much last year because I received the guide during the school year and was too busy to incorporate all of it into my lessons. This year, my earth week activities will be used strictly from this guide. It's an excellent resource.

I like this program. This year I did not use TWIP. I do hope to use it next year. Our grade level ended up over-crowded and I had so many slow learners that I just had time to get in the basics. What a year.

Great. Keep it up. Also I had questions after the inservice but had a difficult time contacting the presenters to ask questions, clarify, etc.

This was a helpful workshop. I use many ideas in classes.

I think it's great.

This is a wonderful program.

I wish more teachers would use it.

The program was excellent.

The students enjoyed it and so did I.

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