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Environmental education: Developing an environmental ethic

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Abstract

Environmental education continues to be a topic of educational concern. The environmental movement peaked in the 1970s with the observance of the first nation-wide Earth Day, the passage of the Environmental Education Act by Congress, and several conferences, all designed to foster an awareness of the ever-increasing need for environmental education programs.

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Environmental Education: Developing An Environmental Ethic

Chapter 1

Introduction

Environmental education continues to be a topic of educational concern. The environmental movement peaked in the 1970s with the observance of the first nation-wide Earth Day, the passage of the Environmental Education Act by Congress, and several conferences, all designed to foster an awareness of the ever-increasing need for environmental education programs.

On April 22, 1970 millions of citizens took part in the first Earth Day. Clean-up campaigns, speeches, marches, and demonstrations took place across the country. The National Education Association estimated that ten million school children took part in educational activities designed to foster an awareness of the seriousness of environmental problems. Others participated in activities such as collecting cans, picking up trash along roadsides, cleaning garbage from waterways, and planting trees ("Earth Day", 1970).

The same year Congress passed Public Law 91-516 The Environmental Education Act (1970).

The law authorized the United States Commissioner of Education to "establish education programs to encourage understanding of policies, and support of activities, designed to enhance environmental quality and maintain ecological balance" (Environmental Education Act, 1970, p. 1312). It provided for the development and support of new and improved environmental education curricula, the demonstration of model education programs, environmental education programs at the elementary and secondary levels, the dissemination of curricular materials and other information to be used in such programs, training for teachers and other educational personnel, the development of outdoor study centers, community education, and the preparation and distribution of environmental materials to the mass media.

Several conferences were held during the 1970s to make recommendations in terms of the responsibility of elementary and secondary schools in fostering positive environmental behavior by citizens. Participants at the conferences discussed the needs, goals, and objectives for

developing environmental education programs (Wisconsin Department of Public Instruction, 1985). In 1977 the first Intergovernmental Conference on Environmental Education was held in Tbilisi, Georgia, USSR. A set of environmental education objectives (see Appendix A) which called for a citizenship action approach came from this conference (Volk, Hungerford, & Tomera, 1984; Wisconsin DPI, 1985).

Responding to the law, the conferences, and public concern for the condition of the environment, elementary and secondary schools attempted to implement environmental education programs. How far have the schools come in their attempts to implement effective environmental education programs? If one believes that current environmental conditions are directly affected by the public school environmental education programs, the 1980 report of the President's Council on Environmental Quality would suggest not very far. The report contained a long and depressing list of continued environmental deterioration including:

> groundwater contamination from improper disposal of toxic wastes, the pervasive pollution of surface waters near large cities, closure or reduced production from millions of acres of coastal waters, acid rain, overloaded sewage treatment plants, loss of prime farmlands to urban sprawl, severe erosion that reduces farm productivity and silts streams, the problem of finding disposal sites for hazardous waste, overcutting of privately held forest land, the loss of millions of acres of tropical forests annually and the list goes on.... (Schoenfeld, 1980)

The truth of the matter is that environmental education has never really gotten off the ground. Environmental education has never held a prominent position in the curricula of public schools. Several reasons account for its low priority status. The initiation of the environmental education curriculum reform movement from groups outside the education field has been cited as a major reason. Further reasons include a lack of

federal and state monies in support of environmental education programs, the fact that many educators have not changed their way of thinking to incorporate the environment into their teaching, the unwillingness of practitioners to "buck the system" of established priorities in order to include current concerns and issues, and the lack of a well-established environmental education curriculum in most schools (Disinger, 1985-1986).

Actually very little progress has even been made in establishing a set of goals which would provide direction for curriculum development, with the exception of the Tbilisi Conference (Hungerford, Peyton, & Wilke, 1980). "The presence of environmental education in public school curricula can often be characterized by loose organization and little sense of direction" (Roth, 1976, p. 7).

Despite the recommendations for goals and objectives made in the Tbilisi Conference Report, it was reported in a 1978 national profile of public school environmental education curricula

that there existed no comprehensive description of environmental education programs or curricula developed and used in United States public schools. In addition, 40% of the programs which existed did not consider the objectives of actually solving environmental problems and developing problem-solving skills of primary importance. This was contrary to the goals recommended at the Tbilisi Conference (Childress, 1978).

The evidence suggested that educators were having difficulty translating the broad goals of the Tbilisi Conference into specific instructional objectives (Hungerford, Peyton, & Wilke, 1980). This difficulty resulted in the use of intuition for curriculum planning. Participants at the National Leadership Conference on Environmental Education held in Washington D.C., in March 1978, drew similar conslusions. Consequently, the Teacher/Leadership Education Working Group of the conference developed a set of subgoals based on the Tbilisi goals which could be used for curriculum planning. The "Goals for Curriculum

Development in Environmental Education" (see Appendix B) are the result of this task. The group further suggested that more specific instructional objectives be written under each subgoal during the program development process within individual school districts.

A national profile of public school environmental education curricula made apparent what educators considered to be the constraints on curriculum development. Inadequate funding at all levels, lack of time to develop curricula, inadequate preservice and in-service training were identified as the primary constraints (Childress, 1978). Furthermore, there is a lack of credible research in terms of both theory and methodology. Educators do not agree on the best ways to develop attitudes and values, nor to promote behavior which will lead to the resolution of environmental problems.

Statement of the Problem

The lack of a clear statement of environmental education goals and the lack of a set of general characteristics of an environmental

education curriculum has led to programs based on intuition, programs with severly limited objectives, and programs which are often no more that a series of unrelated experiences (VandeVisse & Stapp, 1975). Furthermore, communication problems lead to the overlapping and duplication of efforts at various grade levels and the ineffective use of both natural and human resources. All of these hamper the planning, development, operation, and effectiveness of environmental education programs (Childress, 1978).

A national survey designed to assess the perceived environmental education curriculum needs in the United States (K-16) was conducted in 1981. The survey revealed that the goals established by the Tbilisi Conference are considered important, but are not being accomplished by the existing curricula. A critical need exists for the development and implementation of goal-oriented curricula at each level (elementary, middle, secondary, and college). Furthermore, there is an immediate need for preservice and in-service

teacher education. Current outdoor or environmental education centers as well as existing programs need to be examined in terms of the established goals (Volk, Hungerford, & Tomera, 1981).

What can individual educators do to improve the conditions reported in this study? First, they must become aware and informed about environmental issues in order to comprehend the urgency of environmental education. Second, they must develop an understanding of the comprehensiveness of environmental education and its key components. Third, they must initiate the process of developing and implementing environmental curricula.

This paper provides a rationale for an environmental education program in all school systems, a comprehensive definition of environmental education, key characteristics of an "ideal" environmental education program, and a model for developing, implementing, and evaluating a district-wide environmental education program. This information will aid educators in becoming

aware of the critical need for providing all students with the opportunity to participate in environmental education activities. Most importantly, the teachers will be more prepared to begin the process of developing a coordinated district-wide and goal-oriented environmental education curriculum within local school systems as called for in the National Survey of Environmental Education Curriculum Needs conducted in 1981.

Scope of the Review

This paper will review the literature in order to provide a rationale for environmental education, a comprehensive definition of environmental education, which could be used by elementary teachers in the process of planning curriculum, key characteristics of an "ideal" environmental education program, and a model for developing, implementing, and evaluating a district-wide environnmental education program.

Extensive credit must be given to the Wisconsin Department of Public Instruction (Wisconsin DPI) for its Guide to Curriculum

Planning in Environmental Education (1985) and William B. Stapp for his Development, Implementation, and Evaluation of Environmental Education Programs (K-12) (1973). After significant research, this writer chose their models as the basic form for developing an environmental education program. The model presented in this paper is basically a fusion of these two models.

The information presented in this paper was obtained from a variety of sources. An Educational Resources Information Center (ERIC) search was conducted. The Current Index to Journals in Education (CIJE) and Resources in Education (RIE) were also consulted. Journal articles, doctoral dissertations, books, government publications, research reports, and environmental education materials from the University of Northern Iowa Library and Curriculum Laboratory, Cedar Falls, Iowa were used to conduct this review of the current literature on environmental education.

Chapter 2

Rationale

> If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now.
>
> Serious stresses involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today.
>
> Problems of preserving the carrying capacity of the earth and sustaining the possibility of a decent life for the human beings that inhabit it are enormous and close upon us. (Barney, 1980, p.1, 3)

Over the last 50 years, the inhabitants of the planet Earth have seen rapid technological and scientific progress. Despite its many so-called benefits, this progress has also led to severe worldwide environmental problems (Wisconsin DPI, 1985). Technology in and of itself is not bad. However, it is the unwise use of technology by

human beings which often leads to environmental problems (Miller, 1972). Daily citizens hear and read reports of environmental catastrophies (groundwater contamination from improper disposal of toxic wastes, insecticide poisonings, solid waste disposal, quality top soil erosion, acid rain, airborne pollutants contaminating the Great Lakes, loss of prime farmland to urban development, overcutting forest land, and the problem of finding disposal sites for toxic waste). These catastrophies are just nature's way of telling humans they cannot ignore the natural environment (Klimas, 1970). That is, if the world and its inhabitants can expect to survive! Even with all of the technology and scientific research, humans are doomed to extinction without the natural environment.

Several myths exist today concerning environmental education (Hungerford, 1975). One of these myths is that it is and will always be possible to solve environmental problems with scientific and technological solutions. This myth is being taught as the "only" position. It has

the effect of reducing the anxiety of the uninformed citizens. Unfortunately this claim is false (Miller, 1972).

Interdependence is the key word in environmental education. It means mutual dependence--parts of the whole depending on each other. The planet Earth has been described as a spaceship with all of its parts dependent upon each other for survival. Spaceship Earth is made up of an endless series of systems and subsystems all interrelated. The condition of the biosphere (natural environment), the psychosphere (human-made environment), and humans themselves all affect one another (King & DeLaSota, 1976). Disturbing these relationships creates havoc (Klimas, 1970). Humans are not independent creatures. Instead they are an integral part of the environment. To put it another way, every time a particular species of plant or animal life becomes extinct or every time a lake dies, humans lose a part of themselves (Klimas, 1970). The quality of the environment and the quality of life for the inhabitants of Spaceship Earth are

directly related. What is more, the interdependence is continually increasing. Daily the systems of the earth depend on each other more and more (King & DeLaSota, 1976). Consequently, every time individuals act they must take into consideration not only themselves and their local environment, but also the planet Earth itself (Wisconsin DPI, 1985).

Governments through laws and policies can make changes and try to improve environmental conditions; however, unless the citizens of the world develop an awareness of the growing interdependence between human beings and nature and begin to assume responsibility for their actions all policies and programs will be futile. Apathy, a laissez-fire attitude, and ignorance will continue to grow.

Each citizen of the world must possess an understanding of the workings of the natural and human-made environments as well as the values and skills necessary to make wise decisions concerning one's actions in regards to the environment. All decisions made and actions taken by an individual

must take into account the interrelationships between human beings and nature as well as among human beings (Wisconsin DPI, 1985). A realization of how both individual and group decisions and actions affect each other and, in fact, survival of Spaceship Earth must develop within this citizen (Pereira, 1988). The citizen must begin to develop a sense of commitment to preserving all parts of the environment and must be prepared, willing, and eager to take action on behalf of the environment (Sly & Rose, 1981). Such an individual possesses an environmental ethic.

An individual possessing an environmental ethic is not an exploiter of the environment, but instead a faithful steward committed to preserving all life systems (Sly & Rose, 1981). This individual has an environmental conscience which causes one to feel uncomfortable if one participates in an activity which may be detrimental to the natural world or another human being in any way or fails to participate in an activity on behalf of the environment (Stefanich, 1984).

Development of an environmental ethic is not an easy task. Society as a whole must be involved in its creation. The ideal place to begin forming this internal feeling is in the home. Unfortunately, many parents are not well-informed or interested enough in the environment themselves to foster such an ethic (Rillo, 1980). Furthermore, the most effective way to instill an environmental ethic is to provide for a long term experience and one that touches the lives of children daily (Simpson, 1985). Therefore, the school is the logical place to begin (Rillo, 1980). Developing this environmental ethic, then, is the heart of an environmental education program.

Definition

What, then, is environmental education? "Environmental education involves the individual's relationship to his or her total environment" (King & DeLaSota, 1976, p. ii). An environmental education program helps students acquire an awareness and understanding of their natural and man-made environments and the interdependence

involved. The students see themselves as integral parts of those environments. As the students acquire awareness and knowledge, they come to have a respect for the environment and a commitment to its preservation. Most importantly, the environmental education program includes the development of skills necessary for preventing and resolving environmental problems (King & DeLaSota, 1976).

Environmental education is not simply helping individuals develop an attitude of protecting the environment. Instead of being conquerors of the environment, the individuals see themselves as fellow members of it. The individuals feel a personal responsibility for the health of the environment (Leopold, 1962). They accept this responsibility and are not content to sit back and passively allow the destruction of the environment (King & DeLaSota, 1976). Each student must acquire this environmental conscience dedicated to a quality environment and therefore quality life for all.

Environmental education is a life-long process. It is a way of looking at life, fostering awareness of other life and of interrelationships, learning to recognize the effects (good and bad) we have on physical surroundings, and the responsibilities we must accept for the mere fact of our presence and of our activities in our environments. It should enable us to make sound ecological decisions and foresee their consequences; to make value judgments, and act accordingly. It is acceptance of life values and ways of living which minimize destruction and maximize those relationships that enhance life. It is learning how to contribute to the quality of life, and the constructive use, rather than exploitation, of environments.

Environmental education is much more than a schoolhouse approach to ending the degradation of man-made surroundings and the pollution and destruction of the natural

world. (Environmental Education, 1970, p.10, 11).

Possession of an environmental ethic makes environmental education personal. The individual has a love and respect for the environment and seeks to understand it and how it works. Actions on behalf of the environment become a natural response, almost as natural as walking down the sidewalk. Possession of a environmental ethic to the highest degree becomes an unconscious response.

Chapter 3

Key Characteristics

Since the term "environmental education" came into the limelight in the late 1960s, environmental education programs have been viewed in several ways. Many of these views are incomprehensive and lack significant goals. An environmental education program is not a new, self-contained course to be added to an already overcrowded curriculum--just one more thing to teach. It is not an isolated class which is taught in third grade on Monday-Wednesday-Friday at two o'clock. Environmental education is not science class. Environmental education is not conservation, a nature study, a unit on plants, or getting outside for class. It is not simply picking up trash on Earth Day or planting a tree on Arbor Day. Although all of these may be included in an environmental education program, they are not complete in and of themselves. Environmental education is not simply concern for the protection of wildlife or awareness that humans are poisoning the environment. The major

goal of environmental education is not to persuade students to participate in "Save the Whale" or antipollution campaigns (King & DeLaSota, 1976).

All too often an environmental education program has been considered synonymous with one or a combination of the following: nature studies, conservation education, and outdoor education (Disinger, 1985-1986). However, environmental education must not be limited to the natural/pastoral environment. It is imperative that environmental education programs deal with and stress the human environment and its affect on the natural environment. Environmental education programs must be concerned with the interactions of science, technology, and society and underscore the effects of these interactions on the environment. This in turn suggests that the urban environment be included as well (Schoenfeld, 1980). It has been proposed that the educator who is able to go beyond the natural beauty of a rural center and foster environmental education in the cities and suburbs may well be doing the most to

foster an environmental ethic in students (Simpson, 1985).

Immediate concerns dealing with the environment are often stressed wholeheartedly before slowly fading into the background. Examples include the Endangered Species Act of 1973. Concurrent with its enactment school programs dealing with the bald eagle abounded. Instructional packets on energy flooded the markets in the 1970s. Population and marine education took their turns at being highlighted as well. Schoenfeld (1980) points to the fact that all too often special interest groups use the environmental movement for their own causes at the expense of other parts of the environment. The whole idea of the "interdependence" of the biological, ecological, economic, political, technological, and social systems is not stressed (Kniep, 1986).

An "ideal" environmental education program possessing those characteristics found to be most crucial will be described in this paper. First, an ideal environmental education program is

interdisciplinary. It permeates and enriches the entire curriculum with every subject area at every grade level dealing with environmental concepts and issues in some way. When planning an ideal environmental education program educators begin by looking at their existing curriculum in a new way. They view the whole curriculum as a network for planning the environmental education program (Sly & Rose, 1981). The program becomes an integration of all the subject areas; this results in a new way of looking at, thinking about, and behaving toward the environment (King & DeLaSota, 1976; Sly & Rose, 1981). Environmental education provides relevance for each discipline and shows the interrelationships among them (Stapp, 1973). With this view, each educator accepts part of the responsibility for developing environmentally conscious individuals in the same manner that he or she accepts responsibility for the overall development of a child (Buethe & Smallwood, 1987). Perhaps a better way of looking at the task would be to "environmentalize education" rather than to teach environmental education (McInnis, 1973).

Second, an ideal environmental education program is multilevel. It is a part of each grade level from kindergarten through grade twelve (and beyond).

Third, an ideal environmental education program is ongoing and a part of each day's activities. It becomes a part of the classroom way of life. Educators create a learning environment in which daily, routine activites in the classroom demonstrate positive environmental action. Teachers model positive environmental attitudes, values, and actions. For example, lights are turned off when not in use, sweaters are worn to conserve energy, wise use of paper and paper products takes place, and environmental issues are discussed. An environmental education program cannot just be a mini-unit on plants, an Arbor Day tree planting, or a lesson taught on pollution for ten minutes a day. A narrative study of classroom environmental activity studies revealed that short-term exposure to environmental programs was ineffective (Hines, Hungerford, & Tomera, 1986-1987).

The fourth vital characteristic is that the program has as its major goals and objectives those set forth by the Tbilisi Intergovernmental Conference and the 1978 National Conference on Environmental Education (see Appendixes A and B). Specific instructional objectives under each of these major goals are written during the program development stage within individual school districts.

Fifth, combining the multilevel characteristic and the primary goals stated above, an environmental education program is in tune with the developmental stages of children (Baker & Reiher, 1975; Guardian Resource Development, Inc., 1975). Research dealing with intellectual, value, and skill development provides a base for structuring the program. The works of Piaget, Arlin, Epstein, Toepfer, Jr., Krathwohl, and current researchers are always taken into consideration (Wisconsin DPI, 1985).

The sixth characteristic of an ideal environmental education program deals with the three educational domains. Program activities at

each grade level deal with the affective (feeling), cognitive (knowing), and psychomotor (skill-behavior) domains. However, the emphasis on each domain varies with grade level. Careful attention is given to the often neglected affective domain (Guardian Resource Development, Inc., 1975).

At the lower grade levels the major focus is on the affective domain. Awareness activities which help children explore the environment using all of their senses--sight, hearing, smell, touch, and taste--are stressed. Awareness cannot be developed in a single activity, or even in one school year. It is developed only through repeated activities dealing with different parts of the environment. Each activity contributes to an understanding of the working environment and the realization of the role and influence of humans on the quality of the environment (Hammerman & Hammerman, 1980). Educators provide opportunities for children to discover the diversity in the environment by helping them really "look" at the world around them. In this

way, children begin to appreciate the vastness, beauty, and complexity of the natural environment. The fact that much of this diversity is being lost due to the activities of humans (for example, animal and plant extinction) is pointed out (Klimas, 1970).

Gradually the emphasis changes until in the middle and upper grades the focus is on the cognitive and psychomotor domains. Skill in using the senses becomes an aid in acquiring knowledge and understanding of the environment. Students participate in activities such as observing and discussing stages in the life cycle of frogs, comparing animal tracks, and visiting different types of waste disposal sites. Throughout the entire program environmental attitudes and a value system are emerging. Awareness, interests, and appreciations may lead to the formation of values (Knapp, 1980).

In senior high, students continue to develop skills which help them in investigating and devising possible solutions to environmental issues. They become active participants in the

resolution of these issues. An example of such an activity would be presenting alternative solutions to the development or preservation of flood plains on a river in the area to a local governing body (Stapp, 1973). Skill and value development as well as motivation continues in the students' adult lives as they seek to discover and resolve environmental problems.

Seventh, in an ideal program opportunities are provided at all grade levels for students to observe a variety of physical and social environments. Exposure to environments beyond the one in which students live each day is provided. These experiences help students in judging the quality of their immediate environment. Children living in the inner city who have never experienced wide open spaces, rich black soil, stream and pond life, and uncrowded housing may not be capable of forming valid judgments of their local environment. In much the same way, rural children may accept their environment and not be aware of the potential for destruction which exists if people are not actively involved in

maintaining its quality. If one is not aware of what can be or what may happen, how can a fair judgment of what exists be made. Children in neither situation have the background knowledge and attitudes necessary for making sound decisions which will affect the world in its entirety (Stapp, 1973).

The eighth characteristic is that the program stresses the need for the development of positive environmental attitudes and values. Although awareness of environmental issues and concerns is growing, the development of attitudes and behaviors is not keeping pace. The major cause of present environmental problems is more a social than a scientific or technological one. Some believe, given the needed time and money, science and technology will overcome these problems (Pettus, 1976; Hungerford, 1975). What is needed is a change in people's thinking and in their perceptions of the environment. Citizens daily make decisions concerning how they live in relationship to the environment. The values they

hold affect their perception of the environment which in turn influences their decisions.

Throughout their lives people have many experiences. As they grow, learn, and experience new things certain guides to behavior begin to develop. These guides are instrumental in determining the choices they make in terms of how they live their lives. The guides become a part of their individual value systems. Different experiences lead to different values and values may be modified as individuals accumulate new experiences (Knapp, 1972).

Valuing is the link between thinking and action (Cummings, 1974). Thinking allows one to see the alternatives available. Valuing aids in the process of choosing from those alternatives.

It follows that an ideal environmental education program provides students with the opportunity to acquire a value system and decision making skills necessary for choosing a wise course of environmental action. Traditional approaches to teaching values include setting an example (directly or indirectly), inspiring, establishing

rules and regulations, attempting to persuade and convince, limiting choices, appealing to the conscience, and cultural and religious dogma (Raths, Harmin, & Simon, 1966). Opportunities need to be provided for students to examine and compare their values as well as to explore alternatives and compare consequences.

Three major approaches for developing environmental values are suggested in the literature. They are values clarification, values analysis, and moral development. Values clarification involves the process of valuing (Raths, Harmin, & Simon, 1966). Simply stated the three processes of choosing from alternatives, prizing one's choice, and acting on one's choice are used in determining values. The values clarification strategy is based on a specific technique for responding to what students say or do. The response made stimulates the students to look carefully at what they have chosen, prize, or are doing. In this way, they are encouraged to clarify their thinking and action and therefore their values. Value sheets, discussions,

role-play, contrived incidents, open-ended questions, and reaction sheets are just a few of the methods which can be used in this approach.

The values analysis approach encourages students to make value judgments concerning policy decisions by working through a systematic step-by-step analysis process (Hunt, Metcalf, & Banks, cited in Miles, 1977; Harshman, 1978-1979). A series of logical reasoning tests are applied and used in evaluating consequences and values. Skills in discussion, data-collection, and hypothesis testing are utilized.

The moral development approach is based on Kohlberg's moral development stages (Kohlberg, 1975). Kohlberg believes moral reasoning is a long-term process. Moral growth occurs when moral dilemmas requiring one to reason at the next higher level are presented. Conflicts within one's reasoning must be resolved. The approach begins by attempting to determine a student's present level of moral development. Then a moral dilemma or problem situation which will encourage movement to the next stage is presented.

Techniques used in the approach include discussions and role-play (Harshman, 1978-1979; Miles, 1977).

Obviously the three approaches are not mutually exclusive. Some degree of values clarification is apparent in each (Miles, 1977). The use of a variety of approaches would seem to be the most effective method for environmental educators to employ.

Knapp (1972) points to another key factor in educators' attempts to teach values. Before such attempts can be made educators must examine and clarify their personal environmental attitudes, values, and behavior. The lack of such clarification will lead to ineffectiveness.

Much literature refers to environmental attitudes and values. It is important to make a distinction between the two. Values have been defined as those guiding forces that determine the choices individuals make in living their lives (Knapp, 1972). Attitudes on the other hand are expressions for or against something and may be revealed through behavior. An attitude expressed

does not necessarily represent a value. Attitudes may indicate or lead to values, but cannot be considered synonymous with them. Furthermore, attitudes expressed do not always lead to action. For example, people may say they like to swim in clean water, but may in fact swim in a polluted lake because it is more accessible (Knapp, 1972).

The process of identifying and measuring those factors which influence attitudes is difficult and controversial. Most attitude identification processes involve activities which ask the participants to state what they will do in a situation rather than observing what they actually do. Regardless, research has shown that many factors influence the formation and continuation of attitudes. The application of attitude research in relation to environmental education is still in its beginning stages (Knapp, 1972). More studies need to be conducted, especially at the elementary level.

It is often proposed that knowledge leads to positive attitudes. Some research, however, has shown that being better informed does not

necessarily lead to positive attitudes in terms of environmental education. Self-interests, where one lives and works, or cultural and subcultural beliefs may overshadow the knowledge one has acquired. In other words, even when someone is aware of the facts and the best possible behavior, economics and convenience may dictate one's action (Pettus, 1976). However, some knowledge is necessary in order to form positive attitudes (Pettus, 1976).

The small number of attitude studies at the elementary level would suggest that these years are unimportant in the development of attitudes towards the environment (Miller, 1975). This is a faulty and dangerous assumption. In a study of the attitudes toward environmental conservation and pollution of second through eighth graders in four schools in the metropolitan Chicago area, Miller (1975) concluded that the roots of environmental attitudes begin and develop in the early elementary years. In fact, the attitudes of eighth graders are not that much different from adult attitudes in terms of environmental

conservation and pollution. He further concluded that the level of concern for environmental problems grows during the elementary years. When asked to name the three worst outcomes of science and technology nearly three of five eighth graders listed environmental pollution as one of the three.

Jaus (1982) conducted a study on the effect of environmental education instruction on fifth graders' attitudes toward the environment. He concluded that while the children seemed to have positive attitudes toward the environment by the time they reached fifth grade, ten hours of environmental instruction played a significant difference in changing the attitudes to strongly postitive attitudes whereas no instruction led to static attitudes.

A study by Crater (1981) measured the effect of an energy unit on the knowledge of and attitudes toward energy problems held by eighth graders. The treatment group made significant gains on both the attitudes and knowledge test.

It appears that educators must provide opportunities not only for the development and expression of positive environmental attitudes but also for the valuing process to occur. Only then can attitudes become values. For as Knapp (1972) states "a student ultimately behaves according to how he perceives the world through the screen of his own attitudes and values" (p. 27).

Educators would be fooling themselves and expecting too much if they thought that all students could achieve the highest level of valuing while still in school. At the highest level, individuals' values are internalized and have a secure place in their personal affective hierarchies. All the values are consistent with each other and determine behavior. Individuals rarely achieve this level during their 13 years of formal education. Educators must make value objectives realistic and achievable during the time given (Knapp, 1980).

Ninth, an ideal environmental education program focuses on inquiry, problem-solving, and decision-making skills because they seem to go

hand-in-hand with the development of values. An environmental education program which focuses on inquiry and valuing skills is preferable to one which focuses on the acquisition of knowledge (Knapp, 1985). The best way to teach inquiry skills is to give students the opportunity to ask questions and investigate problems.

Decision-making skills are best taught when students are given an opportunity to actually decide on alternatives regarding specific environmental issues. Likewise, the best way to teach valuing skills is to allow students to explore their own attitudes and beliefs.

Educators must help students consider whether their stated beliefs, attitudes, and values are in tune with their actions. Simple exposure to facts, concepts, and "proper" environmental attitudes is not enough. Only by actually using facts, concepts, and their own values to make decisions about environmental issues will students develop an environmental ethic which will lead them to make rational decisions resulting in a quality environment and life (Knapp, 1985).

"What ultimately makes education environmental is not its subject matter, but its procedures" (McInnis, 1973, p. 27). Tenth, the environmental education program uses a teaching model which is more student-centered than teacher-centered. Teachers are viewed as facilitators of learning rather than as conveyors of knowledge. The teachers create a safe learning environment which encourages students to ask questions, share ideas, and express feelings. They assist students in finding information, provide guidance, and learn right along with the students (Knapp, 1985).

There are many different types of learning experiences which educators can provide for students to learn about their environment. These range from direct concrete experiences to abstract symbolic experiences. The direct experiences involve the greatest use of the senses and the greatest learner activity, whereas the abstract involve the least use of the senses and the least learner activity.

When selecting experiences for children, educators must choose those which are as concrete and direct as possible in developing environmental awareness, knowledge, attitudes, and problem-solving skills (Wisconsin DPI, 1985). Learning about the environment and environmental issues must be an active rather than a passive process on the part of the student (Lathrop, Kubitz, Mickel, Schurz, Salters, Niles, Manus, Daws, Mix, Miner, Lowry, Reich, & Hartman, 1974). First-hand experiences and hands-on learning activities are necessary aspects of an effective environmental education program. Students are more motivated to explore concepts when they experience the excitement of discovering them on their own rather than by proving a statement presented to them by the teacher (Stapp, 1973). McInnis put it quite well when he said, "The First Law of Environmental Education: An experience is worth 1000 pictures" (McInnis, cited in Wisconsin DPI, 1985, p. 43).

The eleventh characteristic deals with providing students the opportunity to explore the

natural world first hand. "We must get away from 2 x 4 x 6 education--the two covers of a book, the four walls of a classroom, and the six periods of a day" (Klimas, 1970, p. 31). In order for children to learn about their environment and develop an environmental ethic they must be literally surrounded by and immersed in their environment. They must have the opportunity to explore their environment sensorily, physically, and intellectually. Despite these recommendations, the research on the relationship between outdoor education programs, knowledge of concepts, and environmental attitudes is small and inconclusive for elementary age children (Shepard & Speelman, 1985-1986).

Howie (1974) concluded that outdoor environmental education programs should definitely be an extension of classroom instruction and not a unique experience in and of themselves. An outdoor discovery approach alone does not foster conceptualization of environmental concepts. Children need to be given advanced organizers prior to any outdoor experience.

Zwick (1978) concluded that students who participated in outdoor activites made significantly more positive gains in attitudes than did those who did not participate in an outdoor experience. The outdoor experience reinforced environmental values held prior to the experience.

Hounshell and Liggett (1976) found some gain in knowledge of the environment and environmental concerns by students who participated in an on-site classroom program for seven weeks. Significant gains in attitude were also apparent. Teacher inservice was conducted prior to and during the time of this study.

Kostka (1976) concluded that in order to foster positive environmental attitudes and behavior, nature center programs need to include the social sciences and attitudes, as well as the opportunity for environmental action. Programs should not deal only with the natural sciences.

Program length and teacher training seem to be key factors in the effectiveness of outdoor experiences. One day experiences have not been

found to significantly affect environmental attitudes. Sufficient time for participants to become accustomed to a place must be provided before concept developing activities can be effective (Shephard & Speelman, 1985-1986).

As with all experiences, an outdoor education activity is only as beneficial as the teacher is competent to make it. Out-of-doors environmental education programs must utilize the outdoor laboratory concept and not be seen simply as a field trip or picnic in the woods (Klimas, 1970). Inservice teacher training in the effective use of an outdoor experience is an extremely important prerequisite of such activities.

Twelfth, in an ideal environmental education program students learn about the total environment (natural, man-made, and social) and the interdependence involved. (Specifically, the areas of natural resources, energy, and pollution should be included.) Emphasis should be placed on the interdependence. The concept "Spaceship Earth" is one which can be used and understood by students at all grade levels. Students need to

discover that on "Spaceship Earth" space and resources are limited. The inhabitants of "Spaceship Earth" have all the air, land, and water they will ever have. Students need to see that all parts of the earth, living and non-living, are interrelated and affect each other (Stapp, 1973).

Many concepts now taught in schools deal with this interdependence, however educators need to help students actually see the relationship. This can be accomplished as students are encouraged to view the world through a systems lens (King & DeLaSota, 1976). They must see themselves as inseparable parts of a system and as those whose actions can change the interrelationships in a constructive or destructive way (Stapp, 1973). As students gain an understanding of the interdependence concept, they begin to acquire a feeling of responsibility for their actions and the quality of their environment.

Flexibility is the thirteenth characteristic of an ideal environmental education program. Teachers and students must be free and willing to

react to the "teachable moment." For example, if a unit on trees is scheduled to be taught in April, but a tree in front of the school is cut down in November, what better opportunity will there be to learn about growth rings, sapwood, and heartwood (Klimas, 1970). Current environmental issues in the local environment must be dealt with now and not when such topics may appear in the textbook.

Fourteenth, an ideal environmental education program provides for individual differences. Materials should be presented and activities pursued which take into consideration the backgrounds, needs, and interests of individual students. Certain degrees of independent study will be especially appropriate in the middle and upper grade levels (Stapp, 1973).

The fifteenth characteristic is that a comprehensive in-service teacher training program precedes and facilitates the implementation of an ideal environmental education program. Research has shown that despite the fact that elementary teachers are in the best position to influence

children's environmental attitudes, they are the least prepared in such areas. Buethe and Smallwood (1987) tested the environmental literacy of 500, K-12 certified Indiana teachers in 1975 and again in 1985. They examined environmental literacy in terms of vocabulary, concepts, and attitudes. Results suggested that, despite improvements, overall literacy in 1985 was still low. Science teachers' scores were the highest, while nonscience teachers at the elementary level were the least prepared. When teachers are not fully informed how can children benefit from quality instruction?

The majority of teachers recognize their illiteracy and consequently lack personal commitment to teaching environmental concepts in their classrooms (Jaus, 1978). A study by Jaus (1978) of elementary and middle school teachers revealed that while most teachers believe they should teach environmental issues and that such instruction would be valuable for their students, they seldom teach environmental concepts because

they lack knowledge of the concepts and the methods for teaching them effectively.

In Jaus' study, 51 elementary and middle school teachers were randomly assigned to two science methods courses. The treatment group received instruction on environmental topics and methodology for teaching such topics, while the control group did not. Ennvironmental knowledge and attitude tests were given to both groups. All members of the treatment group scored 85% or better on the knowledge test. More importantly, they had significantly more positive attitudes towards teaching environmental concepts than did the control group. The attitude test consisted of 30 Likert-type statements in the areas of importance of environmental education, outcomes of teaching environmental concepts to children, and personal willingness to provide such instruction. Two examples of statements and the mean scores for both groups follow: "I plan on teaching environmental education to my students." (Treatment 4.82, Control 1.85) "I plan on spending a good deal of time teaching

environmental education to my students." (Treatment 4.25, Control .81). The need for and the desire to receive in-service teacher training is apparent.

Peyton and Hungerford (1980) call for better teacher preparation as well. Teachers especially need training in investigative and evaluation skills. Only by being knowledgable in these areas can educators expect to help their students become environmentally active citizens.

Sixteenth, an ideal environmental education program involves the entire community both in the planning and implementation stages. Community members assist in curriculum development, serve as resource people, and provide opportunities for active participation in the exploration of environmental issues and attempts at solving environmental problems (Guardian Resource Development, Inc., 1975).

Chapter 4

A Model

In order to foster the development of attitudes, values, and eventually an environmental ethic which promotes positive action leading to a quality environment, an environmental education program must be implemented at all grade levels. For this reason, a district-wide environmental education program must be planned, implemented, and evaluated. How does a school district attack such a monumental task? Research provides several plans of action which have been suggested and used. This paper presents a fusion of two models proposed in the literature (Wisconsin DPI, 1985 and Stapp, 1973). There are ten basic steps in the model:

1. Form a district-wide environmental education program committee. Committee membership should include teachers representing grades K-3, 3-6, 6-9, 9-12, teachers representing each subject area, administrators, school board members, students, school support staff, and community members representing environmental protection

agencies, organizations, businesses, industries, and special interest groups. The chairperson(s) of the committee should possess both leadership qualities and a thorough understanding of the environment and environmental education. Although science teachers often assume this responsibility, it should be noted that due to the comprehensiveness of the program they need not be the only members considered for the position. The belief that science teachers are the only ones who can successfully teach environmental education is a myth (Hungerford, 1975). Teachers of all subject areas can and need to deal with environmental objectives. All committee members must be highly motivated to participate and be aware of the responsibility, time, and effort involved in the task (Wisconsin DPI, 1985). Environmental education is multidisciplinary and the entire school staff should plan and work cooperatively as a team to integrate such a program into the school curriculum (Hungerford, 1975).

2. Develop a school district environmental education philosophy. The environmental education philosophy must contain a clear statement of the goals which the program will be designed to strive toward. The philosophy should reflect the district's overall educational philosophy and incorporate the superordinate goal of environmental education set forth at the Tbilisi Conference (Wisconsin DPI, 1985).

3. Review current literature with respect to theories of learning, instruction, and attitude and behavioral change. These reviews will serve as guides in establishing the objectives for the program and how best to achieve those objectives in order to develop citizens who possess an environmental ethic and are dedicated to preserving a quality environment (Stapp, 1973).

4. Develop specific environmental education objectives. Two main kinds of objectives need to be established. First, program objectives outline what must be done in order to implement the program. The committee reviews and plans how best to achieve the key characteristics of an ideal

environmental education program as described earlier in this paper (i.e. how best to integrate the program into all subject areas at every grade level). Second, instructional objectives deal with the actual program content. Three categories of specific behavioral objectives should be designated: (a) affective, (b) cognitive, and (c) psychomotor (skill-behavior). Specific behavioral objectives under each of the major goals designated by the Tbilisi Conference and the 1978 National Conference on Environmental Education are established (Hungerford, Peyton, Wilke, 1980).

5. Assess the current program. The committee must look at the existing program or attempts being made to teach environmental concepts. A survey instrument based on the environmental education philosophy and goals can help identify strengths and weaknesses (Wisconsin DPI, 1985).

6. Develop the scope and sequence. The ideal environmental education program must span the curriculum K-12. In order for the program to be effective, teachers must be actively involved

in the development of the curriculum. Initial plans for infusing the environmental education goals into the existing curriculum should also be made (Stapp, 1973; Wisconsin DPI, 1985).

7. Establish a comprehensive in-service teacher training program. The in-service teacher training should help teachers who are not members of the committee to understand the philosophy statement, the program and instructional objectives, the scope and sequence, and the infusion process (Wisconsin DPI, 1985).

Very few states have environmental education requirements for persons seeking certification in K-12 education (Wilke, 1985). Consequently, most staff members will need additional preparation in environmental education content and methodology. The committee should assess the need for staff training and arrange for needed workshops and/or courses. The workshops should help teachers to: (a) acquire a basic understanding of all aspects of the natural and man-made environment and the interdependence involved ("Spaceship Earth" concept); (b) develop the ability to provide an

environment where students feel comfortable expressing their feelings, perceptions, and ideas, and where each individual's ideas are heard and respected; (c) analyze and clarify their personal attitudes, beliefs, and values concerning environmental issues; (d) acquire the best methods for encouraging students to analyze and clarify their personal attitudes, beliefs, and values concerning environmental issues; (e) acquire the best methods for teaching environmental concepts, specifically student-centered and hands-on activities; (f) acquire the best methods for developing inquiry, decision-making, valuing, and critical thinking skills; (g) develop skills in the use of outdoor facilities and resources to promote environmental awareness, knowledge, and decision-making skills; and (h) acquire effective methods for infusing environmental concepts into the existing curriculum. Plans for periodic workshops and/or college courses for teachers interested in expanding their training in environmental education must be made (Stapp, 1973).

A set of guidelines for infusing the environmental education objectives into the existing curriculum should be drawn up during the inservice training. Materials and instructional aids for use by teachers should be developed. Specific learning activities and teaching aids should be provided. When environmental education objectives alone are given, teachers often have difficulty transforming them into effective learning experiences for students (Baker & Reiher, 1975).

An inventory of the local community environment should be developed. The inventory should include such areas as government, housing, transportation, solid waste disposal facilities, water and air resources, recreation, urban trees, yard care, and public parks. Information should be included for each area in the following categories: (a) basic information, (b) problems and alternative solutions, (c) field trips, (d) resource people, and (e) instructional aids.

Communicating the philosophy of the environmental education program and activities

actually being done throughout the program to parents and the community at large is extremely important. Both teachers and students need to be involved in the communication process. Effective methods for such communication should be discussed and planned.

8. Identify and develop facilities and community resources. This step of the model involves two distinct areas. The first area concerns outdoor facilities. Many environmental education activities will take place outside the classroom. Planning for activities in, or actually developing, some outdoor laboratories will need to take place. Outdoor facilities may include school grounds, farms, cemeteries, lakes and streams, forests, prairies, deserts, swamps, parks, nature reserves, wildlife refuges, and resident overnight sites (Hug, 1980).

The second area involves the identification of community resources. Strong community support and involvement is vital to a program which seeks to develop citizens who are environmentally conscious and active on behalf of the environment.

A directory of local resources including both businesses and individual citizens should be developed. Names, addresses, and phone numbers for each resource should be listed. Initial contacts should be made. Community resources may include the water purification plant, sewage disposal plant, sanitary landfill, botanical gardens, zoos, aquariums, local businesses and industries, government agencies, greenhouses, fisheries, civic organizations such as the garden club, libraries, nature centers, park personnel, and citizens with special interests (Stapp, 1973; Wisconsin DPI, 1985).

9. Infuse the environmental content into the existing curriculum. In order to be effective, the environmental education program must be infused into the present curriculum. All grade levels and subject areas must deal with the environment in some way. After the in-service training, the entire teaching staff should be involved in the infusion process. Suggestions for and practice in infusing content into each subject area should be provided. Included in the infusion

process is the development of student activities. Material and equipment lists should be developed for budget requests. All materials and equipment should be available before the actual implementation of the program (Wisconsin DPI, 1985).

Methods for distributing environmental information and materials to teachers, administrators, and students should be designated. Strategies for overcoming obstacles which may interfere with the successful implementation of the program should be outlined. Scheduling, financing, busing, community apathy and resistance, and poor communication both within the school system and between the school and the community are examples of possible obstacles which may come about.

10. Develop and implement an evaluation plan. Continuous evaluation of the environmental education program is essential. The evaluation should begin with the initiation of the program and continue throughout the entire program. Student involvement in the evaluation is essential

(Wisconsin DPI, 1985). Results of the evaluation should be fed back into the program and changes and modifications made as quickly as possible.

The primary goal of the evaluation should be the improvement of the teaching and learning process. This must involve both the effectiveness and the efficiency of the program (i.e., Are the objectives in each of the domains--affective, cognitive, and psychomotor--being met? Are the methods being used to achieve these objectives the best in terms of student interest, involvement, and motivation, as well as cost and time spent?) Benefits of evaluation include: (a) program improvement (methods, learning activities, and instructional resources), (b) growth in student learning, (c) environmental improvement (indoor and outdoor), and (d) increased program support (within the system and from the community) (Wisconsin DPI, 1985).

Those districts beginning the task of planning and implementing an environmental education program must remember that it is not an easy task. The entire planning and initial

implementation may take two to three years. It must also be remembered that curriculum development is a continuous activity. Evaluation must be used to continually adjust and update the environmental education program.

Chapter 5

Summary and Conclusions

Experts agree that environmental education must receive high priority in the curricula of public schools. Despite the call for comprehensive, K-12 environmental education programs and recommendations for goals and objectives made by the Tbilisi Intergovernmental Conference on Environmental Education, few such programs exist today. The lack of a clear statement of environmental education goals and the key characteristics of an environmental education program have led to programs with severly limited objectives, programs based on intuition, and programs which are a series of unrelated experiences. A critical need exists for development of goal-oriented curricula at every level and for preservice and in-service teacher training.

Individual educators can begin to meet these needs in several ways. First, they must become aware and informed about environmental issues in order to comprehend the urgency of environmental

education. Second, they must develop an understanding of the comprehensiveness of environmental education and its key components. Third, they must initiate the process of developing and implementing environmental curricula within individual school districts.

Interdependence is the key word. "Spaceship Earth" is the term which has been used to signify the interrelationships of the natural environment, the human-made environment, and humans themselves. All parts are dependent on each other for survival. Every decision made and action taken by individuals must take into consideration not only themselves and their local environment, but the Earth as a whole. It is imperative that each citizen of the world become aware of the growing interdependence between nature and human beings and assume personal responsibility for the well-being of the environment. Each individual must possess an environmental conscious. He or she must develop a sense of unity with the environment and be prepared, willing, and eager to take action on its behalf. Literature often

refers to such an individual as one who possesses an environmental ethic. Development of this environmental ethic is the heart of an environmental education program.

An environmental education program helps students develop an awareness and understanding of the natural and man-made environments and the interdependence involved. It fosters the development of attitudes and values in which students see themselves as an integral part of the environment. In addition, it helps students to develop problem-solving and decision-making skills which aid them in preventing and/or resolving environmental problems. Most importantly, the program provides the opportunity for students to actively participate in activities which enable them to make use of these attitudes, values, and skills.

Key characteristics of an ideal environmental education program were identified in this paper. When planning an ideal environmental education program educators begin by examining the existing curriculum in a new way. The program provides

relevance for all disciplines and becomes an integration of all subject areas. The goal becomes one of making education environmental rather than of teaching environmental education (McInnis, 1973).

It is imperative that the environmental education program span all grade levels and become an integral part of each day's activities. It cannot be thought of as a self-contained course which is taught at a particular time or at a particular grade level. Conservation education, nature studies, mini-courses on pollution, outings for picking up litter, or short programs designed to help individuals develop an attitude of protecting the environment cannot be considered environmental education programs in and of themselves. Research has shown that short-term exposure to environmental programs is ineffective. Consequently, an environmental education program must be an ongoing, interdisciplinary, and multi-level program which touches children's lives daily.

An ideal environmental education program has as its major goals and objectives those set forth by the Tbilisi Intergovernmental Conference and the 1978 National Conference on Environmental Education. Specific instructional objectives must be developed by individual school districts under each of these goals during the curriculum development stage.

In an ideal environmental education program students learn about the total environment (natural and man-made). Most importantly they gain an awareness and understanding of the interdependence involved on "Spaceship Earth". Educators must take special care in helping students actually see this relationship. Only by seeing themselves as an integral part of the environment will students begin to develop a sense of commitment to its well-being and be willing and motivated to take action on its behalf.

Special emphasis must be placed on the development of positive environmental attitudes and values as well as on providing the opportunity for active participation in the resolution of

environmental problems. Attitudes and values are an inevitable consequence of all instruction. Educators cannot assume that positive environmental attitudes and values will emerge if left to chance (Michaelis, 1985). Consequently, opportunities must be provided for students to examine existing attitudes as well as to develop and express positive environmental attitudes. A variety of instructional methods must be employed in the development of attitudes and values. Inquiry, problem-solving, and decision-making skills go hand-in-hand with valuing. Therefore, it is crucial that students take an active part in resolving environmental problems. Exposure to concepts, skills, and positive environmental attitudes will not be enough. Students must use these concepts, problem-solving skills, and their own values to make decisions about real environmental issues.

Research has shown that the roots of environmental attitudes are formed in the early elementary years. Therefore, elementary teachers are in the best position to influence children's

attitudes. Despite this fact, they are often the least prepared . Many elementary educators lack knowledge of both concepts and effective methods for teaching those concepts to children. Consequently, they seldom teach environmental concepts. An ideal environmental education program must therefore include a comprehensive inservice teacher training program and provide continuous opportunities for educators to increase their knowledge and skills through workshops and graduate courses.

Developing, implementing, and evaluating a district-wide environmental education program is a monumental task. Several models have been suggested in the literature. This review presented a fusion of two models. The ten basic steps in the model are:

1. Form a district-wide environmental education program committee.

2. Develop a school district environmental education philosophy.

3. Review current literature with respect to theories of learning, instruction, and attitude and behavioral change.

4. Develop specific environmental education objectives.

5. Assess the current program.

6. Develop the scope and sequence.

7. Establish a comprehensive in-service teacher training program.

8. Identify and develop facilities and community resources.

9. Infuse the environmental content into the existing curriculum.

10. Develop and implement an evaluation plan.

The writer of this paper hopes that the information presented here will stimulate educators at all levels (especially those at the elementary level) to examine their personal environmental attitudes and values and to become informed and aware of environmental concepts and issues. She further hopes that they will sense the potential they have for developing positive

environmental attitudes in their students. Awareness of this potential will lead them to not only become knowledgeable of environmental concepts and effective methodology, but also to become models of environmentally conscious citizens. Modeling responsible environmental behavior and providing opportunities for such behavior in the daily routine of classroom living will be highly effective in developing such positive environmental attitudes in students.

In addition, the writer hopes that these educators will initiate the process of developing and implementing a comprehensive district-wide environmental education program within their individual school systems. In this way, they will be instrumental in developing a citizenry of environmentally conscious adults who are knowledgeable concerning environmental issues, who possess the problem-solving and decision making skills necessary for preventing and resolving environmental problems, and who most importantly, are not content to sit back and allow the destruction of the environment, but are motivated

and eager to seek a quality environment and life for all. As Noel McInnis (1973) stated they will be environmentalizing education.

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Appendix A

AWARENESS: To help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

KNOWLEDGE: To help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

ATTITUDES: To help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection.

SKILLS: To help social groups and individuals acquire skills for identifying and solving environmental problems.

PARTICIPATION: To provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

Appendix B

Goals for Curriculum Development in Environmental Education

The Superordinate Goal:...to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level I. Ecological Foundations Level

This level seeks to provide the receiver with sufficient ecological foundations knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

The Ecological Foundations Level would minimally include the following conceptual components:

A. Individuals and populations.
B. Interactions and interdependence.
C. Environmental influences and limiting factors.
D. Energy flow and materials cycling (biogeochemical cycling).
E. The community and ecosystem concepts.
F. Homeostasis.
G. Succession.
H. Man as an ecosystem component.
I. The ecological implications of man's activities and his communities.

Level II. Conceptual Awareness Level-Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in

environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

Goals at this level are formulated to provide opportunities for receivers to conceptualize:

A. how man's cultural activities (e.g.,religious, economic, political, social, etc.) influence the environment from an ecological perspective.

B. how individual behaviors impact on the environment from an ecological perspective.

C. a wide variety of environmental issues and the ecological and cultural implications of these issues.

D. the viable alternative solutions available for remediating discrete environmental issues and the ecological and cultural implications of these alternative solutions.

E. the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.

F. the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making.

G. the need for responsible citizenship action (e.g.,persuasion, consumerism, legal action, political action, ecomanagement) in the remediation of environmental issues.

Level III. Investigation and Evaluation Level

This level provides for the development of the knowledge and skills necessary to permit receivers to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions. Goals at this level are presented in two components.

Component A: Goals for Component A are to develop in receivers:

A. the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and to synthesize the data gathered.

B. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.

C. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.

D. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.

E. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.

F. the ability to evaluate, clarify, and change their own values positions in light of new information.

Component B: Goals for Component B are to provide receivers with opportunities to:

G. participate in environmental issue investigation and evaluation.

H. participate in the valuing process in a manner as to permit the receiver to evaluate the extent to which his/her values are consistent with the superordinate goal of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level IV. Environmental Action Skills Level-Training and Application

This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the

environment. Goals at this level are presented in two components.

Component A: The goal for Component A is to develop in receivers:

A. those skills which will permit them to effectively work toward ends which are consistent with their values and take either individual or group action when appropriate, i.e., persuasion, consumerism, political action, legal action, or ecomanagement.

Component B: The goals for Component B are to provide receivers with opportunities to:

B. make decisions concerning environmental action strategies to be used with respect to particular environmenntal issues.

C. apply environmental action skills to specific issues, i.e., to take citizen action on one or more issues.

D. evaluate the actions taken with respect to their influence on achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment.

Hungerford, H., Peyton, R. B., & Wilke, R. J. (1980). Goals for curriculum development in environmental education. The Journal of Environmental Education, 11(3), 42-47.