

APPENDIX B: BACKGROUND FOR THE DEVELOPMENT OF THE LEARNER GUIDELINES FRAMEWORK

The Learner Guidelines in Context

The National Project for Excellence in Environmental Education, sponsored by the North American Association for Environmental Education (NAAEE), was initiated in 1993. In facilitating the development of a model set of guidelines for environmental education, it joins standards projects for such disciplines as Mathematics, English Language Arts, Geography, Science, Civics, and History developed in response to the national "Goals 2000" process. The first purpose of *Guidelines for Learning* is to serve the field of environmental education by articulating knowledge and skills essential for environmental literacy. These guidelines also demonstrate the essential link between environmental education and the traditional disciplines and to broader efforts for education reform.

Education Reform

the Standards Development Movement

The current push toward education reform in the U.S. was heralded by the 1983 publication of *A Nation at Risk*. This report pointed to declining test scores, poorly prepared high school graduates, declining enrollment in science and mathematics, low academic achievement in comparison to many European and Japanese students, and low levels of literacy—and raised significant questions concerning the quality of the American education system. Following the publication of *A Nation at Risk*, it became common to call into question the very structure of American education.

A decade-long move toward national education reform received its highest level of governmental recognition at the 1989 national education summit in Charlottesville. At the summit, a bipartisan group of the nation's governors and the Bush White House agreed to national goals for education. These broadly formulated goals set out an agenda for education for the year 2000. With the 1994 passage of the "Goals 2000: Educate America Act," the eight goals became official national

policy, guiding numerous activities within and outside the federal government.

Of particular importance for developing environmental education guidelines are:

Goal 3—Student Achievement and Citizenship, which states that “by the year 2000 American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.”

Goal 4—Science and Mathematics, which states that “by the year 2000, U.S. students will be first in the world in science and mathematics achievement.”

Both Goal 3 and Goal 4 set the stage for developing a range of voluntary national standards for the core disciplines. (See page 8 for a sampling of these standards documents.) These voluntary standards have been designed to provide state and local education leaders guidance in generating locally appropriate academic benchmarks.

Building from a Rich History

Guidelines for Learning has been developed with the input of literally thousands of teachers, school administrators, environmental educators, scientists, and parents, as well as from a variety of professional organizations and government agencies. From the inception of the project, the guidelines have used existing environmental education frameworks, definitions, and models as a foundation. The field as a whole owes a great deal to those who have worked to create these documents. Each document is based on a different set of assumptions and priorities, yet the commonalities are considerable. These commonalities, in essence, define the practice of environmental education and provide the basis for the structure of *Guidelines for Learning*.

Developing a Framework for the Guidelines

Much of the work in environmental education has been guided by the *Belgrade Charter* (UNESCO-UNEP, 1976) and the *Tbilisi Declaration* (UNESCO, 1978). These two documents furnish an internationally accepted blueprint for environmental education. The *Tbilisi Declaration* outlined five categories of objectives for environmental education:

- **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 the motivation for actively participating in environmental improvement and protection.
- **Skills**—to help social groups and individuals acquire the 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.

With the evolution of the field, these guiding principles (as well as the more general ones presented in the introduction to this document) have been researched, critiqued, revisited, and expanded. *Guidelines for Learning* draws upon these respected founding writings about environmental education and the field's best thinking to date. This Appendix describes environmental education frameworks developed since *Tbilisi* as a means of revealing the base on which these *Guidelines* are built. In the following examination, a number of environmental education frameworks are divided into those:

- based on research or a synthesis of the research literature;
- created as conceptual frameworks for curricula; and
- developed as part of previous standards or criteria development projects.

Each of these frameworks is explored below. To recreate some of the historical logic of the field, the models are presented in chronological order within each category. Each

outline is a direct excerpt from the original document. The terminology used reflects common usage of the time and the authors' preferences.

Frameworks/Models Based on EE Literature

The following environmental education frameworks are excerpted directly from key documents in the environmental education literature. They provide insight into the evolution of the field and its core ideas. It becomes clear that, while the field has continued to mature since the Tbilisi Declaration was formulated in 1977, the declaration's original intent is still central to environmental education.

Although the environmental education model proposed by Stapp and Cox (1974) predates *Tbilisi*, it is important to include here because of the central role it played in the development of the *Tbilisi Declaration*. The work by Hungerford, et. al. (1980) proposes goal levels for EE curriculum development. The four goal levels were submitted to a content validity expert panel to judge their congruence with the five *Tbilisi* objectives.

In recent years, much scholarly work in EE has focused on describing the precursors of responsible environmental citizenship and environmental literacy—the types of knowledge, skills and dispositions that describe the environmentally literate citizen. The proposed frameworks offered by Iozzi, et. al. (1990), Marcinkowski (1991), Wisconsin Center for Environmental Education (1992), Roth (1992), and the EE Literacy Consortium (1994) are all based in a synthesis of this research and the EE foundations literature.

Finally, the important influence of issues surrounding sustainable development on EE thinking is considered with the inclusion of a framework for sustainable development education published in Canada (1994).

Framework 1

Stapp, W.B. and Cox, D.A. (1974)

Environmental Education Model

Philosophy and Concepts:

An environmental education program should assist the learner in understanding the basic spaceship earth philosophy which would serve as an 'umbrella' of thought and ethic for the

entire program. The spaceship earth philosophy has been divided into five basic concepts: ecosystems, population, economics and technology, environmental decisions, and environmental ethics. These concepts encompass the awareness, knowledge, and understanding of the living and non-living world and their complex interactions; the social, economic, political and aesthetic influences of the populations of people; the need for, and processes of decision making; and development of an environmental ethic that would motivate the learner to adopt a life style compatible with environmental quality.

The Processes:

A. The Skills of Problem Solving

Since the environmental education model is based on student involvement, problem solving skills are essential to developing and carrying out action plans. ... The eight problem solving skills are:

1. Recognizing environmental problems
2. Defining environmental problems
3. Listening with comprehension
4. Collecting information
5. Organizing information
6. Analyzing information
7. Generating alternative solutions
8. Developing a plan of action

B. Clarifying Values

The values clarification approach helps students become aware of personal beliefs, attitudes, values and behavior which they prize and are committed to both in and out of the classroom. This process assists students in considering alternative solutions and the implications of each alternative. ... Values clarification is of major importance in making rational environmental decisions every day of a person's life, and must be a basic part of every environmental education program.

C. Community Problem Solving

Students need to be able to apply learned skills in both valuing and problem solving in an issue that is meaningful to them—a problem that directly affects them either at home, or at school, or in the local community.

The Teaching-Learning Models:

There is no single teaching model that all students will respond favorably toward under all circumstances. ... It is important for a teacher to assess his/her personal skills and the situation and then blend teaching models in an effort to achieve the best learning environment. ... The role of the teacher would be to create a learning environment, assist students in acquiring information, provide guidance to the student, and to participate with the student in the learning process.

Emphasis of Program at Different Age Levels:

Environmental education activities at each grade level should focus on the feeling (affective), knowing (cognitive) and skill-behavior domains. Emphasis in the early years, however, should be on awareness and feelings and in later years on knowledge and skill-behavior. The learner should also be provided with opportunities to explore his immediate environment with all of his senses—sight, hearing, smell, touch and taste. The learner should be exposed to a variety of physical and social environments in order to have experiences to judge the quality of his immediate environment.

Framework 2

**Hungerford, H.R., Peyton, R.B.,
and Wilke, R. (1980)**

Goals for Curriculum Development in Environmental Education

GOAL LEVEL I—The Ecological Foundations Levels

Upon completion of instruction in environmental education, the learner should be expected to be able to...

1. ... communicate and apply the major ecological concepts including those focusing on individuals, species, populations, communities, ecosystems, biogeochemical cycles, energy production and transfer, interdependence, niche, adaptation, succession, homeostasis, and man as a ecological variable.
2. ... apply a knowledge of ecological concepts to the analysis of environmental issues and identify important ecological principles involved.

3. ... apply a knowledge of ecological concepts in predicting the ecological consequences of alternative solutions to environmental problems.
4. ...understand the principles of ecology in order to identify, select and utilize appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental issues.

GOAL LEVEL II—

The Conceptual Awareness Level:

5. ...understand and communicate how man's cultural activities (e.g., religious, economic, political, social and others) influence the environment from an ecological perspective.
6. ...understand and communicate how an individual's behaviors impact on the environment from an ecological perspective.
7. ...identify a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues.
8. ... identify and communicate the viable alternative solutions available for remediating crucial environmental issues as well as the ecological and cultural implications of these various solutions.
9. ... understand the need for environmental issue investigation and evaluation as prerequisite to sound decision making.
10. ... understand the roles played by differing human beliefs and values in environmental issues and the need for personal values clarification as an important part of environmental decision making.
11. ... understand the need for responsible citizenship action in the solution of environmental issues.

GOAL LEVEL III—

The Investigation and Evaluation Level:

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

13. ... demonstrate the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
14. ... demonstrate the ability to identify alternative solutions for important issues and the value perspectives associated with these solutions.
15. ... demonstrate the ability to evaluate alternative solutions and associated value perspectives for important issues with respect to their ecological and cultural implications.
16. ... demonstrate the ability to identify and clarify personal value positions related to important environmental issues and their associated solutions.
17. ... demonstrate the ability to evaluate, clarify, and change value positions in light of new information.

GOAL LEVEL IV—The Issue Resolution Skill Level:

18. ... demonstrate a competence with a variety of citizenship action skills from the following categories of skills: persuasion, consumerism, political action, legal action, and ecomanagement.
19. ... evaluate selected actions in light of their ecological and cultural implications.
20. ... demonstrate the ability to apply one or more citizenship action skills for the purpose of resolving or helping to resolve one or more environmental issues.

Framework 3

Iozi, L. , Laveault, D., Marcinkowski, T. (1990)

**Assessment of Learning Outcomes
in Environmental Education**

**Organization of Learning Outcomes
According to Taxonomies of Educational Objectives**

Cognitive Domain:

Knowledge: of ecology, environmental problems and issues, and environmental action strategies

Skills for dealing with action strategies: including

identification, investigation, and analysis of issues

Skills for dealing with action strategies: including selecting appropriate action strategies, creating an action plan, evaluating an action plan, and implementing an action plan.

Affective Domain:

Environmental sensitivity or appreciation: including ‘the characteristics that result in an individual viewing the environment from an empathetic perspective’ (Peterson, 1982)

Attitudes: towards pollution, technology, economics, conservation, and environmental action

Values: a preference for selected means and ends; values such as a healthy environment and a peaceful world

Moral reasoning: making decisions and judgments about environmental issues according to one's own sense of morality

Ethics: involving the evaluation of a personal world view which reflects a balance between the quality of life and the quality of the environment.

Responsible Environmental Behavior:

Active participation aimed at solving problems and resolving issues: environmentally sound consumer purchasing, methods for conserving resources, assisting with the enforcement of environmental regulations, using personal and interpersonal means to encourage environmentally sound practices, and encouraging environmentally sound policies and legislative initiatives.

Locus of Control:

Individual's sense that he or she can manifest some influence upon or control over the outcomes of a specific activity.

Assumption of Personal Responsibility:

Recognition that one's negative behavior has a negative effect on the environment and, likewise, one's positive behavior can have potentially positive effects

on the environment

Acceptance of personal responsibility for negative environmental effects or impacts, and for one's own role in helping to resolve environmental impacts and issues

Willingness to help correct negative environmental impacts, and a concomitant willingness to help resolve environmental impacts and issues.

Framework 4

Marcinkowski, T. (1991)

The Relationship Between Environmental Literacy and Responsible Environmental Behavior in Environmental Education

Environmental Literacy Involves:

- a. An awareness and sensitivity toward the environment.
- b. An attitude of respect for the natural environment, and of concern for the nature and magnitude of human impacts on it.
- c. A knowledge and understanding of how natural systems work, as well as of how social systems interface with natural systems.
- d. An understanding of the various environmentally-related problems and issues (local, regional, national, international, and global).
- e. The skills required to analyze, synthesize, and evaluate information about environmental problems/issues using primary and secondary sources, and to evaluate a select problem/issue on the basis of evidence and personal values.
- f. A sense of personal investment in, responsibility for, motivation to work individually and collectively toward the resolution of environmental problems/issues.
- g. A knowledge of strategies available for use in remediating environmental problems/issues.
- h. The skills required to develop, implement and evaluate single strategies and composite plans for remediating environmental problems/issues.
- i. Active involvement at all levels in working toward the resolution of environmental problems/issues.

Framework 5

Wisconsin Center for Environmental Education (1992)
University of Wisconsin, Steven's Point

Cognitive Outcomes:

Knowledge of Ecological Principles

Individuals, Populations, and Communities—habitats, niches, and adaptations; food chains, food webs; population dynamics; population and community interactions

Change and Limiting Factors—change as a natural process; biotic and abiotic limits to growth, size, and distribution of populations

Energy Flow—sun as primary source, other sources and forms of energy; transfer and energy through living systems; first and second laws of energy—conservation of energy, entropy; need for a consistent source of energy by systems and individuals; photosynthesis and respiration

Biogeochemical Cycling—conservation of matter, nutrient and materials cycling; hydrologic cycle

Ecosystems and Biodiversity—importance of biodiversity; interdependence of organisms; ecosystems

Knowledge of Environmental Problems and Issues

Air Quality—ozone depletion; global warming; acid deposition; air pollution

Water Quality and Quantity—water pollution; use and management

Soil Quality and Quantity—soil depletion and pollution; use and management

Wildlife and Habitat—habitat and biodiversity loss; use and management

Energy—sustainable and non-renewable; consumption

Human Population and Health—overpopulation; environmental health hazards

Waste—solid waste; hazardous wastes

Knowledge of Environmental Issue Investigation and Action Strategies

Knowledge of Strategies Used to Investigate

Environmental Problems and Issues

Knowledge of Appropriate Action Strategies for the Prevention or Resolution of Environmental Problems and Issues

Affective Outcomes:

Environmental Sensitivity/Awareness

Positive Attitudes and Values for the Prevention and Remediation of Environmental Problems and Issues

Regarding: air quality; water quality and quantity; soil quality and quantity; wildlife and habitat; energy; human population and health; waste

Determinants of Environmentally Responsible Behavior

Locus of Control

Assumption of Personal Responsibility

Environmentally Responsible Behaviors

Ecomanagement; Economic Action; Persuasion; Political Action; Legal Action

Framework 6

Roth, C. (1992)

Environmental Literacy: Its Roots, Evolution and Directions in the 1990's

Nominal Environmental Literacy:

Knowledge Strand—Nominally environmentally literate individuals are familiar with:

The nature of the basic components of elemental systems (e.g., living and non-living things, requirements for life).

Types and examples of interactions between humans and nature.

Basic components of societal systems.

Affective Strand—have affective sensitivities about:

Appreciation of both nature and society.

Elementary sensitivity and empathy for both nature and society.

Elemental perceptions of points of conflict between nature and society.

Skill Strand—have skills of:

Identifying and defining problems.

Recognizing issues surrounding identified problems or proposed solutions (e.g. latent and visible conflicts).

Behavior Strand—demonstrate:

Familial, school and organization activities and habits aimed at maintenance of environmental quality.

Responding and coping behaviors.

Functional Environmental Literacy

Knowledge Strand—The functional environmentally literate citizen, in addition to the knowledge of the nominally literate, has knowledge of and understanding of a number of ecological, economic, geographic, religious, educational and political processes and understanding of the effects/impacts of humans on natural systems, including (abbreviated listing):

Population dynamics

Interactions

Interdependence

Thinking in terms of time frames or scales

Skill Strand—The functionally environmentally literate demonstrate basic skills in analyzing problems and issues and conducting investigations of problems and issues using primary and secondary resource/strategies such as (abbreviated listing):

Identifying environmental issues.

Seeking historical background of issues.

Investigating environmental issues.

Evaluating sources of information.

Analyzing environmental issues from various perspectives.

Applying ecological concepts to predicting probable ecological consequences.

Identifying alternative solutions and value perspectives

Evaluating alternative solutions.

Conducting basic risk analysis.

Identifying and clarifying his/her value positions.

Examining issues from local, national, regional, and international points of view.

Thinking in terms of systems.

Demonstrating ability to forecast, to think ahead, plan.

Affect Strand—the functionally environmentally literate demonstrate such basic affects, attitudes and values as:

Identification with, and feelings of concern for, both society and the environment.

Willingness to recognize and choose among differing value perspectives associated with problems and issues.

Internal locus of control.

Treating public and private property with equal respect.

Sense of stewardship.

Behavior Strand—the functionally environmentally literate moves to action through selected lifestyle activities/behaviors and community/organizational behaviors demonstrated by:

Taking action positions and actions based on best available knowledge.

Taking individual and/or group action through: persuasion, consumerism, political action, legal action, ecomanagement

Operational Environmental Literacy

Skill Strand—Skills involved with evaluating problems and issues on the basis of available evidence (facts) and personal values and skills used in planning, implementing, and evaluating solutions, including using the process skills of scientific inquiry:

using ability to forecast, to think ahead, plan

using ability to separate number, quantity, quality, and value

imagining

connecting

valuing and value analysis

using primary and secondary sources of information
using ability to separate fact from opinion
determining the roles played by differing human
beliefs and values in environmental issues

Affect Strand—Affects, attitudes and values, that indicate a valuation of both nature and society, a sense of investment in and responsibility for the resolution of problems and issues along with a respect for both nature and society and a willingness to participate in, and show a sense of efficacy toward the resolution of problems and issues including (abbreviated listing):

Awareness of and sensitivity to the total environment and its allied programs

Motivation to actively participate in environmental improvement and protection

Taking into account historical perspectives while focusing on current and potential environmental situations

Strong internal locus of control

Personal responsibility: recognition of impacts of personal behavior; acceptance of personal responsibility for the impacts; willingness to help correct or avoid negative impacts

Behavior Strand—Actions that demonstrate leadership in working toward the resolution of problems and issues including:

Evaluating actions with respect to their impact on quality of life and environment

Providing verbal commitments

Working to maintain biological and social diversity

Continually examining and reexamining the values of the culture

Making decisions based on beneficence, justice, stewardship, prudence, cooperation, and compassion

Framework 7

Environmental Education Literacy Consortium

(Hungerford, H.; Volk, T.; Wilke, R.; Champeau, R.; Marcinkowski, T.; May, T.; Bluhm, B.; and McKeown-Ice, R.) (1994)

Environmental Literacy Framework

Cognitive Dimensions (Knowledge and Skills)

- A. Knowledge of ecological and socio-political foundations
- B. Knowledge of and ability to identify, analyze, investigate and evaluate environmental problems and issues
- C. Knowledge of and ability to apply environmental action strategies seeking to influence outcomes of environmental problems and issues
- D. Ability to develop and evaluate an appropriate action plan for the resolution of environmental problems or issues

Affective Dimensions

- A. Recognition of the importance of environmental quality and the existence of environmental problems and issues
- B. Empathic, appreciative and caring attitudes toward the environment
- C. Willingness to work toward the prevention and/or remediation of environmental problems and issues

Additional Determinants

of Environmentally Responsible Behavior

- A. Belief in their ability, both individually and collectively, to influence outcomes of environmental problems and issues
- B. Assumption of responsibility for personal actions that influence the environment

Personal and/or Group Involvement in Environmentally Responsible Behaviors

- A. Ecomanagement—e.g. actions such as using a more energy efficient form of transportation, reducing

consumption of energy or water, improving wildlife habitat, recycling, etc.

- B. Economic/consumer action—e.g., purchasing products in returnable/reusable containers, avoiding purchase of excess packaging, avoiding items with toxic by-products, providing financial support to an environmental organization, boycotting products considered to be damaging to the environment, etc.
- C. Persuasion—e.g., using informal discussion to encourage another to support a positive environmental position or action, distributing "pro-environment" literature, signing a petition, encouraging another individual or group to stop some kind of destructive behavior, writing a letter to a person/group/company to stop an action that has negative environmental consequences, giving a speech, etc.
- D. Political action—e.g., writing letters or speaking directly to elected officials on behalf of an environmental issue, supporting by time or finances a candidate or lobbying group based upon an environmental issue, running for or serving in an official capacity with the intent of supporting pro-environmental positions or actions, etc.
- E. Legal action—e.g. reporting violations in pollution/littering, fishing, trapping or hunting laws or plant or animal collecting to the authorities, working with authorities to patrol areas for enforcing environmental laws, providing information or testimony at a legal hearing or participating in a lawsuit against a person/group who has violated a law aimed at protecting the environment, etc.

Framework 8

Learning for a Sustainable Future, Developing a Cooperative Framework for Sustainable Development Education (1994)

Education for a Sustainable Future: The Knowledge, Skills and Values Needed

Knowledge Needed:

1. The planet earth as a finite system and the elements that constitute the planetary environment.

2. The resources of the earth, particularly soil, water, minerals, etc., their distribution and their role in supporting living organisms.
3. The nature of ecosystems and biomes, their health and their interdependence within the biosphere.
4. The dependence of humans on the environmental resources for life and sustenance.
5. The sustainable relationship of native societies to the environment.
6. The implications of resource distribution in determining the nature of societies and the rate and character of economic development.
7. Characteristics of the development of human societies including nomadic, hunter-gatherer, agricultural, industrial and post-industrial, and the impact of each on the natural environment.
8. The role of science and technology in the development of societies and the impact of these technologies on the environment.
9. Philosophies and patterns of economic activity and their different impacts on the environment, societies and cultures.
10. The process of urbanization and the implications of de-ruralization.
11. The interconnectedness of present world political, economic, environmental and social issues.
12. Aspects of differing perspectives and philosophies concerning the ecological and human environments.
13. Cooperative international and national efforts to find solutions to common global issues, and to implement strategies for a more sustainable future.
14. The implications for the global community of the political, economic and socio-cultural changes needed for a more sustainable future.
15. Processes of planning, policy-making and action for sustainability by governments, businesses, non-governmental organizations and the general public.

Skills Needed:

1. Frame appropriate questions to guide relevant study and research.

2. Define such fundamental concepts as environment, community, development and technology, and apply definitions to local, national and global experience.
3. Use of range of resources and technologies in addressing questions.
4. Assess the nature of bias and evaluate different points of view.
5. Develop hypotheses based on balanced information, crucial analysis and careful synthesis, and test them against new information and personal experience and beliefs.
6. Communicate information and viewpoints effectively.
7. Work towards negotiated consensus and cooperative resolution of conflicts.
8. Develop cooperative strategies for appropriate action to change present relationships between ecological preservation and economic development.

Values Needed:

1. An appreciation of the resilience, fragility and beauty of nature and the interdependence and equal importance of all life forms.
2. An appreciation of the dependence of human life on the resources of a finite planet.
3. An appreciation of the role of human ingenuity and individual creativity in ensuring survival and the search for appropriate and sustainable progress.
4. An appreciation of the power of human beings to modify the environment.
5. A sense of self-worth and rootedness in one's own culture and community.
6. A respect for other cultures and a recognition of the interdependence of the human community.
7. A global perspective and loyalty to the world community.
8. A concern for disparities and injustices, a commitment to human rights, and to the peaceful resolution of conflict.

9. An appreciation of the challenges faced by the human community in defining the processes needed for sustainability and in implementing the changes needed.
10. A sense of balance in deciding among conflicting priorities.
11. Personal acceptance of a sustainable lifestyle and a commitment to participation in change.
12. A realistic appreciation of the urgency of challenges facing the global community and the complexities that demand long-term planning for building a sustainable future.
13. A sense of hope and a positive personal and social perspective on the future.
14. An appreciation of the importance and worth of individual responsibility and action.

Conceptual Frameworks for Curriculum Materials

The form environmental education takes in practice is based heavily upon the curriculum materials available to those "in the field"—for example, teachers, naturalists, volunteer instructors or museum curators. The conceptual or curriculum frameworks direct the writing of individual lessons as well as the overall organization of the materials. Consequently, looking at how EE has been put into practice is essential to developing a model or framework for EE guidelines. Of the abundance of curricula available, a small number of nationally recognized examples were selected as examples.

Framework 1

Project WILD (1986)

I. Awareness and Appreciation of Wildlife

- A. Humans and wildlife have similar basic needs
- B. Humans and wildlife share environments.
- C. Humans and wildlife are subject to many of the same environmental conditions.
- D. Humans have far greater ability to alter or adjust to environments than does wildlife; thus, humans

have a responsibility to consider effects of their activities on other life forms.

II. Human Values and Wildlife

- A. Wildlife has aesthetic and spiritual values.
- B. Wildlife has ecological and scientific values.
- C. Wildlife has social and political values.
- D. Wildlife has commercial and economic values.
- E. Wildlife has consumptive and non-consumptive recreational values.

III. Wildlife and Ecological Systems

- A. Each environment has characteristic life forms.
- B. All living elements of an ecological system are interdependent.
- C. Variation and change occur in all ecological systems.
- D. Adaptation is continuous within all ecological systems.
- E. Living things tend to reproduce in numbers greater than their habitat can support.
- F. Each area of land or water, and ultimately the planet, has a carrying capacity of plants and animals.

IV. Wildlife Conservation

- A. Management of resources and environments is the application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of a natural resource, as well as to improve environmental quality.
- B. Wildlife is one of our basic natural resources, along with water, air, minerals, soil, and plant life.
- C. Good habitat is the key to wildlife survival.
- D. Wildlife resources can be managed and conserved.
- E. Wildlife conservation practices depend on a knowledge of natural laws and the application of knowledge from many disciplines.
- F. In the U.S., wildlife is considered to be a public resource. Ownership of land or water alone does

not secure ownership of wildlife on that land or in that water as it does in some other countries.

V. Cultural and Social Interaction with Wildlife

- A. Human cultures and societies, past and present, affect and are affected by wildlife and its habitat.
- B. Societies develop programs and policies relating to wildlife and its habitat through a variety of social mechanisms.

VI. Wildlife Issues and Trends: Alternatives and Consequences

- A. Human impacts on wildlife and its habitat are increasing worldwide.
- B. Issues involving wildlife and its habitat are a product of social and cultural trends.
- C. Current wildlife issues and trends are complex and involve alternatives and consequences.
- D. Many problems, issues, and trends involving wildlife in other parts of the world are similar to those in this country.

VII. Wildlife, Ecological Systems, and Responsible Human Actions

- A. Each person as an individual and as a member of society affects the environment.
- B. Responsible environmental actions are the obligation of all levels of society, starting with the individual.

Framework 2

Essential Learnings in Environmental Education (1990)

Natural Systems:

General: Environment, Earth, Biosphere

Abiotic Components: Energy, Atmosphere, Land & Soil, Water

Biotic Components: Plant, Animal

Processes: Weather & Climate, Biogeochemical Cycles, Evolution and Extinction

Biological Systems: Ecosystems, Food Chains & Webs, Community, Population, Habitat & Niche

Resources:

Natural Resources: Distribution & Consumption, Management & Conservation, Sustainable Development

Abiotic Resources: Energy & Minerals, Water, Land & Soil

Biotic Resources: Forests, Wildlife & Fisheries, Biodiversity

Degradation of Resource Base: Limits to Systems, Pollution

Human Systems:

Humans and Environment: Humans as part of environment, human adaptation to environment, Human influence upon environment, population factors

Technological Systems: Agriculture, Settlements, Manufacturing and Technology

Social Systems: Economic systems, Sociopolitical Systems, Culture and Religion

Environmental Awareness and Protection: Values and Ethics, Education and Communication, Participation/Voluntary Action, Legislation & Enforcement

Framework 3

**Project Learning Tree Environmental Education
Activity Guide (1993)**

Diversity

Diversity in Environments

Diversity of Resources and Technologies

Diversity among and within Societies and Cultures

Interrelationships

Environmental Interrelationships
Resources and Technological Interrelationships
Societal and Cultural Interrelationships

Systems

Environmental Systems
Resource Management and Technological Systems
Systems in Society and Culture

Structure and Scale

Structures and Scale in Environments
Structure and Scale in Resources and Technology
Structure and Scale in Societies and Culture

Patterns of Change

Patterns of Change in the Environment
Patterns of Change in Resources and Technologies
Patterns of Change in Society and Culture

Framework 4

Project WET Curriculum & Activity Guide (1995)

Conceptual Framework:

Water has unique physical and chemical characteristics.
Water is essential for all life to exist.
Water connects all Earth systems.
Water is a natural resource.
Water resources are managed.
Water resources exist within social constructs.
Water resources exist within cultural contexts.

Affective Framework:

People's awareness of and sensitivity toward water and water-related concepts and issues.
People's attitudes (opinions, likes, dislikes) toward water and water-related concepts and issues.

People's values (consideration of worth, need to cherish, importance) toward water and water-related concepts and issues.

People's behavior toward and expression of water and water-related concepts and issues, influenced by awareness and sensitivity, attitudes, and values.

Skills Framework:

Gathering information.

Organizing information.

Analyzing information.

Interpreting information.

Applying learned information.

Evaluating application of learned information.

Presenting evidence of learning from application and evaluation.

Framework 5

Biodiversity Basics, World Wildlife Fund (1999)

Part I: The Conceptual Framework

What Is Biodiversity?

The concepts in this theme provide students with a fundamental knowledge and appreciation of biodiversity. These concepts also help students understand the characteristics of living systems and the fact that the environment is made up of systems nested within larger systems.

- Definition of Biodiversity
- Basic Ecological Principles
- Key Ecological Definitions that Help to Understand Biodiversity

Why Is Biodiversity Important?

Concepts in this section can help students investigate how biodiversity affects their lives and supports life on Earth. Recognizing the importance of biodiversity increases students' awareness of why and how people's actions affect biodiversity and why it's important to maintain and restore biodiversity.

- Quality of the Environment
- Quality of Life (Economics, Health and Safety, Socio/Political, Culture)

What Is the Status of Biodiversity?

Concepts in this theme help students understand the status of biodiversity and why biodiversity is declining around the world. By learning about the causes and consequences of biodiversity loss, students will be able to participate in maintaining biodiversity in the future.

- Factors Affecting Biodiversity (Population Growth, Loss, Degradation, and Fragmentation of Habitat, Introduced Species, Over-Consumption of Natural Resources, Pollution)

How Can We Protect Biodiversity?

Concepts in this section help students identify ways to ensure that adequate biodiversity will be maintained for future generations. For students to willingly and effectively take action to protect biodiversity, they must have a thorough understanding and appreciation of what biodiversity is, why it's important, why we're losing it, and what people can do to help maintain and conserve it. Students should also begin to understand that ecological integrity, social equity, and economic prosperity are connected and are important components of a sustainable society.

- Studying Biodiversity
- Conserving Biodiversity (Role of Values, Role of Civil Society, Government, and Industry, Future Outlooks for Maintaining and Restoring Biodiversity)

Part II: The Skills Framework

- Gathering Information
- Organizing Information
- Analyzing Information
- Interpreting Information
- Applying Information
- Evaluating Information
- Presenting Information
- Developing Citizenship Skills

Previous Standards or Criteria Development Projects

The quest to define what constitutes quality environmental education is not new. The following outlines represent efforts by the National Science Teachers Association and the American Society for Testing and Materials (ASTM) to develop guiding principles for environmental education. Also included is material prepared by the American Forum for Global Education suggesting conceptual guidelines for national standards for international studies education.

Outline 1

National Science Teachers Association, Criteria for Excellence in Environmental Education, Revised Edition

Effective environmental education depends on multidisciplinary instruction but has a strong science component. It involves minds-on, direct contact with environments as well as vicarious experiences. The learner grows from awareness and understanding to concern and action.

Goal:

To develop and practice creativity and critical thinking along with values analyses. Teachers and learners will search for alternative solutions to environmental issues and evaluate the ethical, social, ecological, and economic costs and benefits of alternatives.

Curriculum

1. Provides activities and information in which people interact with the environment.
2. Develops in the students the intellectual tools to effectively explore the world around them.
3. Directly involves students in investigating the world around them and their relationship to it.

Instruction

1. Fosters open minds and the generation and examination of alternatives;
2. Stimulates and fosters creativity and critical

thinking;

3. Respects the social, intellectual, and developmental maturity of learners;
4. Links science with other areas of intellectual and emotional activity;
5. Provides opportunities for students to be involved in environmental activity at an appropriate level of challenge; hence, fosters a growing sense of confidence that groups and individuals can positively affect the environment;
6. Relates the components of the ecosystem to our health, well-being, and potential for development.

Evaluation

Effective programs and materials provide:

1. Evaluation design based on stated goals, objectives, and outcomes;
2. Field testing of programs and materials in terms of stated goals and objectives;
3. Continuous modification and feedback.

Teachers

1. Distribute EE guidelines to colleagues;
2. Encourage colleagues to increase their environmental literacy;
3. Hold clearly stated goals and objectives for learner behavior;
4. Treat controversial issues fairly and honestly;
5. Teach people how to think, not what to think.

Outline 2

ASTM, EE Curriculum Draft Standards, Curriculum Task Group (1991)

These guidelines recommend that formal educational institutions and agencies develop, promote, and facilitate environmental education curricula that enhance environmental awareness and knowledge; as such the guidelines will:

Impart overall environmental awareness and knowledge.

Recognize and emphasize ecology as a critical cornerstone of all environmental education programs.

Communicate and apply major ecological concepts to an improved awareness and understanding of the environment

(e.g., humans as ecological variables, and extensive discussions and illustrations of different scales of time and space as they relate to function and development of any ecosystem).

Communicate and apply major social science concepts to an improved awareness and understanding of the environment.

Demonstrate the usefulness of ecological and social science concepts in understanding human dependence upon stable and productive ecological and social systems for survival.

These guidelines recommend that formal educational institutions and agencies develop, promote, and facilitate environmental curricula that demonstrate issue investigation, analysis, and action skills; as such, the guidelines will:

Identify a wide variety of environmental issues and problems and demonstrate the application of ecological and social science concepts in recognizing and interpreting these issues and problems.

Describe how human behavior, beliefs, values and cultural activities (e.g. religious, economic, political, social, and others) impact on the environment and relate to environmental issues and problems.

Recommend various issues investigation strategies using both primary and secondary sources of information (e.g. generating research questions; developing a survey; planning data-collection; organizing data into charts/tables/graphs; generating data-based conclusions; developing inferences and recommendations; and communicating research findings).

Identify various alternative solutions to environmental problems and predict the possible or probable ecological, social, political, legal, and economic consequences of alternative solutions to these problems.

Demonstrate a strategy for the identification, evaluation, and modification of personal and group

value positions and action strategies, relative to the environment.

Demonstrate strategies for the correction of environmental problems (e.g. persuasion, consumer action, political action, legal action, and ecomanagement).

Identify sources of scientific and social science information appropriate to the investigation and evaluation of environmental issues, problems, and solutions.

These guidelines recommend that formal educational institutions and agencies develop, promote, and facilitate environmental education curricula that demonstrate the following instructional methodologies:

Goal Orientation

A knowledge of education philosophy will be used to select, develop, and implement curricular programs and strategies to achieve both general educational and environmental education goals.

Coordination with Established Levels of Environmental Literacy

Graded environmental education curricula will be developed to coordinate with the various levels of environmental literacy as detailed in *Literacy Standards for Environmental Education* (refer to documents produced by the Environmental Literacy Subcommittee: e.g., curricula for the nominally, functionally, and operationally literate.)

Coordination with Conventional Levels of Instruction

Environmental education curricula will be developed which are targeted toward several primary levels of instruction: teacher education, lower/upper elementary education, and secondary education. The curricula will be designed so that its facilitation and mode of presentation will be appropriate to the learning level toward which it is targeted.

Curriculum Infusion

Environmental education curricula will be designed with open-ended components to allow for (a) ease of infusion into existing curricula, (b) opportunities for educators to create their own unique topic approaches and presentation formats, and (c) on-going

modifications to reflect the dynamic, ever changing nature of environmental instruction.

Compatibility with Accepted Theories of Teaching and Learning

Environmental education curricula will be developed that utilize and reflect a wide diversity of instructional applications, as detailed in Teacher Education Standards for Environmental Education (e.g. contemporary theories and practices relating to education philosophy, learning behavior, teaching methodologies, evaluation, and development of curriculum materials).

Selection of Appropriate Methodologies/Sites

Environmental education curriculum will select and implement instructional methodologies and sites which are appropriate for desired cognitive, affective, and behavioral outcomes and for a variety of learner characteristics (e.g. outdoor education methods, affective education methods, simulation games and role playing, case study methods, community resource use, etc.)

Evaluation

Environmental education curricula should be designed for ease of evaluation. The evaluation criteria should reflect elements typical of any conventional curriculum as well as evaluation components that may be unique to the scope of environmental education.

Outline 3

Smith, A. (1994)

Concept Paper on Developing National Standards for International Studies Education

Global Issues and Topics

- A. Global environment, including biodiversity and species protection
- B. Global resources, the need for conservation, development of alternative energy sources, and sustainability
- C. Global trends in population and related issues such as urbanization, migration, growth and control, and population distribution

- D. Major economic realities and significant issues of international trade, development, aid and investment
- E. World peace and security
- F. International human rights and human values
- G. Hunger, food supply and distribution around the world
- H. Ethnic conflict, diversity and human commonality
- I. Significant differences in systems of government
- J. The United Nations and other international and regional organizations
- K. World cultures
- L. Global developments in science and technology

Culture Studies and Area Studies—America and the World

- A. America's contemporary and historical connections with global issues and areas
- B. Understanding individuals' relationships and connections with global issues and other cultures
- C. Citizenship responsibilities

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