

Benchmarks On the Way to Environmental Literacy K-12

*Developed by Benchmarks for Environmental Literacy Project
of the Massachusetts Secretaries Advisory Group on Environmental Education
(SAGEE)*

For School-based Educators and Leaders of Youth Organizations

Foreword

Why Benchmarks For Environmental Literacy

The Problem

Environmental issues will be a central concern in the 21st century. Most social and economic issues will have a major environmental component. Environmental issues require new ways of approaching and resolving problems both locally and globally. It is becoming increasingly imperative that our citizenry have a well developed environmental literacy. That is, our citizens must have a strong working knowledge of how the natural systems of our planet work and how human activity affects and may be harmonized with the environment. They need the skills to investigate and evaluate problems, and to take effective action. They need to develop habits of mind that will enable them to become wise, empowered citizens who will act to keep the planet healthy and functioning in order to meet the needs of all its denizens.

The Challenge

Developing environmental literacy is a major task for us as a society. Many parts of our society - including home, family, school, community, church, workplace, interest groups, and the media - can play a major role. Achieving the necessary environmental literacy is a major task for our schools.

This document focuses on the roles that elementary, middle, and secondary schools can play in developing environmental literacy and will be followed by a second document that focuses on the role of higher education in assuring adequate levels of environmental literacy for college and university graduates.

Environmental education is the tool for developing environmental literacy. As a society we need to know how well our environmental education efforts are doing in

developing increasingly sophisticated levels of environmental literacy.

Benchmarks are points of reference from which measurements may be made; standards by which progress toward a larger goal may be assessed. In this case, benchmarks are standards established for knowledge, skills and attitudes that indicate progress toward a mature environmental literacy.

A Response To The Challenge

We are encouraged by recent developments in school reform in Massachusetts. Statements in the Massachusetts Common Core of Learning (1994) suggest a potentially important role for environmental education and recognition of the interdisciplinary nature of this learning. We are also encouraged by the efforts at reform under the PALMS project to emphasize instruction based on the knowledge that learners construct their own understanding through hands-on experiences that encourage the development of critical thinking skills and use authentic tasks of inquiry, reasoning, and problem-solving that reflects real world issues.

We do have concern, however, that in basing the curriculum frameworks process on traditional disciplines, the critical message of the need for interdisciplinary approaches to environmental issues will not be well conveyed to teachers. Our intent in this document is to contribute an interdisciplinary curriculum perspective that focuses on the development of environmentally literate citizens in Massachusetts schools.

We hope that this document will spark a productive conversation about how we will prepare today's young people to deal effectively with the critical environmental issues of the coming century. Comments on the document are welcome and encouraged. It remains a work in progress.

*Trudy Coxe,
Secretary of Environmental Affairs*

Introduction

Historical Background

In 1992, SAGEE (Secretaries Advisory Group on Environmental Education) established a subcommittee on environmental literacy. Its first report to the Secretary of Environmental Affairs was a document broadly outlining the scope of environmental literacy and the need to foster such literacy in Massachusetts. It strongly recommended that development of environmental literacy should be made one of the major goals of education within the Commonwealth.

In 1993, the subcommittee on environmental literacy developed its environmental literacy benchmarks project. This document is the result of deliberations of the project over the following three years. The focus of this initial effort is the K-12 years of schooling and youth groups. In 1996, the next phase of the project will be working on environmental literacy benchmarks for the post-secondary years.

The Challenge

The environmental literacy benchmarks subcommittee began by examining the Benchmarks in Science developed by Project 2061. The committee felt that the items presented in that document were not truly benchmarks but rather an elaborate system of content statements. Our definition of a benchmark focuses on tasks a learners can accomplish based on their comprehension of a body of knowledge, the ability to perform related skills, and use of some basic habits of mind. With that in mind the committee set about creating the set of benchmarks presented in this document.

It was further felt that acquisition of environmental literacy is a developmental process taking place over a lifetime; that is, there are degrees of environmental literacy that build and grow from simpler to more complex levels. Although development of environmental literacy is not strictly school dependent (the information and skills are acquired through a variety of education venues), for our purposes it seemed easiest to develop our benchmarks around clusters of school grade levels. Those chosen are grades K-4, grades 5-8, and grades 9-12.

Such a grade cluster based approach implies a well coordinated curriculum structure K-12. We are quite aware that such does not exist however much one might desire it. As stated, environmental literacy is developmental. Generally, one acquires the simple things before moving to the more complex. In guiding a learner's development it is important to assess where the learner is at the moment and guide the learning forward from that point. One cannot assume that because learners have been exposed to a particular grade level that they have acquired the environmental literacy benchmarks of that level. A teacher/youth leader may need to modify program to help the learners achieve benchmarks that perhaps should have been acquired earlier.

The Result

Benchmarks are essentially learning goals and objectives. They do not constitute a curriculum. Many different instructional approaches and venues may be employed to help learners achieve any particular benchmark. Benchmarks are tools to be used in designing formal and non-formal curricula and programs. They are also guidelines for use in developing assessment tools for programs or for marking individual progress.

The Hope

It is the SAGEE Environmental Literacy Subcommittee's hope that these Benchmarks will receive broad acceptance and will be an aid to curriculum coordinators, classroom

teachers, and non-formal program developers in creating and implementing curricula and programs for our young people that will assure their development as active and effective environmentally literate citizens of this planet.

Environmental Education and Literacy

Environmental education is a process aimed at developing a citizenry that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments and skills to work individually and collectively toward the solution of current problems, as well as the prevention of new ones. *The goal of environmental education is to develop an environmentally literate citizenry, thus environmental education focuses on empowering individuals to deal effectively with positive and negative relationships between people and their environments.* Environmental education is designed to foster and nurture growth of ENVIRONMENTAL LITERACY throughout the human life span.

All of our material needs, and many of our emotional and spiritual ones, are met from our bio-physical and social environments. The quality of the environments affects the quality of our lives. Our actions as producers, consumers, voters, recreators, and procreators have a cumulative impact on the quality of the environments that sustain us. Our future, and the future of generations yet unborn, depends on choices we each make on a day to day basis. It is essential that our educational system develop and nurture environmentally literate citizens. *Environmental education differs from environmental advocacy in empowering people with the knowledge, skills, and attitudes needed to make informed choices rather than advocating specific choices.* Environmental education is a life long process. As people develop, grow and learn, they gain increasingly sophisticated insights into the functioning systems of our planet and the ways in which humans interact with them.

Environmentally literate people know and understand:

- the physical processes that shape the patterns of the Earth's surface;
- the characteristics and spatial distribution of ecosystems on Earth's surface;
- the characteristics, distribution, and migration of human populations on Earth's surface;
- the patterns and networks of economic interdependence on Earth's surface;
- the processes, patterns, and functions of human settlement;
- how human actions modify the physical environment;
- how physical systems affect human systems
- the changes that occur in the perception, use, distribution, and importance of resources.

Environmentally literate people also share a variety of skills.

These include:

- accessing objective, reliable information relevant to specific issues;

- communicating information to others effectively;
- making thoughtful choices from among a range of alternatives;
- working effectively with others to bring about needed changes;
- and a range of basic process and decision making skills such as:

Process skills

- observing
- classifying
- inferring
- predicting
- measuring
- compare & contrast
- critical thinking
- creative thinking
- communicating
- interpreting data
- estimating
- categorizing
- analyzing
- synthesizing
- drawing conclusions
- cooperative skills

Decision-making skills

- formulating operational definitions
- generating relevant questions
- gathering verifiable information
- suggesting potential alternative solutions
- projecting consequences of each alternative
- choosing among alternatives
- acting on choice
- cooperative problem solving

Environmentally literate people also tend to share certain *habits of mind*, in that they:

- look for the various systems that are involved in issues that concern them;
- seek the historical development and background of issues as well as their current status;
- are open to new ideas;
- remain healthily skeptical of quick fix solutions;
- anticipate the potential consequences of a variety of action alternatives before selecting one;
- look for connections and interconnections among issues;

- investigate the historical development of an environmental issue; and
- seek and treat root causes rather than superficial symptoms of dysfunctional systems.

Sound environmental education leads to action, the things we do as consumers, producers, recreators, procreators, and voters. That is, environmentally literate individuals make choices and take day to day actions that will conserve and enhance the ability of the environment to sustain functioning ecosystems and meet human needs now and for generations yet to come. Actions may be as simple as seeing that trash is put in proper containers or more complex activities such as working to promote proper use of rain forest resources or facilitating recycling activity.

There is a rough pattern of how people progress in their development of environmental literacy that can be divided into three levels - nominal, functional, and operational. **Nominal** implies basic cognitive awareness and understanding; **functional** implies narrowly focused issue application; **operational** implies broad application in daily life. *By the completion of 12 years of schooling, the average graduate should have attained at least a **functional** level of environmental literacy.*

Anatomy of an Environmental Literacy Benchmark

The Benchmark Proper

Presents a task learners should be able to do (preferably by the end of the designated grade level grouping).

- The task implies acquisition of significant knowledge.
 - The task assumes certain skill developments have taken place
 - The task assumes development of specific habits of mind
 - The task contributes to basic positive environmental attitudes; and
 - Development of environmental ethics.
- Tasks are often presented in a generic framework that can be applied to a variety of specific issues or problems. Examples of specific issues are set off in italics and parentheses within the benchmark. Learners are not expected to be able to deal with all the examples, but should be able to do a respectable job on one of the examples or a similar related one.
 - Each benchmark is assigned a letter and number for ease of reference: K-4 benchmarks use the letter E, 5-8 benchmarks use the letter M, and 9-12 benchmarks use the letter S.

The Content/Context Statement

- **The first sentence of each content/context statement is set bold.** The content

statement provides a background context setter for the teacher/youth leader. It sets forth the basic concepts needed for understanding the nature of the benchmark task. It sets the basic parameters of understanding but it is not expected that the learners will all be able to deal with the benchmark at this level of sophistication. The content statement also serves as a guide around which teacher/youth leaders can develop rubrics for assessing degree of learner achievement of the benchmark task.

Process Categories

- Achieving a benchmark task requires the learner to use a variety of process and decision-making skills as well as certain habits of mind. Those skills and habits of mind implicit for each benchmark are listed under one of three process categories following the content statement. The categories are:

- Process Skills
- Decision-making Skills
- Habits of Mind

A glossary of all the process and decision-making skills can be found at the end of the book.

Environmental Ethics

- Each benchmark makes a contribution to the development of aspects of an environmental ethic. The benchmark may expand development of:

- Environmental awareness
- Environmental understanding
- Stewardship
- Green consumerism
- Voluntary simplicity

Disciplinary focus

- The disciplinary focus of each benchmark is located in the right margin at the end of each benchmark discussion. It appears in smaller type than the rest of the discussion because it is of lesser importance except for some types of curricular planning. Environmental Literacy Benchmarks are, by their nature, essentially interdisciplinary. They normally draw upon information and understanding from more than one academic discipline. The disciplinary focus box simply indicates those disciplines which would contribute the larger share of information to the learner's capacity to meet the benchmark task.

Benchmark Order

Elementary and middle schools are generally more comfortable with interdisciplinary study than high schools. Therefore the sequence of benchmarks, although clustered in

some broad areas of study, are presented as an interdisciplinary mix and discipline areas are not indicated. However, since interdisciplinary approaches still seem a way off at the high school level, the 9-12 benchmarks are grouped under separate disciplinary heading. This does not make them any less interdisciplinary in nature; it merely recognizes the realities of current secondary school structure.