WISCONSIN YOUTH CONSERVATION CAMP
ENVIRONMENTAL EDUCATION RESOURCE MANUAL

by

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A Thesis

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

College of Natural Resources

UNIVERSITY OF WISCONSIN

Stevens Point, Wisconsin

March, 1983

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Abstract

A Wisconsin Youth Conservation Camp Environmental Education Resource Manual was developed utilizing state and federal Youth Conservation Camp Environmental Education program descriptions and manuals, environmental education literature, the personal Youth Conservation Camp experience of the writer, contact with Youth Conservation Camp participants, counselors, Environmental Education Coordinators and administrators.

The goal of the manual is to aid the Wisconsin Youth Conservation Camp Environmental Education Coordinator to integrate environmental education into the Wisconsin Youth Conservation Camp Program.

To accomplish this, the manual provides the Environmental Education Coordinator with the Wisconsin Youth Conservation Camp Environmental Education Goals. These goals were developed by the writer and validated by personnel from the Wisconsin Department of Natural Resources, the Wisconsin Department of Public Instruction, and the University of Wisconsin. The manual outlines methods for planning, developing, implementing, and evaluating the achievement of the Environmental Education goals for the Program.

To familiarize the Environmental Education Coordinator with the educational resources available in developing and implementing an environmental education program, the manual provides: (1) a description of major ecological areas in in Wisconsin, (2) an ecological inventory of work project

sites and other potential environmental education sites near the camp, and (3) a directory of resource people, their addresses, and their specialties.

In addition to the manual, a resource information file was provided for each Wisconsin Youth Conservation Camp. The file contains background information relating to each of the Environmental Education Goals, typical YCC work projects, and related environmental issues.

ACKNOWLEDGEMENTS

I wish to thank Dr. Daniel Trainer, my major professor, for sharing his time, talents, ideas and humor throughout the development of the manual. Sincere thank are also extended to Dr. Richard Wilke and Dr. Michael Gross for their vital presence on my graduate committee. The fourth member of my committee, Raymond Hendrikse, Chief of the Wisconsin Youth Conservation Camp (YCC) program, has provided valuable guidance throughout my involvement with the YCC program and the development of the manual.

In addition to my graduate committee, I would like to thank Dr. Dennis Yockers, the DNR Environmental Education Coordinator for his help on the manual and for the support he has and will continue to provide for YCC Environmental Education Coordinators.

The YCC staffs and campers that I have worked with at Kettle Moraine, Mecan River, Ernie Swift, and Wyalusing cannot be overlooked; their presence is apparent throughout the manual. Nancy Peters, the Assistant Superintendent at Mecan River provided her constant friendship and the excellent inventory of the Mecan River ecological resources and resource personnel.

I would also like to thank Kermit Traska, Jim Kronschnabel, Alex Katovich, Ralph Bennitt, Pete LaBorde, and my immediate family for the positive experiences they provided in resource mangement, education, and enjoyment.

Appreciation is extended to the Ohio Department of Natural Resources, Michigan Department of Natural Resources, and the U.S. Forest Service for the use of their education program materials.

Lastly, this project would not have been completed without the typing skills of Char Pingel. I will always appreciate the time and energy she put into the completion of the manual.

DEDICATED TO:

Bessie LaBorde

and

Hazel Feuerstein

"After all anybody is as their land and air is.
Anybody is as the sky is low or high,
the air heavy or clear
and anybody is as there is wind or no wind there.
It is that which makes them and the arts they make
and the work they do and the way they eat
and the way they drink
and the way they learn and everything."

-- Gertrude Stein
"What Are Masterpieces"

FORWARD

It is the intent of the author, that the manual and the training for its use be provided to each Wisconsin Youth Conservation Camp (YCC) Environmental Education Coordinator by the Wisconsin Department of Natural Resources Environmental Education Coordinator.

The YCC Environmental Education Coordinator will then utilize the manual for planning, designing, implementing, and evaluating a YCC Environmental Education program. The Environmental Education Coordinator will suggest program improvements to strengthen future YCC Environmental Education programs.

The evaluation and program improvements will be submitted in the form of an end-of-the summer report to the Wisconsin Department of Natural Resources (WDNR) Environmental Education Coordinator.

The WDNR Environmental Education Coordinator will develop environmental education support materials, and focus future training sessions to meet the needs and suggestions outlined by the YCC Environmental Education Coordinator.

To the YCC Environmental Education Coordinator:

After reading the Wisconsin Youth Conservation Camp Environmental Education Resource Manual, please duplicate and complete the following Manual Evaluation form. The form should be sent to:

Environmental Education Coordinator
Wisconsin Department of Natural Resources
Box 7921
Madison, Wisconsin 53707

Manual Evaluation Form

1. Did the manual aid you in developing an environmental education program? How?

2. What additional materials/information should be provided in the manual?

3. What sections should be covered in more detail?

4. Was the manual easy to follow?

5. Would you like a training session that would explain how to use the manual and develop an environmental eudcation program?

6. Additional comments:

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SECTION 1
ENVIRONMENTAL EDUCATION
IN THE
WISCONSIN YOUTH CONSERVATION CAMP PROGRAM

Introduction and History

The Wisconsin Department of Natural Resources (WDNR) is involved in the development of policies and the enforcement of regulations concerning the state's natural resources. Resource management decisions, regardless of discipline, depend upon one vital component - people. Issues concerning groundwater quality, solid waste landfill sitings, wetland preservation, air quality standards, sewage treatment effluents, leadshot usage, and aerial spraying are resource issues strongly affected by and dependent on public involvement and support.

The relationship between natural resource management and the public may be the most significant factor that the WDNR must consider. Fazio and Gilbert (1981) stated:

> "that resource management is a practice closely confined within a social framework. It is stewardship of natural resources for people and in partnership with people. It is also management of people."

Dependency on public involvement and support means that all resource management involves public scrutiny. Agencies that do not take the time to develop public understanding and support will find that their programs often meet with rejection or failure. Schoenfeld (1957) stated:

> "that we must have public support, or at least sufferance, if natural resource management is to be practiced."

Even legitimate management techniques can be thwarted if the public is uninformed and/or opposed to the program. Misunderstood resource management programs such as clear-

cutting, prescribed burning, wetland management, and steel shot use can easily become controversial.

To communicate resource management policies to the public and develop their support, the WDNR utilizes numerous methods and programs. These include the Wisconsin Natural Resources Magazine, WDNR Newsletter, public hearings, news releases, Wisconsin Conservation Congress, public appearances by WDNR personnel, the MacKenzie Environmental Center, the Wisconsin State Fair exhibit, and the Wisconsin Youth Conservation Camp program. Each of these methods and programs has specific objectives to inform specific publics. This paper will focus on the Youth Conservation Camp program (YCC).

The 1961 Outdoor Recreation Act (ORAP) set aside funding for the creation and operation of the YCC program. A 1961 report by the Wisconsin Department of Resource Development describing the philosophy of the YCC program stated:

> "These camps present a marvelous opportunity for conservation education, as well as giving 600 young men a chance for healthy and constructive outdoor activity each summer. The Conservation Department has a backlog of thousands of man-years in work projects which could be handled by young men based at the three locations selected by the department. Without added help, the department estimates that some of these projects will be delayed for more than 30 years." (WDRD:1961)

Between 1962 and 1973, four YCC camp facilities were established and operations were initiated at: Statehouse Lake Youth Camp in Vilas County (1962), Ernie Swift Youth Camp in Washburn County (1963), Mecan River Youth Camp in Marquette County (1964), and Kettle Moraine Youth Camp in

Sheboygan County (1973). Originally each camp conducted two 6-week sessions for 100 boys 16-19 years of age. The camp was administered by a camp superintendent, an assistant superintendent, and a staff of ten counselors. Each counselor was responsible for a cabin with ten campers, a daily work project and crew, and specifically assigned evening and weekend duties.

Presently each camp (one all-girl, one all-boy, two co-ed) conducts two 5-week sessions for 100 campers 15-19 years of age. Each year these camps offer 800 high school students the opportunity to increase their environmental understanding, to develop constructive work habits, and to participate in outdoor recreation activities. The YCC program provides the WDNR with an enthusiastic work force, an opportunity to complete needed conservation projects, and a unique opportunity to explain the agency's goals, objectives, and resource management programs.

A stated objective of the YCC program is "to develop an understanding and an appreciation of the natural resources of the state" (WDNR:1982). Concepts regarding the development of camper understanding and appreciation have depended upon evolving attitudes toward education and the environment.

According to Fazio and Gilbert (1981), education concerning the environment developed during three eras: 1) nature study, 2) conservation education, and 3) environmental education. The initial nature study era evolved into the conservation education era during the 1930's. Conserva-

tion education, focusing on resource management concepts, stressed the wise-use of natural resources and Leopold's land ethic (Swan, 1975). The Wisconsin YCC program was initiated during this era.

The influence of the conservation education era on Wisconsin's YCC education program is reflected by the 1962 education report from the White River (Ernie Swift) Youth Camp (Appendix A). The education program consisted of "formalized education as well as on-the-job training" in forest management, wildlife management, fish management, boat and gun safety, and fire control. Conservation education programs were developed at each camp utilizing personnel of the University of Wisconsin, the Wisconsin Department of Public Instruction, the Wisconsin Conservation Department, and the Youth Camp staff.

The conservation education program consisted of a weekly formal lecture on a specific area of conservation management which was supplemented by an educational tour.

It was the responsibility of each counselor to stress conservation education as part of the work project. By weaving conservation education into the work project, the counselor could effectively convey many resource management concepts to the work crew. The use of the work project site as an educational setting provided campers with greater insight into the importance of the project itself and how it resulted in the wise management of natural resources. For example, on a fish management work project, the campers

observed trout streams and learned ways to improve trout habitat; then after building wing deflectors and bank covers, campers hopefully understood and appreciated the specific management practice.

In the 1970's conservation education began to evolve into environmental education. In describing the environmental era, Fazio and Gilbert (1981) state:

> "With the new, complex issues of the Sixties came the realization that an interdisciplinary approach to problem-solving was essential. No longer could the emphasis be merely on biology. To be sure, an understanding of ecology forms the foundation of environmental education. But problem identification and the action leading to solutions of those problems requires paying attention to a wide array of social and physical considerations. Engineering, political science, chemistry, sociology, psychology, and law are a few of the disciplines that are just as important as the traditional areas of resource management or biological science. Environmental education, unlike conservation education, involves all citizens and their life styles. Its mission is perhaps inseparable from saving us from ourselves."

Faced with growing environmental concerns and crises, the environmental education era was marked by several significant international workshops and conferences. In 1975, and International Workshop in Environmental Education was held in Belgrade, Yugoslavia. This workshop resulted in the "Belgrade Charter" which suggested goals and objectives for environmental education (UNESCO, 1976). In 1977, the world's first Intergovernmental Conference on Environmental Education was held in Tbilisi, Georgia (USSR). The resulting Tbilisi Declaration "established the framework, principles, and guidelines for environmental education at all levels - local, national, regional, and international - and all age

groups within and outside the formal school system" (UNESCO-UNEP, 1978).

To aid in the organization and implementation of environmental education curricula, Hungerford, Peyton, and Wilke (1979) developed the "Goals for Curriculum Development in Environmental Education" (GCDEE). The GCDEE consist of a superordinate goal and four subgoals. The superordinate goal of environmental education is...

> "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."

The four levels of goals that aid in reaching the superordinate goal are:

Level I: Ecological Foundations Level
Level II: Conceptual Awareness Level
Level III: Investigation and Evaluation Level
Level IV: Environmental Action Skills Level

The full text of the GCDEE is provided in Appendix B.

During the environmental education era, a Federal YCC was initiated basing its Environmental Awareness goals on the environmental education goals of the Belgrade Charter. In 1975, the Wisconsin YCC program began receiving supplementary federal funding. With federal funding came federal requirements and regulations. In 1976, the Wisconsin YCC was reviewed by federal auditors who indicated that if the WDNR desired to continue receiving federal funding, each camp would be required to offer and document 10 hours of environmental education per week. Prior to this, Wisconsin

campers were receiving 8 hours of education per week. The federal requirement was developed to insure that education time was spent on "environmental education" rather than on sessions such as first-aid or camp orientations.

Environmental education programming consisted of a variety of learning situations including work projects, field trips, formal presentations, and informal presentations. By coordinating the learning experiences and relating them to each other, the effectiveness and quality of a learning experience could be enhanced.

For example, a wildlife management crew may be clearing an area to provide wildlife openings for deer. The crew would learn why the work project was necessary, as well as the ecology of the site (plants, animals, and how they interact). The wildlife manager supervising the project could explain the habitat and nutrient needs of deer and the responsibilities of a wildlife manager. Traveling to and from the work site, the crew might see and talk about deer and deer habitat.

Similar coordination of a learning experience could occur during an educational tour of a sawmill or a paper company. Rather than having the educational tour be an isolated event, planning and coordination with the work project counselor and the DNR supervisor could show how the tour relates to each work project category. The wildlife crew could learn the effects of forestry practices on deer habitat, and the need for the wildlife manager and the forester to work and plan together.

The coordination of educational experiences and work projects takes time. Unfortunately, counselors and Assistant Camp Superintendents often did not have sufficient time and/or environmental knowledge and background to plan, coordinate, or interrelate activities.

Recognition of the need for an integrated environmental education program in the WYCC program, led to the addition of an Environmental Education Coordinator (Coordinator) for each camp by 1979. It was the Coordinator's responsibility to develop an environmental education program that would incorporate the various educational opportunities and convey environmental principles to camp participants.

Many educational resources were available to the Coordinator to develop the environmental education program. The camp's work project sites often contained a variety of natural resources and diverse ecosystems. WDNR personnel offered trained natural resource professionals who could provide evening presentations and conduct field trips. The Coordinator, however, was often new to the WYCC program and to the educational resources available. Consequently, the Coordinator was limited in her/his ability to integrate environmental education into the WYCC program.

This manual was developed to aid the Coordinator in integrating environmental education in the YCC program. The manual was designed to help Coordinators familiarize themselves with the WYCC program, the ecological area surrounding the camp, the area's environmental education opportu-

nities, and the area resource personnel. This will enable the Coordinators to plan the environmental education program prior to arriving at camp and being unmessed in its hectic schedule. Prior preparation will also enable the Coordinator to take advantage of his/her respective university or nature center's capacity to provide additional resource materials necessary in developing and implementing an environmental education program.

Pre-planning will also allow the Coordinator to commit more time during the first week of camp toward implementation of the environmental education program rather than its development. During this period, the Coordinator can discuss and fine tune the environmental education program with the staff, review work project sites, and provide information to the staff concerning the implementation of the environmental education program.

This manual is not a substitute for planning, hard work or enthusiasm. It is merely a tool, which can enhance the planning, development and implementation of the environmental education program for the WYCC.

Objectives of the Environmental Education Resource Manual

1. Develop and present environmental education goals for the Wisconsin Youth Conservation Camp program.
2. Outline methods of planning, developing, implementing, and evaluating an environmental education program in the WYCC program.

3. Provide an ecological description of the major ecological areas in Wisconsin.
4. Provide a list of the area's resource people, their specialties, and how to contact them.
5. Provide an ecological inventory of work project sites and other potential environmental education sites.
6. Provide each camp with resource information such as brochures or files relating to each of the WYCC environmental education goals, work projects, and ecosystems.

SECTION 2
WISCONSIN YOUTH CONSERVATION CAMP
ENVIRONMENTAL EDUCATION GOALS

Development of Environmental Education Goals

Environmental education goals for Wisconsin's YCC program were established to guide the development of environmental education programs at each Wisconsin YCC camp. An environmental education program based on these goals will acquaint YCC campers with Wisconsin's natural resources and the various factors and attitudes that effect natural resource use and management. This includes providing campers with the opportunity to develop citizen participation skills which enable them to play an active role in resource management decisions, and recreational skills to help them enjoy Wisconsin's natural resources through activities which have minimal environmental impact.

The WYCC environmental education goals, developed as part of this thesis, were based on the goals of "A Framework for EE Curriculum Planning and Development" (Hungerford, et.al., 1980), and the "Federal YCC Environmental Awareness Goals" (USDA/USDI, 1977). These environmental education goals were then submitted to a three step validation process. Professionals involved in validating the WYCC environmental education goals were:

Raymond J. Hendrikse:	Chief of YCC section, Wisconsin Department of Natural Resources
Dave Engelson:*	Environmental Education Supervisor, Wisconsin Department of Public Instruction

*Dave Engelson approved the WYCC Environmental Education Goals as satisfying the Wisconsin Department of Public Instruction's requirements necessary for high school students to earn one high school credit for attending the WYCC program.

Richard Wilke:**	Director, Central Wisconsin Environmental Station, University of Wisconsin-Stevens Point
Dennis Yockers:	Coordinator of Environmental Education Programs, Wisconsin Department of Natural Resources

Proposed environmental education goals were submitted to Raymond Hendrikse and Dennis Yockers for suggestions and comments. The revised goals were then sent to Dave Engelson, Richard Wilke, and Dennis Yockers for evaluation. The goals were again revised and submitted for final validation to all four validators.

Wisconsin Youth Conservation Camp Environmental Education Goals

Goal #1

To provide campers with an understanding of the work project: its need and purpose, how it fits into WDNR resource management policy, altenatives to and effects of the project.

Goal #2

To increase camper's awareness of their environmental surroundings and to provide a foundational base in Ecological Principles that govern the Environment.

2.1 Identify types of ecosystems and their components within the area encompassed by camp activities

2.2 Understand the following concepts relative to the ecosystems within each area:
- Individuals and Populations
- Community
- Niche
- Adaptations
- Interactions/Interrelationships
- Environmental Influences/Limiting Factors
- Homeostasis
- Carrying Capacity
- Ecosystem
- Energy Flow

**Richard Wilke is also co-author of "A Framework for EE Curriculum Planning and Development"

- Biogeochemical Cycles
- Ecological Succession
- People as Builders and Members of Ecosystems

Goal #3

To provide campers with the opportunity to identify, understand, and enjoy Wisconsin's natural resources, to consider the demands society places on these resources, and how these resources are managed.

3.1 Introduction to Wisconsin's natural resources; soil, minerals, water, fisheries, wildlife, forests, physical geography, parks, wetlands, and scientific areas. The following should be considered:
- History of the Resource
- Uses of the Resource
- Resource Relationships
- Stability/Quality of the Resource
- Economics of the Resource (Food, Shelter, Jobs, Recreation)

3.2 Develop understanding of how life styles effect the use of natural resources. What campers can do to influence the use of natural resources on a personal, family, community, and camp level (water conservation, energy conservation, recycling).

3.3 Exposure to resource management techniques.

3.4 Provide a description of the Wisconsin Department of Natural Resources.
- History of WDNR, the Agency
- Organization of the Agency
- Responsibilities of the Agency
- Various Publics that this Agency Must Consider
- Problems that the Agency Faces
- Accomplishments of the Agency

3.5 Explanation of factors taken into account when making decisions concerning the management of natural resources.

Goal #4

Develop an awareness of the wide range of attitudes and values that are held toward natural resources.

4.1 Understanding of the differences in attitudes that arise concerning natural resources.
- How Resources Should be Used
- What Resources are Important
- What Degree of Resource Quality and Quantity is Needed

4.2 Exposure to the wide spectrum of attitudes and views needed to be considered in a decision making process.

Goal #5

Provide skills and confidence which will enable campers, as citizens, to take responsible roles in the decision making process.

5.1 General explanation of the legislative process.

5.2 How citizens can effect decisions.

5.3 Importance of investigating all sides of an issue before reaching a decision.

5.4 Steps involved in communicating a person's viewpoint to representatives.

Goal #6

Provide lifetime recreational skills and experiences that will enable participants to enjoy Wisconsin's natural resources to a greater extent with less of an environmental impact on the site.

6.1 Experience canoeing, map and compass reading, hiking, camping, fishing, hunting.

6.2 Discuss the use of high impact recreational activities on a site, i.e., all terrain vehicles, snowmobiles, power boats.

SECTION 3
ENVIRONMENTAL EDUCATION PROGRAM DEVELOPMENT

Resources Available to the Coordinator

There are many components of an environmental education program that the Coordinator will need to consider. To assist the Coordinator in program development, the Environmental Education Program Model, an adapted version of the "General Teaching Model" of Miles and Robinson (1970), was developed (Figure 1).

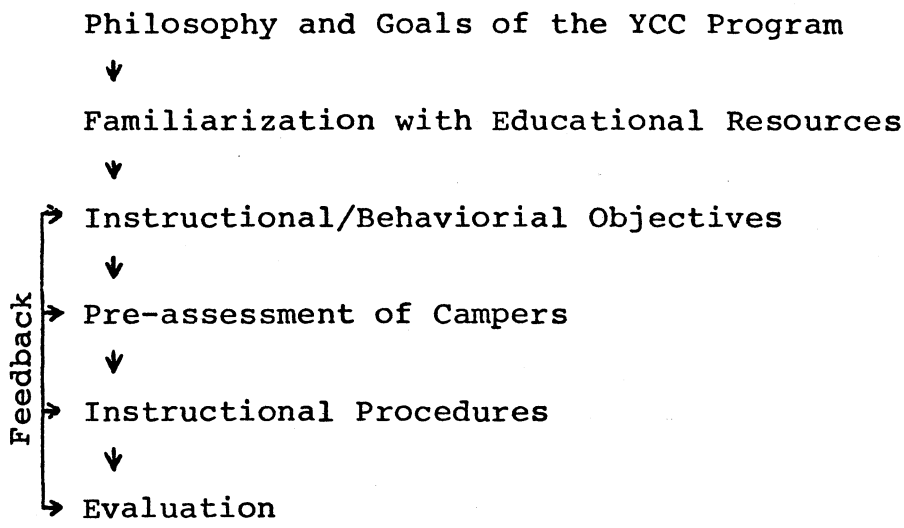

Figure 1. Environmental Education Program Model

Each of the Environmental Education Program Model components can be utilized as follows:

Philosophy and Goals of the WYCC Program: The overall WYCC program objectives and the environmental education goals are the basis from which to develop an environmental education program. It is imperative that the Coordinator become familiar with the YCC program, its objectives, and its environmental education goals.

Familiarization with Educational Resources: Each youth camp has a variety of educational resources available to aid in the development of an environmental education program. Familiarity with these educational resources will enable the Coordinator to utilize these resources more effectively and integrate environmental education into the YCC program.

Instructional/Behavioral Objectives: Instructional/Behavioral objectives are the Coordinator's means of stating what s/he expects campers to achieve. These objectives are developed for each environmental education goal and are statements of desired learner outcome after participating in specific educational activities.

Pre-Assessment: Pre-assessment of Campers helps determine whether campers have the prerequisite knowledge and skills to participate in the environmental education program. They also will document if campers already have the skills which will be taught in the environmental education program.

Instructional Procedures: The Instructional Procedures are the Coordinator's plans to help learners achieve specific behavioral objectives. They include educational activities, instructions to implement activities, and methods for the learners and the activity to be evaluated.

Evaluation: An Evaluation provides information which can be used to determine whether the campers have achieved the behavioral objectives. This feedback is used to adjust or modify instruction when necessary. Evaluation also provides a measure of success.

The following Comprehensive Outline incorporates the components of the Environmental Education Program Model into a step by step process for developing an environmental education program. Explanations of the step by step process follows the Comprehensive Outline.

Comprehensive Outline for Environmental Education Program Development

PHASE I. Familiarize Yourself with the Resources Available to the Coordinator

- A. WYCC program's philosophy, structure, routine (Appendix C, page 112).
- B. WYCC Environmental Education Goals (Section 2, page 11).
- C. Ecological resources available around camp (Sections 4, 6, pages 65, 75).
- D. Resource personnel able to provide educational presentations (Section 5, page 71).
- E. Educational resources.
  1. Work projects
  2. Evening presentations
  3. Field trips
  4. Camp life activities
  5. Educational displays
  6. Recreational activities (Section 3, page 16).
- F. Camp's superintendent's:
  1. Philosophy of the EE program
  2. Preferences concerning how EE program should run
  3. Perceptions of staff roles (i.e., counselor, Assistant Superintendent, Superintendent, EEC)
  4. Suggestions for EE program
  5. Critiques of past EE programs
- G. Work projects of the camp, location of project, and the EE potential of site (Appendix E, page 120).
- H. Staff, EE backgrounds, interests, and needs.

PHASE II. Develop Behavioral Objectives

- A. Gather information concerning goals to aid in development of objectives.
- B. Express objectives in behavioral terms.

PHASE III. Design the Environmental Education Program

A. Develop an Instructional Plan (page 45).
   1. List all work projects
   2. Identify objectives/goals which can be achieved through the work project or on the work project site
   3. Identify how the remaining objectives can be achieved
      a. Evening presentations
      b. Field trips
      c. Camp life activities
      d. Educational displays
      e. Recreational activities
   4. Develop instructional procedure for achieving behavioral objectives
      a. Develop educational activities (page 46)
      b. Consider field trips and evening presentations
      c. Design educational displays
      d. Gather educational background information concerning activities
   5. Develop a plan for evaluation
   6. Plan an EE training session for staff during orientation week
   7. Consider a means of pre-assessment

B. Coordinate and Facilitate Staff Involvement (page 56).
   1. Discuss EE program with camp superintendent and staff members
   2. Develop methods to strengthen staff environmental education skills
   3. Plan activities, field trips, etc. considering:
      a. Camper supervision, safety, and transportation
      b. Educational objectives of the activity
      c. Time schedules of campers, presenters, trip hosts, cooks, DNR personnel, etc.
      d. Method of evaluation
   4. Visit the work project site with the project counselor
      a. Explain ecological communities
      b. Discuss educational activities that can take place on the work site
   5. Talk with work project supervisors about the goals that they can help achieve
   6. Establish avenues of communication with staff members
      a. Provide staff with EE information
      b. Allow feedback for evaluation
   7. Familiarize YCC staff with the EE program (Staff EE training session)
      a. EE activities and objectives
      b. Environmental concepts

c. Environmental concepts
d. Methods of evaluation
e. Skills needed to evaluate activities

PHASE IV. Pre-assessment of Campers (page 60)

A. Why.
B. When.
C. What methods.
D. Who administers.

PHASE V. Evaluation (page 61)

A. Program description.
   1. Weekly EE plan
   2. Daily accomplishment chart
B. Program accomplishment.
   1. Weekly evaluation
      a. Campers
      b. Staff
      c. Coordinator
      d. Administrators
   2. Session evaluation
C. Future recommendations based on evaluation.

Resources Available to the Coordinator

WYCC Program and Environmental Education Goals: When developing the Environmental Education program, the Coordinator must first understand the WYCC program and its Environmental Education goals. The WYCC program is described in Appendix C (page 112) and the WYCC environmental education goals are presented in Section 2 (page 11). Further questions concerning the Environmental Education goals can be directed to:

Environmental Education Coordinator
Wisconsin Department of Natural Resources
Box 7921
Madison, Wisconsin 53707

To aid the Coordinator in conceptualizing how YCC environmental education fits into the WDNR, the WDNR policy on education is provided in Appendix D (page 116).

Ecological Resources: The Coordinator should also be familiar with the multitude of educational resources available to aid in the development of an environmental education program. The Ecological Resource Inventory (Section 6, page 75) lists potential educational sites around the camp such as power plants, bogs, work project sites, tree nurseries, and heron rookeries.

Because work projects may change location from summer to summer, ecological inventories of specific work sites may not be available in the Resource Inventory. If this occurs, the Coordinator can visit the specific work site or a comparable site with the work crew counselor and discuss educational activities. The new site should be inventoried and added to the Ecological Resource Inventory for future use. A summation of the previous and current work projects is available from:

YCC Section - Chief
Wisconsin Department of Natural Resources
Box 7921
Madison, Wisconsin 53707

A list of the YCC 1982 work project categories such as forestry, wildlife, and fish management is in Appendix E (page 120). Each category describes the type of work that is accomplished on the site and is accompanied by related education suggestions.

Resource personnel: Tremendous assets to the Coordinator are resource personnel. They are valuable in gathering background information for environmental education activities, providing evening presentations, or conducting educational

field trips. The list of resource personnel (Section 5, page 71) provides the Coordinator with the names and addresses of the resource persons, their phone numbers, specialties, and interests.

YCC Staff: A key person who should be sought for input throughout the development, implementation, and evaluation process is the Camp Superintendent. Specific information concerning the respective camps and their environmental education programs can be obtained from the Camp Superintendent. The Superintendent's address can be obtained from the YCC Chief.

The Assistant Superintendent and counseling staff are also instrumental in the environmental education program throughout the summer. The Coordinator may wish to contact individual staff members prior to arriving at camp to determine their environmental education backgrounds, strengths, weaknesses, and interests. This will aid the Coordinator in determining what information/training staff members might need in regard to environmental education activities. Staff addresses are available from the Camp Superintendent and/or the YCC Chief.

To provide additional information on each of the environmental education goals, work projects, environmental education concepts, and various environmental topics, an educational file was compiled and is available at each camp (Section 7, page 88).

Work Projects: The work project offers campers the opportunity to gain an understanding of natural resource management and to develop an awareness of ecological principles while doing meaningful work. Capitalizing on the work project as a learning environment can make the work project itself more meaningful. Environmental education on the work project site can help campers better understand: 1) the purpose of the work project, 2) alternatives to the work project, 3) the environmental impact of the project, and 4) the surroundings (ecosystems) that they are working in.

For example, a forestry project located in a pine plantation can be used to achieve many objectives/goals. The pine plantation will aid in explaining:

- forest ecosystem (2.1)
- forest management practices, i.e., pruning, thinning, planting (3.3)
- forest resources and utilization by humans (3.1, 3.2)
- tree growth and aging techniques (3.1)
- tree competition for sunlight (2)
- comparison of tree ring width and light, nutrients and water available (2.2)
- comparison of pine plantation ecosystem to hardwood forest ecosystem (2)
- comparison of ecosystem complexities (2)
- reasons and uses of pine plantations (3.1, 3.2)

A summary of 1982 YCC work project categories and suggestions for how each work project category can be used to achieve environmental education goals is provided in Appendix E (page 120).

The education potential of a work project site should be reviewed and discussed with the work crew counselors. Counselors should be provided examples of how to utilize the work project site to implement environmental education activities and to reinforce environmental education goals.

Each work site is supervised by a DNR project supervisor who may be a forester, fish or wildlife manager. The DNR supervisor is an important resource for environmental education. Work project supervisors present a short project orientation to the YCC work crews on the first day of each work project. The Coordinator should meet with the DNR supervisors and discuss ways in which the supervisors feel they can integrate environmental education into the work projects. Some topics supervisors could cover during their project orientations include explanations or further information concerning: 1) the natural resource that campers are working with, 2) resource management techniques, 3) resource management issues (Appendix F, page 124).

Evening Presentations: Each camp has access to numerous resource people who can provide evening presentations on a wide range of topics. If resource personnel are contacted well in advance, these topics can be used to reinforce environmental education goals.

The Coordinator should meet with presenters to explain what environmental concepts campers are learning about and explore the possibilities of the speaker integrating and stressing these concepts during their presentation.

For example, at Mecan River YCC, an area forester gives an excellent presentation on Wisconsin wildflowers. In addition to identifying wildflowers, the forester could broaden his talk and illustrate the niches that flowers fill, the different adaptations flowers have, flowers that are endangered species, or the connection between wildflowers and scientific areas.

The Coordinator must keep in mind that these professionals have a limited amount of time to prepare for evening presentations and that advance notice is vital if variations in their presentations are requested.

The counseling staff and the campers also provide evening activities. The Coordinator can capitalize on a counselor's area of expertise (backpacking, orienteering, canoeing, fishing, wildlife drawing, trapping, photography) to strengthen and add variety to the environmental education program.

Field Trips: Field trips are valuable components of an environmental education program, providing various educational opportunities. An integrated work/EE program can capitalize on field trips to reinforce the environmental education programs.

The ecological resource inventory (Section 6, page 75) contains many potential field trips to areas such as sawmills, power plants, tree farms, and agricultural systems. Additional sites can be added to the resource inventory by the Coordinator.

For example, in the sample EE program (Appendix F, page 124) a field trip on soil and water issues is used to supplement the previous week's activities in soil and water investigations on the work site.

To increase the effectiveness of the field trip, a DNR hydrologist delivered an evening presentation on groundwater quality. The presentation described the various threats to groundwater quality and regulations designed to protect it. The hydrologist also explained some of the attitudes toward groundwater regulations and how the regulations affect private and public concerns.

The field trip included visits to various industries which could be groundwater threats: agricultural systems, wastewater treatment facilities, sanitary landfills, paper industries, etc.

People at these sites provide a tour of the facilities and explain their view on groundwater regulations, how regulations affect them, how their industry affects water quality, what their industry can do to limit pollution, what are the economic costs and considerations in pollution control, what the impact of regulations are on their industry's productivity.

A respresentative of a citizen's environmental group also offered additional views on groundwater pollution and regulations.

After the field trips, campers in small groups discuss the views and attitudes of the different tour hosts as well as their own attitudes concerning groundwater pollution and regulations, while listening to each other's views in an accepting atmosphere.

Role playing offers each group an opportunity to present a different viewpoint. In a simulated public hearing to consider the chainging of groundwater regulations, each group will develop and present their representative industry's or agency's concerns and suggestions for groundwater regulations.

When planning and implementing the field trips, the Coordinator should consider the following:

1. Prepare background information which will strengthen camper and staff understanding of the subject matter to be covered enabling them to ask questions which will aid in learning more about the subject. The information can be given to campers through evening presentations such as the one mentioned previously or on crew by the counselor.
2. Discuss the trip's objectives in advance with the field trip hosts. Let them know what your objectives and aims are.
3. Prior to the field trip, tell the campers the objectives of the trip.

4. In addition to the environmental education goals and objectives of a field trip, the Coordinator should consider:
   - camper safety, supervision, and transportation
   - lunches and notification of cooks, re: meal schedule
   - preparation needs of staff and notification
5. The Coordinator could organize a field trip plan in the following manner:
   - Goals and Behavioral Objective(s)
   - Concepts to be covered
   - Location of visits
   - Material to be covered at each visit
   - How the entire trip will be tied together
   - Method of evaluation

(The following points are from Betty Van der Smissen's "A Leader's Guide to Nature-Oriented Activities" (1977).

6. A field trip is not a lecture. The leader talks with the group, not at them. There should be a feeling within the group that they are free to ask questions and the leader must have no qualms about saying "I do not know, perhaps we can look that up together."
7. Stops on a field trip should be meaningful--stops should be made to observe something. Rest stops on field trips are unnecessary as each person rests when stopping to observe. On extended field trips,

provision should be made for the physical comfort of the individuals.

8. The group should be kept together and be small enough for all to hear what the leader is discussing and to participate in the observations and gathering of information and materials. This means that it is desirable for groups to be no larger than 15-20 persons.
9. An effort should be made to have a "buildup" (anticipation for the field trip through group planning and other motivating devices). There also should be followup with the information obtained or the specimens collected. Why go if you are not going to use what you acquired?
10. Evaluate the field trip so that future trips may be improved.

Recreational Activities: The Coordinator should consider utilizing recreational activities in the achievement of behavioral objectives. Environmental education can be enhanced by many recreational activities. The Coordinator can gather information from area resource managers concerning the history of a recreational site, interesting places such as deer yards or heron rookeries, and species of plants and animals unique to the area. This information can then be presented to the campers in an informal session prior to the trip or at appropriate times during the activity. The Coordinator must remember, that the emphasis of a recrea-

tional activity is RECREATION; environmental education should complement it, not burden it.

The following examples show how environmental education can be integrated into specific recreational activities.

Overnight camping trips can introduce campers to ecological communities, different habitats, examples of succession, or discussions about owls, stars, constellations, edible plants. Opportunities also exist to practice basic camping skills, survival skills, or map and compass skills.

Canoe trips offer many environmental education opportunities. A river may bring campers past heron rookeries or osprey nests. If these sites are known to exist, campers can be prepared to look for them. A canoe trip can trigger discussions about endangered species, soil erosion, water quality, or stream ecology.

The following list of possible environmental education subjects can help the Coordinator brainstorm his/her own methods of utilizing recreational activities as educational mediums.

- the history of the area
- special ecosystems to be visited
- potential wildlife/plants to be seen
- interesting sights along the way
- fishing and fish habitats, cleaning and identification
- outdoor cooking skills
- fire-building and safety
- backpacking skills

- camping skills
- canoeing skills and history of Voyageurs in Wisconsin
- map and compass skills/orienteering
- edible plant identification
- constellation identification, northern lights, sky phenomena
- discussion and stops at beaver lodges
- thought provoking discussions about endangered species
- water quality
- clouds, meteorology, predicting weather
- lightning and thunder
- pets and domesticated animals as well as wild pets
- animal tracks
- how artists and writers have experienced and interpreted the environment

Camp Life: Routine camp life activities offer the Coordinator an opportunity to relate environmental education to the camper's daily living situation, strengthen the environmental education program and fulfill environmental education goals.

Environmental education activities can take advantage of camp routine and include: 1) measuring the impact of camp activities/camp life styles on resource use, 2) developing and implementing plans to limit resource use, 3) developing and implementing projects beneficial to the camp. These activities can occur during the evening or on weekends and can involve small groups or the entire camp.

The following ideas are a few of the possibilities open to the Coordinator to incorporate environmental education into camp life. In all instances it is essential to have participants directly involved in the activity.

1. Measure the camp's water usage, develop a water conservation plan, implement the plan and remeasure to note any change (same project with electricity).
2. Analyze the camp's garbage volume and characteristics (paper, organic, glass, etc.), develop plans to reduce waste (recycle if possible, use non-returnables, etc.), implement plans and analyze results.
3. Analyze impact of foot traffic and erosion on grassy areas of camp, develop and implement plans to limit erosion and traffic impact, and evaluate results.
4. Plan and develop an interpretive trail for the camp with the theme focusing on the environmental concepts (Appendix G, page 141).

In all of these activities, campers should contact resource personnel to obtain information to aid in the development and implementation of plans. For example, a soil conservation scientist could provide information on ways to limit impact on grassy areas or how to restore heavily used areas.

When considering camp activities, always confer with the camp superintendent to obtain ideas and approval prior to beginning the activity. The camp superintendent is a

valuable source of suggestions and ideas for implementing activities.

Educational Displays: Educational and interpretive displays, bulletin boards, reading tables and Johnny/Jane notes (environmental messages taped to the inside of bathroom stalls) can be used to reinforce and clarify weekly topics of the environmental education program.

Interpretive displays take many forms and fit many situations (Appendix G, page 141). Displays can demonstrate environmental concepts, resource management techniques, and relevant environmental issues. When developing the environmental education program, the Coordinator should use displays to help achieve behavioral objectives. These displays can be placed in the camp library, recreation room, dining room, or on the camp bulletin board. Prior to implementation, the Coordinator should discuss display content and placement with the camp superintendent.

Display themes can change in conjunction with the concepts of the environmental education program. Displays need to be well done and well maintained; a poor display is uninviting to the learner and projects a poor image of the environmental education program and the camp.

Meal Time Discussions: Each camp has time set aside either before or after the meal for daily progress reports from work crews and announcements concerning evening activities. This time can be used to briefly introduce or review an environmental concept or to ask campers to share an "en-

vironmental happening" of the day. These experiences can provide personalized views and descriptions of environmental subjects which in turn can stimulate other camper's interest and involvement.

For example, during a meal time discussion, a forestry crew member may share the sighting of an owl. The Coordinator can ask the camper to explain what features of the owl the crew noticed, did the owl fly quietly, what type of habitat was it in, etc. The Coordinator can explain the adaptations owls have for silent flight and ask why these adaptations are needed. Further information about owls can be displayed in the camp library. If there is enough interest, an evening presentation on owls can be scheduled.

Meal time discussions should be brief. The Coordinator should use the discussion to excite campers and get them interested in sharing what they observed during the day.

Travel Time: The drive to and from the work project site can be an important part of the environmental education program. Capitalizing on travel time is a skill. To aid in the achievement of behavioral objectives, the Coordinator and counselors can plan some of the travel experiences ahead of time. DNR work project supervisors and resource personnel can provide information concerning educational stops/sights that are relevant to the work project and the environmental education program.

During travel time, counselors can point out different ecosystems, human impacts on natural resources, resource management techniques, and relate these to the work projects. The counselors can also use animal and bird sightings to reinforce environmental education concepts.

For example, on the way to a work project a pair of Baltimore (northern) orioles are sighted. The van is slowly pulled over to the side of the road to allow the campers to observe the orioles. The following topics could be discussed: why coloration is different on the male and female birds, what niches birds fill, what type of nest orioles build, where to watch for oriole nests, and what other colorful birds to watch for. The sighting can be used to explain an environmental concept (adaptation and niche) and to provide campers with interesting examples which keep them investigating their surroundings.

During travel time, the Coordinator's and counselor's first and primary concern is SAFETY. Road traffic must always be given full attention.

Spontaneous Activities: Spontaneous activities will often occur on work crews, during travel time, during field trips, or during educational activities. These activities, referred to as teachable moments, occur when a hawk swoops down next to the crew and picks up a mouse, or a fox runs across the road, or a wildflower is in bloom.

Teachable moments can be used to capture camper interest and enthusiasm. The Coordinator should expect them to occur

and capitalize on them. Just because an experience does not aid in the achievement of a behavioral objective or fit into a planned activity does not mean that it should be overlooked. Spontaneous activities complement the environmental education program. The sighting of a fox can lead to discussions on food chains or the role of predators. The hawk and mouse exemplify interrelationships. Smelling a prairie rose can tune a camper's senses to Wisconsin's natural resources. A discussion about the types of flowers present on Wisconsin's roadsides may encourage campers to begin looking for flowers and exploring the environment on their own. See Appendix I, (page 154)for further explanation of teachable moments.

Educational Activities: The Coordinator can develop or adapt educational activities to achieve environmental education goals/objectives. These educational activities can take place on work projects, as part of field trips, during recreational outings, or as optional evening activities. The development of educational activities is discussed on page 46.

Educational Simulations and Case Studies: These are two additional educational devices which can be developed within environmental educational activities. Bottinelli (1977) effectively explains environmental simulations/games as follows:

> "Environmental simulations/games provide students with models of the real world, paradigms through which they may interact and experiment with alternative strategies toward the resolution of local, state, or environmental

> problems. Since so few people wish to risk the consequences of experimenting in the real-world situation, the use of environmental simulations and games can be a valuable educational technique. Students may assume roles, face environmental problems, formulate strategies, make decisions, and obtain feedback on the consequences of their decisions. Additionally, the student must apply the facts and concepts undergirding the environmental simulation in order that he can effectively "play the game." Motivation, concept learning, the application of facts to problem-solving, and the examination of alternate solutions to the population/resources/environment crisis appear to be improved through the use of efficient and realistic environmental simulations and games."

The following description of GOMPSTRON: A POLLUTED CITY summarizes what is contained in an environmental simulation.

> "GOMPSTRON: A POLLUTED CITY (Grades 9-12, college, adult): This simulation game focuses on a case study of a hypothetical city, Gompston, entangled in the throes of an advanced stage of air and water pollution. During the course of play (four to seven class periods), students assume the roles of forty local and state officials as they conduct a town meeting to discuss their problems and find solutions to their local environmental crises. A filmstrip and audio cassette provide participants with the history of Gompston and glimpses of various sections of the floodplain city. Students are motivated to research pollution abatement technologies and to devise solutions to Gompston's problems while attempting to retain their own special interests. That there are no simple solutions to extremely complicated problems and that trade-offs must be are the dual themes of GOMPSTON."

There are environmental simulations developed that can be presented in a smaller time frame and easily adapted to the YCC program. The U.S. Forest Service's (1977) "Investigating Your Environment Series - A Land Use Simulation" is a good example (Appendix J, page 157).

Case studies often used in conjunction with a simulation game provide learners with a condensed study of an environmental issue. Case studies can be used to provide

campers with "real life" descriptions of resource management or environmental issues. Campers can learn management and action strategies which may be useful to them in similar situations. Often times case studies describe one or more instances of citizen action and explain the issue which prompted the action. In developing case studies, reprints concerning an environmental issue are obtained from newspapers, journals, and magazines. Together these articles present an overview of an environmental issue and the citizen action taken in regards to the issue.

Audio-visual Aids: Educational films and slide programs can provide entertainment, education, and variety to the environmental education program. Most audio-visuals are presented during the evening. They can also be used to take advantage of time on rainy days when a work crew may find unsafe conditions on the work project site and alternate work is difficult to find.

A good source of audio-visual material is the Bureau of Audio-Visual Instruction (BAVI) University of Wisconsin-Extension. A BAVI catalog is available at each camp for the Coordinator's use in renting audio-visual materials.

Each camp has money available for audio-visual rental. The Coordinator should obtain funding approval from the camp superintendent.

Developing Behavioral Objectives

It is the responsibility of the Coordinator to develop an environmental education program to achieve environmental education goals. Behavioral objectives are the Coordinator's statements of what s/he feels campers should do to achieve an environmental education goal. Behavioral objectives state:

- what a camper is supposed to do to accomplish an environmental education goal
- how s/he is supposed to do it
- how much s/he is to do

For example, Environmental Education Goal #2 is...To increase participant's awareness of their environmental surroundings by providing a foundational base in Ecological Principles that govern the Environment.

2.1 Identify types of ecosystems and their components within the area encompassed by camp activities.

2.2 Understand the ecological concepts listed under Goal #2.

It is the Coordinator's responsibility to develop behavioral objectives stating how the Coordinator feels a camper should demonstrate the achievement of an environmental education goal. The following behavioral objectives for Goal #2 are taken from the Sample Environmental Education program (Appendix E, page 120).

Sample Behavioral Objectives

Campers will be able to describe an ecosystem as an ecological unit including the community of plants and animals

as well as the interacting abiotic (non-living) factors within the environment.

Campers will investigate the following ecosystems:

deciduous hardwood forest	pond
pine plantation	lake
prairie/open field	marsh
agricultural field	stream

Campers will compare their investigation findings for deciduous hardwood forests with pine plantations; open fields with agricultural fields.

Campers, while investigating an ecosystem, will list members of the ecosystem that are present and predict other members of the ecosystem as well as describe the interrelationships within the ecosystem.

Using the information gathered in the investigation, campers will describe the ecological community, its members, their niches, and the interrelationships by completing the following:

- diagram a food chain of 6 members designating the producers, consumers (herbivores, carnivores), and decomposers
- diagram a food web utilizing the food chains made by fellow campers
- diagram a model of an ecosystem (biotic and abiotic)
- participate in a discussion comparing ecosystems (complexity, members)
- predict the future characteristics of the ecosystems
- give four reasons why such an ecosystem is useful
- diagram an ecosystem operating at carrying capacity
- diagram an ecosystem operating beyond carrying capacity
- diagram the abiotic factors of an ecosystem
- provide four examples of animals or plants and their adaptations

After behavioral objectives have been developed, the Coordinator can design or adapt educational activities to focus on achieving those behavioral objectives. All of the

behavioral objectives may not be achieved through one activity. In fact, behavioral objectives can be accomplished through a number of activities during the camp session. These activities may include educational field trips, evening presentations, educational activities, or recreational activities.

The Coordinator will also use behavioral objectives to evaluate the environmental education program and educational activities. Clearly stated behavioral objectives provide the Coordinator with stated activity/program objectives. If the program objectives are met through the activity, the activity is successful under those terms.

The following information concerning behavioral objectives is provided in the U.S. Forest Service's "Investigating Your Environment Series - A Lesson Plan for Developing Environmental Investigations," (1977):

Behavioral Objectives.

Many instructional specialists contend that the single most important instructional advance of the past several decades is the current quest for clarity in the statement of educational outcomes. Today more than at any previous time in educational history, educators are being urged to clarify the descriptions of the outcomes they hope to achieve through their instructional efforts.

It is important that we be able to distinguish between instructional objectives which are well formed and those which are not. Well formed objectives possess a tremendous advantage over other objectives in that they reduce ambiguity.

This ambiguity reduction leads to significant dividends in planning instruction and evaluation. The less ambiguity that surrounds a statement of an educational outcome, the more cues we have regarding what kind of instructional sequence will prove effective. The less ambiguity, the more readily we can devise precise measures to reflect that outcome. Well formed objectives thus constitute a useful mechanism for improving instruction and evaluation. (From stating educational outcomes SW Regional Laboratory for Education R & D).

Some Guidelines for Developing Behavioral Objectives

1. An objective describes an expected change in the learner's behavior.
2. When the learner has DEMONSTRATED this behavior, the objective has been achieved.
3. An objective is a group of words and symbols which communicate the expectation of the learner so exactly that others can determine when the learner has achieved it.
4. A meaningful stated objective, then, is one that succeeds in communicating your expectation for the learner.
5. The best objective is the one that excludes the greatest number of possible alternatives to your goal. (No misinterpretation)

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Criteria

1. Have you identified who the learner is?
2. Have you described the behavior the learner will demon-

strate as evidence that he has achieved the performance task?

Is it measurable action or performance by the learner? (see list of Action Words)

Action Words

Here are nine action words from the American Association for the Advancement of Science that apply to curriculum related activities in the environment. These are not the only usable action words.

Identify - The individual selects a named or described object by pointing to it, touching it, or picking it up.

Name - The individual specifies what an object, event, or relationship is called.

Order - The individual arranges three or more objects or events in a sequence based on a stated property.

Describe - The individual states observable properties sufficient to identify an object, or relationship.

Distinguish - The individual selects an object or event from two or more which might be confused.

Construct - The individual makes a physical object, a drawing or a written or verbal statement (such as an inference, hypothesis, or a test of any of these).

Demonstrate - The individual performs a sequence of operations necessary to carry out a procedure.

State a Rule - The individual communicates, verbally or in writing, a relationship or principle that could be used to solve a problem or performs a task.

Apply a Rule - The individual derives an answer to a problem by using a stated relationship or principle.

(USDA/USDI: 1977)

Designing the Environmental Education Program

It is desirable for the Coordinator to pre-plan the majority of the environmental education program prior to arriving at camp. Pre-planning is not mandatory, but it can increase the quality and effectiveness of an environmental education program.

Developing an Instructional Plan: After the Coordinator has become familiar with the material presented in the Comprehensive Outline Phase I (page 19), s/he can begin to design the environmental education program.

Farr, Milbrath, DiCerbo, and McGregor (1980) evaluated the federal and state YCC environmental education programs; testing campers in various content areas before and after the camp session. Campers exhibited greater increases in knowledge in areas that were directly related to daily work project and camp life activities. During the planning of the environmental education program, the Coordinator should relate the environmental education goals to the work project and camp life. Findings of the Farr et.al (1980) study are provided in Appendix K (page 168).

Eight hours of the 40 hour work week are spent on environmental education. (Campers are paid for 32 hours of work/week.) This time period, however, need not be the only time when environmental education activities occur. Additional environmental education programming can be woven into various camp activities including work projects, field trips, evening presentations, meal time question and answer periods, and recreational activities.

The Coordinator should use these educational opportunities to develop an instructional procedure which determines how the environmental education goals will be achieved. The Coordinator should consider the following:

1. What goals/objectives need to be achieved?
2. What goals/objectives can be achieved through the work project?
3. What educational methods can be used to achieve the remaining goals/objectives?
4. How will the educational methods be used (instructional procedure)?
5. How will the achievement of behavioral objectives be evaluated?

Developing Educational Activities: The University of Wisconsin-Stevens Point's Central Wisconsin Environmental Station's activity format and the U.S. Forest Service's plan for developing Environmental Investigations is used here to explain the development of educational activities.

The Central Wisconsin Environmental Station environmental education activity format presents an activity in

in three parts:

Warm-up - Introductory activity or experience to introduce concept. Develop interest in subject. Involves everyone.

Activity - Main activity focusing on involving participants in an environmental investigation. An activity to gather information and personal experience of concept.

Pulling Things Together - Discussion or sharing session used to tie concepts together. Relates the activity to the participants.

Additional information also needs to be considered when developing an educational activity. The following description is a complete outline of a CWES Unit.

A. Educational activity (adapted from Central Wisconsin Environmental Station format)
   1. In a Nutshell - A concise description of the activity.
   2. Behavioral objectives - Quantitative statements identifying measurable learner outcomes, that can be expected from the student following the activity.
   3. Learning Station - A description of the type of area needed for the activity.
   4. Materials Needed - A complete list of equipment, books, data sheets, and other materials the instructor will need for the activity.
   5. Preparation Needed by Counselor - Instructions to prepare the person teaching the unit. Should include such items as familiarizing themselves with area, preparation of special equipment, familiarizing counselors with concepts and other appropriate information.
   6. The Activity - A narrative description of the activity including appropriate questions to be asked. Broken into:
      a. Warm-up - Directions and techniques for introducing the concepts and activity.

b. Activity - Directions and teaching techniques for leading the activity or activities.
c. Pulling Things Together - Directions and teaching techniques for leading a discussion or sharing session to tie together the concepts and conclude the activity.

7. Method of Evaluation

See example on next page.

Water Chemistry

In a Nutshell

Students will investigate two different water bodies: a deep lake, and a pond. Using various testing equipment, they will examine and compare various abiotic factors in the two water bodies. Discussion will focus on how the abiotic factors affect the living aquatic community. High School level, warm months.

Behavioral Objectives

Upon completion of this unit, students will be able to:

..test for the following factors: temperature; dissolved oxygen; pH; nitrogen; phosphates.
..explain the relative importance of each of the above factors to members of the aquatic community.
..state 2 examples of how these factors are interrelated.
..state 3 ways man can affect the aquatic ecosystems through abiotic factors.
..explain how the abiotic factors together affect the type of aquatic plant/animal community found.

Equipment

2 of each of the following:
- thermometer
- dissolved oxygen test kit
- pH test cube
- phosphate test cube
- nitrogen test cube

data sheets (for pairs)
clipboards (for pairs)
pencils (for pairs)

Learning Station

For the lesson select either a deep clear lake or a shallow pond where easy access to the water is available. At the Station, we use Sunset Lake, Minister Lake or the Sunset Sloughs.

Preparation by Leader

Familiarize yourself with the learning station and the use of the various equipment. Review the water chemistry insert and be prepared to discuss the various aspects of each of the factors being tested.

Warm-Up

Take your group to the learning station. Explain that they will be testing the chemical characteristics of an aquatic ecosystem. Make sure they understand the concept of ecosystem (all the living and nonliving components interacting in a given area).

Ask the students why testing of water bodies is necessary. What would they want to find out about the water? Who would want to know this information. Draw out the idea that biologists are interested in the ability of the water to support various life forms: health officials are interested in how safe the water is for human recreation and consumption.

Ask which tests the group feels would be important to do in order to find what organisms could survive in a body of water. Explain that there are a large number of tests which could be done, but that today you are concentrating on temperature, dissolved oxygen, pH, nitrogen and phosphates.

Explain that the non-living factors which affect an aquatic ecosystem are refered to as abiotic factors. All the tests to be done are measuring various abiotic factors. Ask for other examples of abiotic factors (micro and macro nutrients, sunlight, soil or bottom type, depth, size, etc.)

Briefly review the abiotic factors the group will be testing (the insert contains detailed background information):

Temperature. "Why test for this? How can temperature affect the water and what lives there? What influences the temperature of a water body? What other factors might temperature influence?"

Dissolved Oxygen. "Why is oxygen important in the water? How does it get into it? How does it affect the aquatic community? What influences the amount of dissolved oxygen in a water body?"

pH. "What does pH measure in the water? What does it tell you about the water and the organisms that can live there? What influences the pH level of a water body?"

Nitrogen. "Why is nitrogen important to community members? How does it get into the water? How does an abundance or lack of nitrogen affect the quality of water and community members?"

Phosphate. "Why is phosphate important to community members? How does it get into the water? How does an abundance or lack of phosphate affect the quality of water and community members?

Activity

Divide the group into two teams. Provide each team with a clipboard, data sheet and pencil. Have each team examine the water body and predict what community members might live there (left, bottom column of data sheet). In addition, have them record their aquatic plant and animal observations and predictions.

Distribute one set of testing equipment to each team. STRESS careful handling of all testing equipment (especially thermometers), and careful reading of kit instructions. Allow 20 to 30 minutes to perform the tests. The kits are easy to use if the directions are followed, and you should not need to demonstrate their use. The two teams should be widely seperated, testing in different parts of the water body (i.e. open and weedy areas; shallow and deep water; sunny and shady areas; etc.) Circulate between the teams and assist when necessary. Results should be recorded on the top half of the data sheet.

When both teams are done, have them come together and pool their results on the data sheet. Have the teams use their data and determine what organisms could live in the water body (right column of data sheet). What differences occured between the right and left column? Why?

Pulling Things Together

Discuss the following questions with your group:

"Are the results what you expected to find? What would be the reasons for differences?" Examine results for each abiotic factors.

"What do the results tell you about the suitability of the water for various aquatic organisms?"

"Is their a high nutrient (phosphate/nitrate) level? Why or why not? How does this affect water quality? Where do the nutrients come from and/or go?"

"How are temperature and dissolved oxygen related? How would this affect the aquatic community?"

"Is the pH what was expected? Why is it more alkaline or more acidic than neutral? What caused this?

"Would you expect the same results at different times of the year? Why or why not?"

Allow a few minutes to discuss how man might influence these factors in the ecosystem.

"Do any of the results reflect influences from man? How has man influenced this water body? Is it positive or negative?"

"How can man affect the abiotic factors in an aquatic community? How do our activities affect the quality of water? What is the impact (long and short termed) on members of the aquatic community?"

Discuss several examples, familiar to the students, which exemplify man's impact on aquatic ecosystem (detergent phosphate, pesticide pollution, acid rain, thermal pollution, feedlot runoff, etc.)

Option

If time permits bring your group to a different type of water body and repeat the activity.

Place the results from all the water bodies on a chart and compare similarities and differences.

"How are the water bodies different? What might account for these differences in these abiotic factors?"

"How have these differences affected the organisms which live in the ecosystem?"

"Are there any similarities between the sites? Is this reflected in the plant/animal community?"

"Are there examples of one abiotic factor affecting another factor?"

"Has man affected any of the similarities/differences observed? In what way? If the impact is negative, how could it be prevented? Has this impact been reflected in the plant/animal community? Is the impact the same in each water body?"

WATER CHEMISTRY DATA SHEET

Water Source _____

	Group I	Group II	Average
Temperature			
Dissolved Oxygen			
pH			
Nutrients			
Phosphorous			
Nitrogen			

Aquatic Plants

None	Few submerged plants (Underwater)	Abundant submerged plants with emmergent plants

Aquatic Animals (record your observations and/or predictions) _____

Predict whether your group thinks the organism below lives in this lake			Tolerance levels for life, growth and reproduction			Estimate whether organism lives in lake based on measurements	
ORGANISM	Yes	No	pH	Dissolved O2 (min.)	Temperature	yes	no
Trout			7.0-9.0	7 ppm	32-68°		
Bass			6.5-8.5	3 ppm	32-80°		
White Sucker			6.0-9.0	3 ppm	32-80°		
Mayfly			7.0-9.0	NA	32-68°		
Caddis Fly			7.0-9.0	NA	32-68°		
Snails;clams			7.0-9.0	NA	NA		
Crappie			6.5-8.5	3 ppm	32-80°		
Bacteria			1.0-13.0	NA	NA		
Most Aquatic Plants			6.5-12.0	NA	55-80°		

st possible limiting factors to organisms (depth, vegetation, concentration, pesticides, man activity, phosphates, nitrates, etc.): _____

mments: _____

E CENTRAL WISCONSIN ENVIRONMENTAL STATION
81

The U.S. Forest Service's (1978) "Investigating Your Environment Series - A Lesson Plan for Developing Environmental Investigations" presents the following three part method for developing environmental investigations.

Pre-investigation questions - questions designed for maximum group response and interaction. The pre-investigation questions can create interest and motivation for the audience to gather data. What can we find out about this log? What might be important to look at?

Investigation - The Forest Service environmental investigation utilizes task cards. Cards are self-directed educational devices used to promote individual and small data-collecting and interpretation. A task card may simply be a card with the directions for a learning experience written on it.

Guidelines for developing task cards:

- have one specific goal;
- keep task brief enough to maintain interest and sequence;
- keep directions simple;
- should fit within a time limit;
- some form of self-evaluation statement;
- use processes of observing, collecting, recording, and interpreting data.

Task activities should:

- involve the environment;
- be relevant to the learner's world (age level, topic, etc.);
- include opportunities for problem solving;
- include opportunities for the learner to collect and record data based on her/his own observations;
- include opportunities for the learner to make her/his interpretation about the data s/he collects.

Post Investigation discussion - A discussion using the following Basic Question Sequence to discuss the investigation and tie everything together.

A Basic Question Sequence for the Interpretation of Data Process

It can be important to develop a basic sequence to allow people to interpret their own observations in the interpretation of data process.

There are four basic question categories that can be used in this process. Select a topic (common to all) about which they should write the questions. It could be something in the immediate area or room.

1. Open Questions
   Open questions are designed to provide an opportunity for all persons to participate and to obtain a body of specific data which will provide the opportunity to focus on significant points.

   This type of question provides an opportunity for every person to become immediately involved in the discussion, regardless of his or her ability or background. It is completely free of the element of "guess what's on my mind." Since the response depends on the viewpoint of the participant, there are no wrong answers.

   The characteristic of this question is openness.
   "What do you see as you look at the hillside?"
   "What do you notice about the soil profile?"

2. Focusing Questions
   The focusing question is an extremely important element in the interpretation of data process. It focuses on specific points that will later be compared, contrasted, and related to other points.

   Its basic purpose is to focus the attention on specific data as a central point for discussion.

   The characteristics of this question is specificity.
   "What are some things that are helping the log decay?"
   "What are some things that affect the quality of water?"

3. Interpretive Questions
   Interpretive questions are designed to compare, contrast, and seek logical relationships between the specific points brought out in the focusing question(s).

The learner is asked to compare and contrast two or more specific points in the data; two or more groups of data; two or more feelings, concepts, or ideas, and express a perceived or inferred relationship between them.

The characteristic of this question is its focus on relationships.
"Are there any of these that seem to belong together?"
"What can we say about the pH of the water from the aquatic life found there?"
"How do you account for the differences between these two areas?"
"Why were the two trees the same age but different in size?"

4. Capstone Questions
Capstone questions are designed to obtain conclusions, summaries, and closing.

They occur at the close of a particular discussion and call for a statement which summarizes in a generalized form what has been discussed so the generalization or big idea applies to a variety of situations.

The characteristic of the capstone question is its conclusiveness.
"How could we summarize our discussion about architecture?"
"Based on our observations and discussion, what can we say about urban environments?" (U.S.D.A.; 1978)

When developing an environmental education activity, Stapp and Cox (1979) recommend that the following ideas be considered:

a. "Behaviors that are positively reinforced are most likely to recur.

b. The most effective effort is put forth when students try tasks that fall in the "range of challenge" -- not too easy and not too hard -- where success seems likely but not certain.

c. Students are most likely to throw themselves wholeheartedly into any project if they themselves have

a meaningful role in the selection and planning of the enterprise.

d. Reaction to excessive direction of the teacher is likely to be apathetic conformity, defiance, or escape.

e. The learning process ought to involve dynamic methods of inquiry.

f. Learning takes place through the active behavior of the student. It is what s/he does that s/he learns, not what the teacher does. The essential means of an education are the experiences provided, not the things which the student is merely exposed to.

g. One of the keys to motivation is a sense of excitement about discovering for oneself, rather than having a generalization presented by a teacher and requiring a student to prove it.

h. Helping citizens to acquire technical knowledge alone regarding an environmental problem may not increase their concern for the problem.

i. Citizens are more likely to become involved in environmental issues if they personally believe they can have some effect upon decision-making."

Coordinating and Facilitating Staff Involvement: Upon arrival at camp, the Coordinator should show the prepared environmental education program to the camp superintendent and staff. The Coordinator should solicit additional ideas, and confirm that planned activities are compatible with work projects and camp activities.

If possible, the Coordinator should visit the work project sites with the work project counselor and explain the ecological communities present on the site as well as provide the counselor with examples of how the site can be used to conduct environmental education activities. The Coordinator should also visit with project supervisors and discuss their role in the environmental education program.

It is also important that the Coordinator work with the Camp Superintendent and communicate the various aspects of the environmental education program to staff members. The following is a model for communication with the staff:

Friday: Provide each counselor with an outline of the following week's environmental education program along with background material concerning the topics to be covered. The counselors should or can have the material read by Monday morning.

Monday morning: Prior to breakfast, the Coordinator can meet with all staff members to discuss the week's environmental education activities and find out who will need help in conducting activities that they are scheduled to lead.

The Coordinator can spend the rest of Monday preparing the additional materials counselors have asked for. During the week, the Coordinator should visit crews and help counselors with the environmental education activities.

Every summer prior to camp, the DNR Environmental Education Coordinator holds a training session for all YCC camp staffs. If the Coordinator is planning on counselors to lead environmental education activities, a training session could be conducted to help staff: 1) understand environmental concepts, 2) understand activity content, 3) develop techniques to lead activities, 4) develop skills to lead discussions with campers, 5) develop techniques to utilize work sites in teaching environmental education, and 6) realize how to utilize teachable moments. During the YCC staff orientation week the YCC Environmental Education Coordinator can continue to identify and meet the environmental education needs of the counseling staff.

Stapp and Cox (1979) suggest that the training session "should help staff acquire the concern, knowledge, and skills that will enable them to do the following:

a. Successfully explore relevant environmental issues with learners;
b. Encourage learners to express their feelings, perceptions, and ideas;
c. Foster an atmosphere where information and ideas can be freely expressed and exchanged and the views of individuals and organizations heard and respected;
d. Encourage participants to analyze and clarify personal values;
e. Serve as a resource person in assisting learners in acquiring information;

f. Assist in the implementation of appropriate solutions devised by learners."

Stapp and Cox further suggest that training sessions include:

g. "Orientation of staff to the philosophy and structure of the environmental education program;

h. Discussion and development of written guidelines on: Ways to integrate environmental education into the YCC program;

i. The role of the Coordinator and counselor in selecting, planning, executing, and evaluating environmental education programs;

j. The (DNR's) administrative policies and procedures that relate to environmental education;

k. Handling of value analysis and clarification;

l. Handling controversial issues."

Pre-Assessment

Pre-assessment of camper knowledge, in the areas to be covered by the environmental education program, can help the Coordinator determine whether campers have the prerequisite knowledge and skills to participate in the environmental education program that the Coordinator has designed. The Coordinator can use pre-assessment to determine which environmental concepts will be relatively new to most campers and which concepts are already understood. The Coordinator can then modify the environmental education program according to pre-assessment findings.

Since campers begin the environmental education program the day following their arrival at camp, it is not easy to obtain pre-assessment information to use in initial pre-camp program development. The best way to gather pre-assessment information for initial program development is to assess campers prior to their arrival via mail. Mailing costs can be a limiting factor for a pre-assessment mail program; this should be discussed and resolved with the Camp Superintendent.

Pre-assessment provides information about camper's environmental interests, their environmental education expectations, and what they would like to learn. This information can be used to develop optional evening activities, field trips, or presentations that will capitalize on camper interests.

Surveys can also assess camper attitudes toward the environment. A study by Burrus-Bammel (1978) measured attitudes toward environmental topics held by campers attending The West Virginia Forest Industries Camp. The test was administered before and after camp (Appendix L, page 173). Likert-type scales are often used to measure attitudinal change. These scales have campers respond to statements by circling SA (strongly agree), A (agree), D (disagree), SD (strongly disagree), or DK (don't know).

A test can also pre-assess camper environmental knowledge and be compared to post-test scores. Burres-Bammel (1978) used a test to measure conceptual and factual knowledge (Appendix M, page 176). The Federal YCC Environmental Awareness test which was used to assess camper knowledge before and after attending camp is provided in Appendix N, (page 179)

Evaluation

At the end of each summer, the Coordinator is required to submit an environmental education report to evaluate the YCC environmental education program.

Evaluation evidence is needed to establish program effectiveness. This evidence can be of a formal statistical nature or it can take other forms (O'Hearn, 1982). Passineau (1976) suggests the following forms of evaluation:

- informal teacher observation
- formal tests
- attitude scales

- unobtrusive observations

- field tests

O'Hearn (1982) states the "the most compelling evidence for evaluation comes directly from students in terms of reports, drawings, and projects..." This evidence can be easily correlated to document the successful achievement of program objectives if behavioral objectives have been written clearly and specifically.

An environmental education program evaluation has two components:

I) Program description

II) Judgment of program effect

The Educational Systems Model has three categories which further describe the aforementioned components.

I. Program Description

A. Input: Student knowledge or attitudes the program is addressing (this can be pre-assessed findings or camper abilities and/or the behavioral objectives).

B. Process: Instructional procedure used to affect student knowledge and attitudes.

II. Judgment of program effect

C. Outcomes: Results noted on camper knowledge and attitudes. The outcomes can be measured with a test or evidence can be given to prove campers have mastered the behavioral objectives through projects, interviews, essays, drawings, personal involvement, or actions.

The Educational Systems Model can be used to develop a systematic approach to organizing the end-of-the-summer YCC

Environmental Education Report evaluating the environmental education program. The Coordinator should:

I. Describe the environmental education program.

A. Pre-assessment procedure and findings
Environmental education behavioral objectives

B. Instructional procedure - weekly description of the following:
1. Work Projects: Educational activity and behavioral objectives
2. Evening Presentation: Subject, objectives
3. Educational Field Trip: Theme, objectives, visits
4. Educational Displays: Theme, design
5. Weekend Activities
(See Appendix O, page 195, for Daily Accomplishment Chart to aid in logging Environmental Education Events.)

II. Judge the effect of the Environmental Education Process

A. Evaluation of each activity should cover:
1. Behavioral objectives met
2. Examples of camper achievements
3. Evaluation techniques used
4. Camper evaluation responses
5. Staff responses
6. Quality of activity
7. Problems that arose during activity
8. Methods of improving activity
a. Changes in activity
b. Additional information needed
c. Equipment needed
d. Changes in methods of communicating activity to YCC staff and campers

B. Evaluation of overall environmental education program
1. Objectives achieved
2. Objectives unable to achieve and why
3. Pre-assessment findings vs. post-assessment findings
4. Overall camper comments
5. Overall staff comments
6. Overall administrative comments
7. Integration of WORK/EE
8. Suggestions for program improvement

9. Environmental Education Needs:
   a. Additional orientation information for Coordinator prior to arrival at camp
   b. EEC training needs at staff training session
   c. Counselor training needs at staff training session
   d. Educational equipment needs

To aid in the evaluation process, there are sample evaluation forms in Appendix P, (page 199). These can be used to evaluate the Environmental Education manual, the behavioral objectives, the instructional procedure, the environmental education activities, and the overall environmental education program. The evaluators can include campers, counselors, the Coordinator, and the camp administration.

Every component of the environmental education program should be evaluated. One copy of the evaluation report should remain at the camp as a file copy and additional copies should be sent to the YCC Chief and the DNR Environmental Education Coordinator.

After analyzing the Environmental Education Reports, the DNR Environmental Education Coordinator can:

1. Develop additional orientation materials
2. Supplement the environmental education manual
3. Develop specific or new or additional education materials
4. Plan a spring training session to focus on:
   a. Improvements of YCC Environmental Education Coordinators' skills
   b. Strengthening YCC staff environmental education skills and understanding

SECTION 4
ECOLOGICAL DESCRIPTION OF 4 WISCONSIN HABITATS

Forest Habitat

Imagine for a moment that the farms so common to Wisconsin's landscape were to vanish. In their place, substitute largely unbroken forest in the north and forest interspersed with extensive grassland in the south. The resulting landscape would be the countryside known to the native Indians and first white settlers of our state. Then, forests covered over 22 million acres, roughly 63 percent of the total land surface. Many of these woodlands were climax forests, forests dominated by trees capable of regenerating themselves under the shade of their own canopy. Mature trees of these forests were often several hundred years old and the product of a process (succession) other hundreds of years in the making.

In the north, hardwood forest characterized by sugar maple, yellow birch, and hemlock dominated the land. White pine took over the dominant role in drier areas, while in wetter areas black spruce, black ash, and tamarack prevailed. In the northernmost corner of Wisconsin and at the tip of Door Peninsula, a small band of boreal forest fringed the cool shores of Lakes Superior and Michigan. White spruce and balsam fir, both typical of the vast forests of Canada, were the main species there.

Hardwood forests also dominated in the south, but the sugar maple stood among basswood, slippery elm, and ironwood. Dry areas supported a variety of oak species, while wet lowland areas of river valleys and lakeshores supported silver maple and American elm. Grasslands surrounding these southern woodlands were the direct result of burning, both by natural fires and by the centuries-old Indian practice used to concentrate game animals and create open areas for travel. Without these fires, most of the land we now call Wisconsin would have been covered by forest. The combination of forest and grasslands benefited wildlife by creating a forest edge, a rich source of food for many species and important to their survival. In northern areas where few grasslands occurred, openings caused by fallen trees or natural burns were likewise beneficial to wildlife. Thus, while forests dominated the landscape, their habitat potential was enhanced by open areas.

White settlement brought drastic changes to Wisconsin's forests. Southern forests were the first to feel the axe as land was cleared for farming. Although clearing these forests was back-breaking labor, early settlers preferred these areas to the open prairies and savannas, which were looked upon with suspicion because of their treelessness and avoided because of their thick sod. Since trees were considered obstacles to farming, forests were cleared as quickly as possible, with all cleared trees not used for local building simply burned.

However, in the north, forests were viewed as a resource to be harvested. Logging began around 1840 and reached its peak by the turn of the century when Wisconsin was the leading lumber-producing state in the nation. High market demand and competition for the lumber led to frenzied cutting, which took a heavy toll on the land. Fires swept through cutover areas, denuding the land and damaging the soil. Large areas became wastelands sparsely covered by weeds and grasses. Later, aspen and other pioneer species sprang up under conditions not suited to the original forest components, setting the forest back to its earliest stages of development.

Today, trees again cover much of Wisconsin but we are many years away from the original forests that graced the land 150 years ago. Oaks dominate in the south with young maples and basswood just beginning to come in. In the north, aspen, birch, balsam fir, pine, and maple are found, most of them young stands. Pockets of original relatively undisturbed forests are found in a few areas of the state and are extremely valuable reservoirs for a host of rare plants. Many are protected in state scientific areas, but others are jeopardized by development. All deserve special attention, for they represent what none of us will see develop again in our lifetime.

Let's back up for a moment and look at what a forest is. Of course a forest is trees, but there's much more to it than that. Thought of in terms of habitat for plants and animals, a forest is a sheltered area protected from extremes of wind and rain. Besides the canopy of mature trees, it has a ground layer composed of herbs and shrubs and an understory of young trees, both adapted to the particular level of sunlight reaching them through the screen of leaves overhead.

In mature forests, sunlight may be so limited that the ground layer is practically free of growth except in early spring, when a host of plants pops up and matures in the short period before leaves develop on the trees. In younger forests, the ground layer may be a tangle of vegetation so thick that it is almost impossible for humans to walk through, although smaller animals move through it with ease. The understory and mature trees of the canopy offer height, thus adding an important dimension to the forest habitat. Since forests are dynamic living systems, they contain dead trees as well as living ones, some of them fallen to the ground and decaying, all providing food, home, or substrate for a variety of plants and animals.

Even though forests share many things in common, they are not all the same. Each stand of trees requires certain soil and moisture, harbors particular species of trees, is attuned to a certain climate, and exists at any one time at a certain stage of development. All of these factors influence which plants and animals live within a given forest. In the case of endangered and threatened forest species, some factor or factors available and favorable in the past are no longer present or have dwindled. The problem may be a shortage of fallen trees for dens, inadequate buffer from man's activities, food contaminated by pesticides, or disturbance of the forest floor. Whatever the problem, the reaction of these species signals that the forest is not the same as it once was, and that they are worse off for the change.

/ater/Wetland Habitat

In the early 1800's, Wisconsin wetlands covered 10 illion acres, roughly one-quarter of the state's total rface area. Wetlands were so extensive in central Wisnsin that the area came to be known as the "great amp." Except for the steeply drained hillsides of the uthwest, wetlands were scattered throughout the ate, often covering huge areas. Whether they were lled swamps, marshes, sloughs, bottomlands, or bogs, ese wetlands had one thing in common: water. If they eren't outright wet with standing water, they were ggy. Poorly drained soils or exposed ground water acounted for the wetness in most cases, but the water as not deep enough or permanent enough to form a ke. For although wetlands are without doubt partly ater, they are also partly land. The robust plant comunities common to wetlands are clear indicators that here is soil not far below the water's surface.

The Indian inhabitants of Wisconsin and first white xplorers viewed wetlands as a valuable source of food nd fur and left them largely intact. Wild rice, blueberes, and cranberries grew abundantly; and waterfowl, sh, and fur-bearing mammals were attracted to wetnds in great numbers. Settlements were located near etlands to take advantage of this richness. So important was wild rice to the Indian diet that wars were ought over the harvest rights of wetland stands. Early ettlers used the drier lands to harvest hay and graze ivestock, and a few enterprising individuals made the rst attempts to grow cranberries commercially.

But this harmony between man and wetlands didn't ast forever. As Wisconsin's population grew larger and ressure mounted for agricultural land, wetlands fell nto disfavor. Viewed as wasteland because they could ot be cultivated and a public menace because they were thought to breed disease, wetlands were attacked with pioneer zeal. Drainage was the cry, and diking, ditching, and filling were the tools. Through the years, over 3 million acres of wetlands have been drained for agricultural use, most of them for corn and vegetable crops. Many other wetlands have been converted to pasture. However, some of the most ambitious wetland drainage schemes failed when fires swept the exposed peaty soils and early frost killed crops in land successfully drained. Many of these lands were simply abandoned, but some were reclaimed as fish and wildlife habitat. Such wetland reclamation marked the beginning of a swing back to a recognition that wetlands were worth preserving.

Today, an estimated 2.5 million acres of wetlands remain in Wisconsin. Public attitudes have come full circle, and wetlands are again looked upon as a valuable resource. Besides providing some of the last open spaces in urban areas, wetlands serve important biological functions. Acting as natural sponges, they absorb flood waters and nutrients that would otherwise erode the land and enrich our lakes and streams. Managed by man, they continue to produce natural crops of berries, hay, wild rice, and sphagnum moss. And for plants and wildlife, they carry on their centuries-old function of providing habitat.

Closely related to wetlands are lakes and streams, permanent bodies of water that support emergent plants only along their shallow fringes. They differ from wetlands by degree, their dominant feature being clearly water rather than land. In fact, most wetlands are lakes that have grown old and shallow, oxbows of rivers cut off from the main channel, or seasonally flooded river shorelands. Wisconsin's inland lakes cover almost 1 million surface acres, and if placed end to end, streams would measure 30,000 miles. In addition, Wisconsin is bordered by water on all but its southern edge, with two Great Lakes and the Mississippi River boundary waters adding huge acreages to the state's total. The number of lakes and streams has actually increased through the years by impoundments constructed for recreation and industry. However, their benefit to threatened or endangered species has, in most cases, been negligible.

Lakes and streams have always been exploited, first for their fishery resource and human transportation routes, later as market "highways" for logged timber, and more recently for their hydroelectric power. They also have a regrettable legacy of use as dumping ground for garbage, sewage, and industrial wastes. In contrast to wetlands, no waters were physically done away with through human use, but many were altered biologically by pollution, dams, and shoreline development. For the plants and animals living there, the effect was often devastating. Dams cut off migrating fish from their spawning grounds, pollution choked off life-essential oxygen, and shoreline development did away with feeding and nursery areas for wildlife and growing room for plants. Fortunately, much of this degradation has been reversed, and enlightened laws and public attitudes guard against future misuse of Wisconsin's water resources.

Seen as habitat for plants and wildlife, water/wetlands are a watery world where there is as much activity below the surface as above. Truly aquatic animals such as fish, mussels, immature amphibians, and many kinds of plants never leave the water, depending on it for oxygen as well as all the other essentials of life. For them, land is as foreign an environment as water is to humans. Air-breathing animals such as muskrats, ducks, and beaver use water to get around in their daily search for food, shelter, and safety. Clumsy and often laboriously slow on land, these animals become graceful and swift in the water. Some plants, known as emergents, live half in and half out of water also, using water for base support and nutrient absorption but using air for respiration and pollination. Many land animals frequent water/wetlands in search of food or drink, wading or dipping into the water whenever necessary but never completely at home there.

While water is the lifeblood of the water/wetland habitat, plants are its building blocks. Given sunlight, oxygen, and water, they manufacture their own food. Animals use plants in every phase of their lives, most importantly for food, shelter, and nesting cover. These animals are in turn used by other animals as food, increasing the size and stability of the water/wetland web of life. Plants also lend the dimension of height to the habitat, providing dry nesting or roosting sites for songbirds and insects. Where trees occur, other birds perch and nest, surveying the surrounding landscape for food from their lofty vantage points. Particular plants present in a wetland vary with the environmental conditions present. Cattails may dominate one wetland while sedges, sphagnum moss, or tamarack characterize another. But some will always be there, just as surely as water is there to bathe their roots.

Water/wetlands are among the most productive habitats on earth because of the combination of water and land. Yet they are fragile systems that can be upset, even destroyed, by a change in water supply or purity. For the plants and animals living there, such changes cannot be ignored. If the changes are drastic enough, those capable of leaving abandon the area and search for undisturbed habitat. Those that can't leave are faced with making do or dying out; many cannot adapt. The result in both cases is dwindling populations of plants and animals, and often not long afterward, lost species.

Prairie/Open Field Habitat

Early explorers of southern Wisconsin were greeted by vast grasslands, their long-stemmed plants undulating in the wind like ocean waves. These grasslands were largely woodless landscapes with trees completely absent or occurring in widely separated clumps, much like islands in a sea of grass. Early accounts describe this sparse tree cover as looking hand planted, so unnatural was its spotty distribution. The explorers had never seen anything quite like these grasslands, and were at a loss to name them. Eventually, the word "prairie", a French word meaning meadow, was used for the treeless areas, and the name remains today. The term "savanna" was coined for the treed grasslands, a word picked up by far-wandering explorers from tropical Indians living among similar landscapes.

In presettlement Wisconsin, prairies and savannas are estimated to have covered more than 11 million acres, most of them occurring in a triangle cornered by what are now Racine, Grant, and Polk counties. Although covering large, unbroken areas, they were interspersed with forest. As the density of trees increased, grasslands merged into savannas and eventually into forests, where wildfires were unable to reach, completing the mosaic landscape that then covered southern Wisconsin. Although there were no true prairies in the north, pine savannas were scattered amidst the vast forests.

The blooming of prairie plants colored the landscape from early spring to late fall, with low-growing spring wildflowers giving way to towering grasses by summer's end. Plants found in a particular piece of prairie varied with soil and moisture conditions present there. On dry hillsides or windswept uplands, pasqueflower, side-oats grama grass, and yellow puccoon were typical. On well-drained, gently rolling landscapes, big bluestem, Indian grass, rattlesnake master, and wild indigo were numerous. Wet lowland sites produced sloughgrass, New England aster, prairie dock, and bottle gentian. Many more plants graced Wisconsin prairies, some of them so tolerant that they could be found almost anywhere. In the savannas, oaks were the typical tree species in the south, and jack pine in the north. However, prairie grasses and wildflowers clearly remained the dominant savanna vegetation.

Today, Wisconsin's grasslands are largely gone, occurring only in remnants along railroad corridors, on bluffs too steep to cultivate, in forgotten corners of farm fields, or in specially managed areas. In their place are the corn and alfalfa fields so basic to Wisconsin's dairy industry. Savannas have been converted to woodlots; through natural succession in the absence of fire, the giant open-grown trees of the old grasslands are now engulfed by new-growth forests.

Although today's most productive farmland is former prairie, the first settlers shunned the grasslands. Treelessness cast suspicion on their richness, and the tough root systems of prairie plants made sod-busting next to impossible. But as the richness of prairie soils was discovered and new plows developed, grasslands were eagerly homesteaded. Upland prairies were converted to cropland, and lowland areas used for pasture.

In either case, prairie plants were replaced by plants of man's choosing and the landscape was changed forever.

Although the settlers destroyed the prairies through drainage and farming, they weren't the first people to manipulate them. Long before, Indian bands inhabiting the area managed the prairies using fire as a tool. The landscape was set ablaze each fall to congregate game animals and to create open areas for travel and pasture. Without this regular burning, there is little doubt that Wisconsin grasslands would have been quickly replaced by shrub and forest cover. Deep-rooted prairie plants were unhurt by fire and, rejuvenated, sprang up profusely over the charred ground each spring. Likewise in the savannas, the thick-barked oaks were oblivious to fire but woody undergrowth was destroyed, leaving only grasses and large trees. White settlement disrupted this centuries-old custom, and the fires that once set the horizon aglow were ended.

Although true prairies and savannas are rare today, open fields are not uncommon. Many of them sport prairie grasses and wildflowers along with weedy invader species. Logging, fire, or plowing can create an opening and if no crops are seeded after the disturbance, nature takes charge. Sun-loving annual plants are the first invaders and quickly cover the open ground. After a few years, they are crowded out by perennial grasses which spread widely by roots. Shrubs may eventually invade the grassland, sending the open field further down the road toward forest.

Open areas provide unique habitat for wildlife. Actually, the term "open area" is a poor description of this kind of habitat from an animal's point of view. Although to human beings such areas do indeed look open, they are quite a protected world for the animals living there: it's all a matter of living close to ground level or, better yet, below it. There, thick mats of roots, stems, and leaves provide living space as closed as the canopy of a mature forest. Walking through an upland field, you're likely to hear more animals than you'll see, except for a rippling swath of grass telling you in what direction "whatever it was" has gone.

The ground level is alive with small animals, nestled among the ground litter or traveling crisscross paths well below eyesight of potential predators. Ground-nesting birds fledge their young there, content to abandon the air for the safety of their hideway. Other animals play it even safer by burrowing below the ground, exploiting new food sources and living space. Such burrowers play an interesting and important role in plant succession. Newly excavated earth from their diggings provides a site for pioneer plant species to seed, adding variety to the plant community and keeping it young. When abandoned, these burrows provide nesting sites for other animals unable to dig themselves. Larger animals and tree-nesting birds are found in open areas, too, most of them predators which make a living by outwitting the abundant ground dwellers.

The trouble with open areas, however, is that they rarely stay the same for very long. Prairies once did, but only because they were constantly maintained by burning. Today's open areas either grow in naturally to closed vegetation or are "put to use" by man for crops or buildings. Most of the plants and animals inhabiting open areas evolved in the stable conditions of the managed prairie and find temporary homes at best in the transitory open areas of today. Others are limited to the patches of surviving prairie and face an even more precarious existence.

Of course, many plants and animals are hardy enough to adapt to the changing environment of open areas, prospering in brushy fencerows or in the very middle of cornfields. But others do not fare as well and cannot survive without help. These are the endangered and threatened species of our upland fields and prairies.

Dune, Beach and Cliff Habitat

Dunes, beaches, and cliffs are special Wisconsin habitats that don't readily fit into the types already discussed. In fact, in terms of their plant and animal communities, these three habitats themselves differ greatly from one another. However, they share one characteristic that makes it logical to group them together. None has true soil, and their substrates are composed of loose sand or bare rock. As a result, they present rather harsh environments that often require special adaptations of their inhabitants.

Let's look at dunes first. They are irregular mounds of sand deposited along lakeshores above the highest beachline, the sand picked up by wind blowing off the lake. Such windblown sand is dry and shifting: newly formed dunes are constantly on the move, here one day and there another. Eventually, a few hardy plants colonize these shifting dunes and gradually stabilize them. Such plants must be drought resistant because of the extreme dryness of dunes and must have well-developed anchoring systems to hold them in place. Once the dune is stabilized, low shrubs move in, and given time, tree species may eventually become established. Most Wisconsin dunes are located along the Great Lakes shorelines, especially along Lake Michigan. However, some occur along windward shores of larger inland lakes.

Closer to the water, where the influence of waves is still felt, lie the beaches. They are often called strand communities because of their narrow, string-like shape. Upper beaches, those farthest away from the water, have the best-developed plant communities. Although their surface sands may look quite dry, there is water a few feet below the surface. The churning action of waves is not felt in this zone except during storms, making it more hospitable for plants to get started and survive. Beach areas nearer the water feel the direct action of waves and support fewer plants. The middle beach has reduced numbers of plants spottily distributed, and the lower beach usually lacks them altogether. Like dunes, the best-developed beach habitats in Wisconsin are located along the Great Lakes shores. Inland shores often lack the sand deposits or wind action needed for beach formation, although in low-water years extensive beaches may develop on some of them.

Dunes and beaches are open places, and by nature located near water. Their animal inhabitants exploit these characteristics, finding food in washed-up debris or in the water itself and taking advantage of the sun-warmed sands to incubate eggs. Since dunes and beaches are relatively flat and are laid out in long strips, most activity occurs on the ground and has a linear orientation. Birds are the most common and conspicuous inhabitants of dunes and beaches. To combat the vulnerability to predators that goes along with their open habitat, many species are colonial, nesting and roosting in large groups. Others have plumage patterns or egg markings that blend so well with the surrounding landscape that they are rendered practically invisible.

Cliffs occur anywhere in the state, wherever there are exposed rock formations. They are most numerous in the Driftless Area of the southwest and along the Niagara Escarpment of eastern Wisconsin. Cliffs vary in height from just a few feet to several hundred feet where there is a steep drop in elevation. Many occur along existing rivers and lakes, others where extinct glacial lakes and rivers used to be found.

At first glance, plants growing on cliffs look as if they are rooted in the bare rock. A closer look reveals pockets of soil wedged in cracks or gouges in the rock. The types and number of cliff plants depend on what conditions of soil, moisture, and sunlight are present and the nearness of other plants that can serve as seed sources. For animals, the cliff habitat offers special advantages. Height is one, providing safety and a vantage point for food gathering. Warmth is another. If exposed to the sun, the rock surface of cliffs heats up readily and retains the heat for long periods. In addition, the many rock crevices of cliffs offer ideal spots for nesting and denning.

Dunes, beaches, and cliffs are worthy of study and protection wherever they occur. Their plant communities are especially noteworthy because they often include species found nowhere else in the state. Some species occur in only a few locations, widely separated from their nearest neighbors. Such species are especially vulnerable, and any disturbance can mean a big loss to Wisconsin's flora. Animal communities of these habitats are likewise vulnerable to disturbance, with many species incapable of living in other habitats.

For dunes and beaches, the most destructive force is human use. Houses, all-terrain vehicles, and recreational use can spell destruction for their communities. In addition, beaches are at the mercy of wave action, storms, and changing water levels. Habitat present one year may be gone the next.

Cliffs are most often hurt by quarrying, logging, grazing, and fires. Increasing use of cliffs for home sites also presents a problem for animal species intolerant of the human presence.

Endangered and threatened species of these habitats are sending out a signal that disturbances are occurring and that they cannot go unnoticed.

SECTION 5
RESOURCE PERSONNEL

Resource personnel can aid in the gathering of background information for environmental education activities, provide evening presentations, conduct educational field trips, and add support information for work crews. The Coordinator should meet with area resource personnel and ask for their ideas on how they can help to integrate environmental education into the YCC program. The Coordinator should then utilize their many talents to implement the environmental education program.

The Coordinator should remember that these professionals have other management responsibilities and are limited in the amount of time they can spend on the YCC. With this in mind, the Coordinator should contact resource personnel well in advance so that they will have enough time to provide the information and prepare the presentations that the Coordinator has requested.

The following list of resource personnel was developed for the Mecan River Camp. It can be used as an example for other camps. It includes the name of the resource person, how to contact them, and their specialties and interests. Additional resource personnel should be added to the list as the Coordinator becomes aware of their existence.

Mecan River Resource Personnel

The following list of Mecan River resource personnel was compiled by Nancy Peters, Assistant Superintendent at Mecan River Youth Camp.

MECAN RIVER RESOURCE PERSONNEL

Name	Occupation	Business Address	Business Phone	Discussion Topic
Tom Hansen	Wildlife Manager	Berlin-DNR	361-3149	wetland preservation
Tom Howard	Wildlife Manager	Wautoma-DNR	787-4686	sandhill cranes
Alex Katovich	Forester	Wautoma-DNR	787-4686	environmental ethics forest related topics
Elward Engle	Land Manager	Wautoma-DNR	787-4686	wildlflowers, fish mgmt.
Dale Brege	Fish Manager	Montello-DNR	297-2888	aquatic insects fish management
Jim Kronchnabel	Forester	Montello-DNR	297-2888	environmental ethics forestry techniques
Bob Wallen	Naturalist	MacKenzie Environ. Poynette	608-635-4498	helpful in borrowing films, tours
Dennis Yockers	DNR Env. Ed. Coor.	Madison, GEF II	608-266-0870	
Bill Smith	Falconer	Poynette	608-635-2428	

MECAN RIVER RESOURCE PERSONNEL continued:

Name	Occupation	Business Address	Business Phone	Discussion Topic
Mike Yeska	Taxidermist	White River Taxidermy Neshkoro	293-4573	taxidermy
Henry's Honey Farm	Honey Farmer	Red Granite	566-2340	his son does a slide show, 566-2855
Mark Martin	Curator-Goose Pond	Arlington	608-635-4160	slides of Goose Pond
Inga Brynildson	DNR-Endangered Spp.	Madison, GEF II		

SECTION 6
ECOLOGICAL RESOURCE INVENTORY

The Ecological Resource Inventory of potential environmental sites near the camp aids the Coordinator in using the surrounding area to develop an environmental education program.

The ecological resources are indexed by title, environmental education goals which can be met on the site, and by resource type (wetland, forest, prairie/open field, industry, agriculture).

The following information is provided for each site:

- Title of area
- Concepts/skills which can be presented
- EE goals that can be met
- Description of area (concise description including brochures of area)
- Location: county, directions from a landmark
- Facilities: availability of parking, tours, nature centers, lookout points, trails
- Limitations: tour schedules, fees, group sizes, safety precautions
- Map of area:
- Distance to area: from camp
- Educational ideas:
- Person in charge of area and how to contact them
- Comments: additional information

To compile an Ecological Resource Inventory the Coordinator should:

1. Familiarize themselves with the EE goals
2. Brainstorm. Compile lists of potential areas
3. Get input from: Assistant Superintendent, Superintendent, Area Naturalist, Foresters, Wildlife Managers, Fish Managers
4. Inventory work project sites
5. Inventory sites, gathering necessary information on sites and place in inventory form
6. Add site to indices

Mecan River Ecological Resource Inventory

Resources Indexed by Goals

Resource Number	Resource Site	Environmental Education Goals 1	2	3	4	5	6
RS1	Aldo Leopold Memorial Reserve		X	X	X		
RS2	Arlington Experimental Farm		X		X		
RS3	Baraboo Mountain Range		X	X			
RS4	Bog		X	X			
RS5	Columbia I and II Coal-fired Electric Power Generating Plant			X	X	X	
RS6	Comstock Marsh		X	X	X		
RS7	Devil's Lake State Park	X	X	X	X		X
RS8	Endeavor Marsh Scientific Area		X	X	X		
RS9	French's Creek Wildlife Area	X	X	X			
RS10	Germania Marsh Wildlife Area	X	X	X	X		X
RS11	Goose Pond Scientific Area	X					
RS12	Grand River Marsh	X	X	X	X		X
RS13	Green Lake	X	X				
RS14	Griffith State Nursery		X	X	X		
RS15	Hammerstroms - Birds of Prey Rehabilitation		X	X	X	X	X

Resource Number	Resource Site	Environmental Education Goals 1	2	3	4	5	6
RS16	Hancock Experimental Farm & Station		X	X	X		
RS17	Harrisville Pond/Wild Rice		X	X	X		
RS18	Hartman Creek State Park	X	X	X	X		X
RS19	Honey Farm (Apiary)		X	X			
RS20	Horicon Marsh Wildlife Area		X	X	X		X
RS21	International Crane Foundation		X	X	X	X	
RS22	Keller's Woods Scientific Area		X	X	X	X	
RS23	Kirk Christmas Tree Company		X	X	X		
RS24	Lawrence Creek Public Hunting and Fishing Grounds	X	X	X	X		X
RS25	Little Wolf River		X	X	X		
RS26	Lock and Dam Sites on the Fox River			X	X		
RS27	MacKenzie Environmental Education Center	X	X	X	X		
RS28	Mecan River and Chafee Creek	X	X	X	X		X
RS29	Mecan Springs	X	X				
RS30	Montello Muck Farm (Vegetable Farm)		X	X	X		

Resource Number	Resource Site	Environmental Education Goals					
		1	2	3	4	5	6
RS31	Montello Red Granite Quarry			X			
RS32	Mud Lake Scientific Area		X				
RS33	Mud Lake Wildlife Area	X	X	X			X
RS34	Muir Park Natural Area		X	X	X		
RS35	Necedah National Wildlife Refuge		X	X	X		
RS36	Nekoosa Paper Company			X	X		
RS37	Parfrey's Glen Scientific Area		X	X	X	X	X
RS38	Pine Island Public Hunting and Fishing Grounds		X	X			
RS39	Pine Plantations	X	X	X	X		
RS40	Poygan Marsh Wildlife Area	X	X	X	X		
RS41	Prairie Nursery			X	X		
RS42	Prickly Pear Cactus Site		X	X	X		
RS43	Redgranite Quarry			X			
RS44	Ripon Prairie Scientific Area		X	X	X		
RS45	Roche-A-Cri State Park	X	X	X	X		X
RS46	Rock Springs			X			

Resource Number	Resource Site	Environmental Education Goals 1	2	3	4	5	6
RS47	Schoenberg's Marsh		X	X			
RS48	State Game Farm	X	X	X	X		
RS49	Taxidermist			X			
RS50	Tellocks Woods Scientific Area		X	X	X	X	X
RS51	Upham Woods Nature Center		X	X	X		
RS52	Wautoma Sewage Disposal Plant		X		X		
RS53	Westfield Fish Hatchery		X	X	X		
RS54	White River Marsh Wildlife Area	X	X	X	X		X
RS55	White River Stream Improvement Project	X	X	X	X		X
RS56	Wild Rose Fish Hatchery	X	X	X	X		
RS57	Wild Rose Park Stream Improvement Project	X	X	X	X		

Resources Indexed by Type

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS1	Aldo Leopold Memorial Reserve	X	X	X		
RS2	Arlington Experimental Farm				X	
RS3	Baraboo Mountain Range		X			
RS4	Bog		X			
RS5	Columbia I and II Coal-fired Electric Power Generating Plant					X
RS6	Comstock Marsh		X			
RS7	Devil's Lake State Park	X	X			
RS8	Endeavor Marsh Scientific Area		X			
RS9	French's Creek Wildlife Area		X	X		
RS10	Germania Marsh Wildlife Area		X			

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS11	Goose Pond Scientific Area		X	X		
RS12	Grand River Marsh		X			
RS13	Green Lake		X			
RS14	Griffith State Nursery	X				X
RS15	Hammerstroms-Birds of prey Rehabilitation					
RS16	Hancock Experimental Farm & Station				X	
RS17	Harrisville Pond/Wild Rice		X			
RS18	Hartman Creek State Park	X	X	X		
RS19	Honey Farm (Apiary)					
RS20	Horicon Marsh Wildlife Area		X			

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS21	International Crane Foundation					
RS22	Keller's Woods Scientific Area	X				
RS23	Kirk Christmas Tree Company	X				X
RS24	Lawrence Creek Public Hunting and Fishing Grounds	X	X	X		
RS25	Little Wolf River		X			
RS26	Lock and Dam Sites on the Fox River		X			
RS27	MacKenzie Environmental Education Center	X	X	X		
RS28	Mecan River and Chafee Creek		X			
RS29	Mecan Springs	X	X			
RS30	Montello Muck Farm				X	

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS31	Montello Red Granite Quarry					
RS32	Mud Lake Scientific Area		X			
RS33	Mud Lake Wildlife Area		X	X		
RS34	Muir Park Natural Area	X	X	X		
RS35	Necedah National Wildlife Refuge	X		X		
RS36	Nekoosa Paper Company					X
RS37	Parfrey's Glen Scientific Area					
RS38	Pine Island Public Hunting and Fishing Grounds	X	X	X		
RS39	Pine Plantations	X				
RS40	Poygan Marsh Wildlife Area		X			

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS41	Prairie Nursery			X		
RS42	Prickly Pear Cactus Site			X		
RS43	Redgranite Quarry					
RS44	Ripon Prairie Scientific Area			X		
RS45	Roche-A-Cri State Park	X	X	X		
RS46	Rock Springs					
RS47	Schoenberg's Marsh		X			
RS48	State Game Farm					
RS49	Taxidermist					
RS50	Tellocks Woods Scientific Area	X				

Resource Number	Resource Site	Forest	Wetland	Open Field Prairie	Agricul.	Industry
RS51	Upham Woods Nature Center	X	X	X		
RS52	Wautoma Sewage Disposal Plant					X
RS53	Westfield Fish Hatchery					
RS54	White River Marsh Wildlife Area		X	X		
RS55	White River Stream Improvement Project		X			
RS56	Wild Rose Fish Hatchery					
RS57	Wild Rose Park Stream Improvement Project		X			

SECTION 7
RESOURCE INFORMATION FILE

Each camp will be provided with an informational file containing background information on each of the work project categories, each of the environmental education goals, and various environmental issues.

The Coordinator can use this background information in the development of behavioral objectives, educational activities, educational displays, educational tours, or evening presentations.

The file folder titles are listed below (additional files can be added):

Work Projects: (#1, #2.1, #3.3)

- Forest Management
- Wildlife Management
- Fish Management
- Park and Recreation Management

Ecological Concepts: (#2)

Natural Resources: (#2.1)

- Soil
- Water
- Minerals
- Wetlands
- Scientific Areas
- Great Lakes

Conservation/Lifestyles: (#3.2)

Wisconsin Department of Natural Resources: (#3.4)

Citizen Action: (#5)

Environmental Issues: (#4)

Groundwater Pollution

Water Quality

Acid Rain

Hazardous Waste

Steel Shot

Endangered Species

Recycling

Miscellaneous

Nature Interpretation Skills

Energy Sources

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APPENDIX A
White River Education Report

Formal Instructional Activity - Specific Listing - White River

1. First Encampment - June 10 to July 21
   a. Fire Control - A fire demonstration was held in the Brule area.
   b. Fire Prevention - This involved the entire camp.
   c. Boat and gun safety, compass reading, direction finding.
   d. Wildlife habitat lecture, field trip.
   e. Fish propagation, lamprey control, fish shocking at camp and Brule hatchery.
   f. Broader aspects of conservation by Department of Public Instruction - three lectures were given.
   g. Life history of deer, early history of northwest area, soil identification, geology, lecture, field trip, tree identification, timber survey, land description.
2. Second Encampment - July 22 to August 31
   a. July 22-28 - Gun and boat safety, compass reading (by Swenson and Miner).
   b. July 29-August 4 - Soils and water (by Ed Baker of the University of Wisconsin).
   c. August 5-11 - Wildlife and plant succession (by Robert Ellerson, University of Wisconsin).
   d. August 12-18 - Broader aspects of conservation (by Busch, Schunk and Miller, Department of

Public Instruction).

e. August 19-25 - Forestry (by Ted Peterson, University of Wisconsin).

f. August 26-September 1 - History of deer and the northwest area (by Otis Bersing, Wisconsin Department of Natural Resources).

Although the time is given by weeks, the classes were conducted every Friday under the direction of the Conservation Coordinator and with the cooperation of the various Conservation Divisions and other state departments, including the Department of Public Instruction, University of Wisconsin Extension Division, School of Agriculture, University. General class procedure consisted of a lecture and the presentation of a film or slides and a field trip or application of the skills and information demonstrated during the lecture or film.

3. Formal Education

Individual kits composed of a variety of booklets and other printed materials on conservation were issued to each camper through the efforts of the Conservation Education Coordinator. Professional literature and a professional library was obtained through the cooperation of the Conservation Department and the Ashland Library. The Ashland Library contributed a basic supply of 250 books and provided the opportunity of exchanging books at our conve-

nience. Movies were obtained through the Conservation Department and were shown Wednesday nights after the physical recreation program. Work projects were one of the major instruments contributing to the education of the campers for each work project demanded special skills and know-how and made unique contributions to the individuals participating.

Informational Education

1. Community living within a camp setting offered many opportunities for learning much about people, human behavior, making new friends, sharing camp responsibilities, and adjusting to the demands and limitations of a work day world.
2. Recreation activities provided many of the men with new experiences or offered them the opportunity to acquire new skills in areas in which they have had previous experience.
3. Camp tours and trips were arranged so that all of the men had the opportunity to become acquainted with the natural and human resources of the area.
4. Special events were discovered by observing the offerings of local communities or studying the community calendars and arrangements would be made so that campers might take advantage of such as the World Championship Lumberjack Rodeo held at Hayward, Wisconsin.

5. Work projects, as under formal education, made lasting contributions to the education and orientation of the campers to their environment.

APPENDIX B

Goals for Curriculum Development

Goals for Curriculum Development in Environmental Education [1]

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. [2]

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.

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1. This document represents the final draft of the goals subsequent to validation. The final validity assessment was conducted by a panel of five professional environmental educators. This panel was composed of Drs. Robert S. Cook, John Disinger, Robert George, Harold McKenna, and R. Thomas Tanner.

2. Adapted from Gary D. Harvey, A Conceptualization of Environmental Education. In J. L. Aldrich, A. M. Blackburn and G. A. Abel (Eds), A Report on the North American Regional Seminar on Environmental Education. Columbus, Ohio: SMEAC Information Reference Center, 1977.

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 . . . 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 value 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 environmental 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.

Assumptions Made By the Developers

The following assumptions have been made relative to the goals:

1. That the goals for curriculum developmnt in EE are appropriate for use in guiding both formal and nonformal EE curriculum development efforts.

2. That a "receiver" can be thought of as any person, of any age, who can be reached through either the formal or nonformal educational sectors.

3. That the superordinate goal is philosophically correct as stated. That this goal represents the most appropriate direction for environmental education if EE is going to meet the tremendous challenges facing mankind both today and tomorrow.

4. That ecological foundations are critical to any EE program as prerequisite or corequisite cognitive knowledge. That ecological concepts are an integral part of EE. Despite this premise, it remains cogent to make certain that receivers distinguish between environmental education and ecology per se.

5. That, regardless of the importance of methodologies such as outdoor education, environmental interpretation, acclimatization, and outdoor recreation, these are not a part of the substantive structure of EE per se. Therefore, ancillary goals representing these activities directly do not appear here although a number of the goals for curriculum development in EE might be facilitated by the use of these and other methodologies.

6. That some level of "environmental sensitivity" is probably critical to the receiver's being willing and/or able to engage profitably in Levels II, III, and IV of this set of goals. Irrespective of this assumed prerequisite,

the developers have arbitrarily omitted goals dealing with sensitivity on several grounds. These are:

A. Sensitivity would have to be represented as foundational.

B. Sensitivity per se cannot be operationalized in a manner as to provide for any measurable criterion level of affect.

C. Every individual will enter the EE process with a unique set of affective predispositions, generated by the individual's own background of experiences.

D. Like values clarification, sensitivity will, in part, result from EE activities themselves. In particular, judiciously developed instructional programs in ecological foundations and conceptual awareness should measurably assist in the sensitization process.

7. The process of valuing, values clarification and moral reasoning are implicit in the goals, particularly III and IV.

8. That environmental action is, in fact, represented by the five categories of action as stated in the goals (or in combinations of these categories). The assumption is also made that these action categories (or combinations of them) are exhaustive.

9. That the concept of maintaining and/or achieving a dynamic equilibrium (homeostasis) must be interpreted from both cultural and ecological perspectives. That said equilibrium may well result in a distinct compromise between quality of life on one hand and quality of the environment on the other. The curriculum developer must be constantly aware of this in order to produce curricular materials that look rationally at both the cultural and ecological costs involved in achieving a true equilibrium.

10. That the phrase, " . . . to provide receivers with opportunities to apply environmental action skills to specific issues" implies no more than what is stated. That an educator cannot ethically force a receiver to take action but, instead, should provide mechanisms whereby action can be taken if desired.

11. That instructional objectives would be generated under each subordinate goal during curriculum development.

12. That EE is an interdisciplinary pursuit and that numerous disciplines must be reflected in the generation of any set of goalsfor curriculum development. Only in this manner can EE help receivers to successfully meet the challenges facing them as world citizens.

Developers' Initial Content Validity Assessment

The developers initially assessed the content validity of the goals by comparing the goals expressed at each level of their document against the five (5) categories of environmental education objectives proposed at the Tbilisi Intergovernmental Conference on Environmental Education in 1977. The Tbilisi objectives follow:

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 experiences 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 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.

The validity comparison grid will be found in Fig. 1 on page 9.

Results of the Validity Panel Assessment

Subsequent to the developers initial content validity assessment they submitted the goals to a validity panel consisting of seven nationally recognized environmental educators for their evaluation. The use of such a validity panel is an accepted and recommended means of establishing content validity (Ary, Jacobs & Razavieh, 1972; Kerlinger, 1973). Further, this same procedure is recommended by Saylor and Alexander (1974) for defining and validating subgoals such as those included in the Goals for Curriculum Development in Environmental Education. A more complete description of the validity panel assessment follows.

During the winter of 1978 the authors developed an instrument to assess

Tbilisi Objectives					Developers' EE Curriculum Goals by Level	
Awareness	Knowledge	Attitudes	Skills	Participation		
1	2	3	4	5		
					Level I.	Ecological Foundations Lev
X	X				----------	All Subcomponents (A-I)
					Level II.	Conceptual Awareness Leve
1	2	3	4	5		Subcomponent:
X	X				----------	A
X	X				----------	B
X	X				----------	C
X	X				----------	D
X	X	X			----------	E
X	X	X			----------	F
X	X	X			----------	G
					Level III.	Investigation and Evaluation Level
1	2	3	4	5		Subcomponent:
X	X		X		----------	A
X	X		X		----------	B
X	X		X		----------	C
X	X		X		----------	D
X		X	X		----------	E
X	X	X	X		----------	F
X	X	X	X	X	----------	G
X		X			----------	H
					Level IV.	Action Skills Level
1	2	3	4	5		Subcomponent:
			X		----------	A
			X	X	----------	B
				X	----------	C
				X	----------	D

Fig 1: Developers' Validity Assessment - A Comparison of the Goals for Curriculum Development in Environmental Education to the Tbilisi Conference Categories of Objectives (1977).

the validity of the goals. The instrument was sent with a copy of (1) the goals, (2) the assumptions, and (3) the developers' initial validity assessment to the validity panel. The developed instrument contained a number of categories to which the panelists were asked to respond as appropriate. In an attempt to standardize the validity assessment, the developers requested the panelists to initially assume the superordinate goal to be conceptually correct as stated. The developers asked the panelists to make this initial assumption so that they would analyze the subordinate goals in the context of the superordinate goal. However, this did not mean that the panelists could not disagree with the superordinate goal as stated. In fact, the panelists were also asked specifically to assess the superordinate goal. In additional directions given to the panelists, the developers asked them to assume that the four levels of goals were not necessarily exhaustive or appropriate as classified in the document. The developers also pointed out that it was entirely possible that they could have failed to recognize a critical element that should have "level status" in the model. The validity panelists were asked to provide their suggestions regarding these variables. Further, the panelists were asked to respond specifically to the following items:

1. Content Validity - Subordinate Goals: To what extent do you perceive that the subordinate goals in this model represent the substantive structure of the superordinate goal as stated?
2. Content Validity - Superordinate Goal: To what extent do you perceive that the superordinate goal is valid for use in curriculum development in environmental education?
3. Syntax:
   A. To what extent is the sequencing from Level I through Level IV logical? That is, is the "level hierarchy" appropriate?
   B. To what extent is there logical sequencing within each level?
4. Subjective Analysis: To what extent do you believe that this model represents a suitable framework for curriculum development in EE?
5. Recommended Goals and/or Levels: Are there other goals and/or levels perceived as critical?

Completed validity assessments were received from five of the seven panelists. In general, the comments received from the panelists were consistent. The consistency of the comments greatly facilitated the process of revising both the goals and the assumptions made by the developers regarding the goals. The revision process was completed during the Spring of 1978. The revised goals and the assumptions regarding the goals are presented herein.

Implementing the Goals

The utility of the Goals for Curriculum Development in EE lies in their application. Basically, the goals exist as a framework within which specific performance objectives can be written by the curriculum developer from which a curriculum for EE can be developed. As far as the writers can determine, no EE curriculum has ever been developed in precisely this manner. This may expalin why the literature abounds with challenges by professionals, to the community as a whole, to produce syntactically sound curricula which transcend the "awareness level" of receiver achievement.

Although EE curricula abound throughout the world, it is evident that most curricular packages are produced largely on the basis of developer bias and intuition. Many such packages were developed even before any consensus was reached relative to the parameters of EE per se. It would be the writers' recommendation, therefore, that new curriculum development projects are needed and that these projects be responsibly produced with environmental issue investigation and the remediation of issues as major goals. The utilization of the Goals for Curriculum Development in EE would certainly facilitate this process.

The writers have also found that the Goals for Curriculum Development can be used for analyzing and evaluating EE materials currently in existence. One such analysis is presented here.

In 1978, a one-year program for EE was published entitled Investigation and Action Skills for Environmental Problem Solving. The program is composed of a set of six (6) modules written by H. Hungerford, R. A. Litherland, R. Ben Peyton, and A. N. Tomera. The modules are published by Stipes Publishing Company, 10 Chester Street, Champaign, Illinois 61820. This program's intent is to assist receivers in acquiring those skills needed to become effective issue investigators and responsible citizen activitists.

Subsequent to the development of the Goals for Curriculum Development in EE, the writers decided to compare the modules against the goals in order to determine which goal levels were represented by that program. Such an analysis could assist the program's developers in an evaluation of the modules and profide indications of where the modules might need subsequent revision.

A partial report of that analysis appears here in the Table entitled, "Goal Analysis of the Investigation and Action Skills Modules". The performance objectives for each module are accounted for in this analysis (by number because space does not permit an iteration of each objective). Although some objectives could be included in more than one goal level, the writers arbitrarily chose to place each objective into the one level that appeard to be the most appropriate. The column entitled "Other" contains those objectives that deal specifically with skills directly associated with areas such as math and language arts.

(Table Appx. Here)

In summary, much of the curriculum planning for EE has been based upon the use of "hunches" as Childress (1978) has noted. The writers believe that the responsibilities of EE are too great . . . the time too short . . . and practitioners' skills too few to allow curriculum development to remain a matter of intuition. Therefore, the writers recommend that the Goals for Curriculum Development in Environmental Education be utilized to guide curriculum planning and development in the field. Further, the writers recommend that existing EE programs be analyzed to determine the extent to which they meet the goals.

Table 1. Goal Analysis of the Investigation and Action Skills Modules.

The Modules (Read Down)	Goals By Level: Level I Ecological Found's.	Level II Awareness Level	Level III Investigation/Evaluation	Level IV Action Skills	Other
I	5.	6,7,10,11.	12,13,14,15,16,17.		1,2,3, 4,7,8,9.
II		4.	1,2,3,5,6,7,8,9.		
III			1,2,3,4,5,6,7,8.		
IV			1,3,4,5,6,8.	2,7.	
V			All		
VI		1,2,3,4,5,6,7.		8,9,10,11, 12,13,14, 15,16,17,18, 19,20,21.	

Note: The modules were written on the assumption that the receiver groups using them would already have experienced instruction in ecological concepts.

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APPENDIX C

Wisconsin Youth Conservation Camp Program Explanation

Wisconsin Youth Conservation Camp Program Explanation

The Wisconsin Youth Conservation Camp program consists of four camps: Ernie Swift, Kettle Moraine, Mecan River, and Statehouse Lake. Each camp has 100 campers 15-19 years of age, 10 counselors, 1 Environmental Education Coordinator, 2 cooks, an assistant superintendent, and a camp superintendent.

Campers and staff live in cabins usually 10 campers/counselor/cabin. The Environmental Education Coordinator lives with campers and staff in the cabins.

Throughout the YCC session, quality and safety are stressed both in cabin clean-up and on the work site. Work is done well and done safely.

The YCC program has six objectives:

1. To offer summer work experience in conservation.
2. To develop constructive work habits.
3. To offer the opportunity of living with others, both socially and democratically.
4. To develop an understanding and appreciation of the natural resources of the state.
5. To develop self-reliance.
6. To develop leadership.

Camp Routine

All four camps follow approximately the same schedule.

6:00 Staff is up getting ready for the day: running vehicle safety checks, getting tools and safety equipment ready.

6:30 Revillee: campers get up, dress for the day and clean cabins.

7:15 Breakfast.

8:00 Campers are transported to work projects.

12:00 Lunch on the work site.

12:30 Resume work.

4:30 Campers return to (arrive in) camp, clean and return tools to supply building.

5:00 Soap and Towel: Campers clean-up and get ready for supper.

5:30 Flag Ceremony.

5:45 Supper.

6:30 Free Time: Softball, volleyball, basketball, fishing, canoeing, frisbee, letter writing, reading, table games, relaxing, hikes, jogging, films, evening presentations.

9:45 Call to Quarters: campers return to cabins.

10:00 Lights Out.

Saturday

6:30 - 11:00 Campers change bedding and work on in-camp clean-up projects.

11:00 - 9:00 p.m. Sunday Free Time: recreation, town trips, or special activities away from camp.

Work Projects

Every morning YCC counselors drive work crews consisting of ten campers to work projects located within a 50 mile radius of camp. Because work crews stay on-site all day, a prepared lunch is taken from camp.

Work crews work on projects involving forest, fish, wildlife, and park and recreation management. The type of work performed by work crews is outlined in the 1983 YCC brochure as follows:

1. Stream improvement including installation of bank deflectors, erosion control devices, fencing to prevent cattle grazing, and general fish habitat improvement.

2. Recreational area development and maintenance including brushing, shoveling, digging, chopping, and building to prepare such things as public campsites, canoe portage trails, picnic grounds, or other recreational use areas.

3. Forest management work such as thinning or pruning trees in plantations, building firebreaks by clearing strips, by chopping and removing cover, or fighting fires in emergency cases and manning fire towers.

4. Game area management work to improve habitat in general by creation of shallow water flowages (building dikes and removing plant cover), chopping openings in wooded areas, and planting seeds for wildlife food plants.

5. Fish management work to remove stunted fish from the lakes, make fish counts, and remove scale samples for biology study.

6. For rainy days there is work such as painting, building picnic tables, and maintenance work.

7. Maintenance work at ranger stations.

Camp Facilities

Each camp has a main building which contains a dining room, kitchen, office, infirmary, showers and bathrooms. A camp library is also available. A supply building is present for the storage of camp tools and other camp supplies. There are cabins at each camp for campers and staff. All camp facilities are well maintained by campers and staff with everyone expected to participate in these duties.

APPENDIX D

Wisconsin Department of Natural Resouces Policy on Education

SECTION 1. NR 1.70 is created to read:

NR 1.70 POLLCY ON EDUCATION. (1) Wisconsin has a unique abundance of varied and high quality natural resources. The successful stewardship of those resources is largely dependent upon enlightened and responsible decision-making by Wisconsin citizens, government and private interests. The department recognizes the need to develop a coordinated environmental education program. Education is the foundation of effective resource management and environmental protection activities. Natural resources protection and management goals can be more readily achieved and sustained by incorporating education elements in department functions and philosophies. An active educational program is necessary to encourage incorporation of education into department programs, to inform citizens on natural resources issues and to develop alternative solutions to natural resources problems.

(2) Effective environmental education will result in better understanding of the operations and programs of the department and will help meet management goals. The goal of the department's environmental education program is to assist in developing a citizenry that:

(a) Is aware of Wisconsin's natural resources;

(b) Understands resource use issues, limits, capabilities and problems;

(c) Analyzes and evaluates personal and public values that affect resource management; and

(d) Acquires the individual and collective skills and purpose to act responsibly in using natural resources in work and leisure.

(3) The department shall assist Wisconsin educational institutions at all grade and age levels by:

(a) Making available supplemental services, education materials, expertise of department employees and volunteers, and facilities and properties;

(b) Cooperating and coordinating with the department of public instruction, University of Wisconsin-System, Wisconsin Board of Vocational, Technical and Adult Education in assisting teachers, administrators and others interested in education in understanding the importance of their role in environmental education and in obtaining knowledge, skills and materials in this instructional area.

(4) Department education programs shall follow agency policies, management directives and guidelines. Educational programs should be a means of achieving management goals and objectives; should complement and be consistent with agency priorities; and should focus on the areas of natural resource management and environmental protection. To implement its educational policy, the department shall:

(a) Designate the bureau of information and education as agencywide coordinator of environmental education activities.

(b) Create a department education committee, appointed by the secretary, to advise the secretary on environmental education matters.

(c) Actively cooperate with private, state, and federal agencies and organizations with existing or potential interest in environmental and conservation education.

(d) Consider and incorporate education elements into annual and long-range program plans and budgets.

(e) Consider environmental education skills and interest in the recruitment, training, promotion, and assignment of department employees.

(f) Delineate environmental education responsibilities in position descriptions.

(g) Incorporate additional and broadened environmental education elements in department subprograms.

(h) Incorporate environmental education elements in property and facility acquisition, development and programming.

(i) Utilize the MacKenzie environmental education center and youth camps and facilities for environmental education programming.

(j) Identify teachers and selected adult groups as primary audiences to maximize program impact.

(k) Encourage involvement with volunteer, school, youth, special interest and adult groups.

(l) Develop written and audio-visual materials, supplies and aids necessary to accomplish program goals.

APPENDIX E

Work Project Categories and Environmental Education Ideas

The 1981 YCC report lists the following work project categories:

Wildlife work projects including: Game surveys and game banding (usually ducks and geese), wildlife food planting, game habitat improvement, fence construction-repair or removal, dike maintenance.

Environmental Education Ideas:
- History of waterfowl management
- Horicon Marsh management or harassment?
- Ecosystem investigation
- Habitat of area
- Food requirements of animals in the area
- Conditions needed for wild rice
- Game vs. non-game management
- Benefits of wildlife openings
- Encroachment of human populations on wildlife
- Species that adapt well to human presence
- Species that are threatened by human activity
- Attitudes toward hunting
- Reasons for hunting
- Cost of raising and stocking game animals
- History of the area
- How much land should public agencies have?
- Attitudes toward trapping
- Plant succession
- Quality of the ecosystem
- What makes an ecosystem "a quality" ecosystem
- Lead shot poisoning, what is it?
- Predators of the area, need for them and their major threats
- Impact of users on the wildlife area and suggested measures that will limit the impact

Forestry work projects including: Pruning, plantation release from shade, forest improvement by thinning, weeding nursery seedlings.

Environmental Education Ideas:
- Need for wood products
- Use and impact of using pesticides or defoliants in forest management
- Need for tree nurseries
- Tree farm explanation
- Who owns most of Wisconsin's woodlands
- How is it managed?
- Fire - prevention and suppression
- Soil consideration in forestry

Forests as habitats
Ecosystem investigation
Insects - pests/treatments/implications
- beneficial insects
Multiple-use, what is it?
Sustained yield
Difference between renewable and non-renewable
Role of dead trees as den trees

Fish work projects including: Stream improvement work installing structures to increase water flow, deflect water direction, and provide under bank shelter for trout. Fish hatchery work including fin clipping to identify fish age, and disease prevention. Several boat landing sites were maintained, and some fencing done.

Environmental Education Ideas:
Explanation of stream improvement
Water quality
Trout species and specific needs
Water cycle
Ecosystem investigation
Commercial vs. recreational fishing
Wisconsin lake fisheries
Cost of raising and stocking fish
Who pays?
Threats to fish populations
Watershed quality and its effect on the stream
Erosion control
Human impact on area and suggested measures to lessen impact
Litter analysis - Would a bottle bill reduce litter?
Appropriate uses for different resources
Canoeing vs. fishing vs. inner tubing
Acid rain, what is it and does it effect the stream?
Electro-shocking - what, how, and why?

Park and Recreation work projects: Extensive trail construction and improvement work. Landscaping was completed to improve heavy use campsite areas, firewood supplies were provided, buildings were maintained (some painted) and a great deal of litter was removed.

Environmental Education Ideas:
User impact on park and measures to lessen impact
Need for hardened surfaces
Need for recreation areas
Who uses recreation areas?
Vandalism - why and what is done to decrease it?
Litter analysis
Ecosystem investigation
Succession

History of area
Trail placement and considerations
Erosion control
Problems with wildlife overpopulating the area
Attitudes toward hunting in parks
What makes a park a good park?

APPENDIX F
Sample Environmental Education Program Outline

The Sample Environmental Education Program outline contains:

1. Sample Behavioral Objectives
2. Environmental Education Outline
   - Sample outline to introduce EE program
   - Work project and natural resource explanations
3. Week 2
4. Week 3
5. Week 4
6. Week 5
7. Summary of Sample Environmental Education Program

Sample Environmental Education Program Outline

Sample Behavioral Objectives

Goal #1

To provide campers with an understanding of the work project; the need and purpose of the project, how the project fits into the WDNR resource management policy, alternatives of the project and the effects of the project.

Behavioral Objectives

Campers will demonstrate achievement of Goal #1 by:
- explaining the purpose of the project that they are working on.
- explaining the impacts of the work project.
- be able to list alternatives to the project.
- completing their assigned work projects as directed.

Evaluation Methods

Counselor will interview camper during the week discussing the work project with the camper. The weekly work grade can also be used.

Goal #2

To increase participant's awareness of their environmental surroundings and to provide a foundational base in Ecological Principles that govern the Environment.

Campers will be able to describe an ecosystem as an ecological unit including the community of plants and animals as well as the interacting abiotic (non-living) factors within the environment.

Campers will investigate the following ecosystems:

deciduous hardwood forest	pond
pine plantation	lake
prairie/open field	marsh
agricultural field	stream

Campers will compare their investigation findings for deciduous hardwood forests with pine plantations; open fields with agricultural fields.

Campers, while investigating an ecosystem, will list members of the ecosystem that are present and predict other members of the ecosystem as well as describe the interrelationships within the ecosystem.

Using the information gathered in the investigation, campers will describe the ecological community, its members, their niches, and the interrelationships.

Campers will:
- diagram a food chain of 6 members designating the producers, consumers (herbivores, carnivores), and decomposers
- diagram a food web utilizing the food chains made by fellow campers
- diagram a model of an ecosystem (biotic and abiotic)
- participate in a discussion comparing ecosystems (complexity, members)
- predict the future characteristics of the ecosystems
- give four reasons why such an ecosystem is useful
- diagram an ecosystem operating at carrying capacity
- diagram an ecosystem operating beyond carrying capacity
- diagram the abiotic factors of an ecosystem
- provide four examples of animals or plants and their adaptations

Goal #3

To provide the opportunity for participants to be exposed to Wisconsin's natural resources, the demands society places on these resources, and how these resources are managed.

Behavioral Objectives

Campers will participate in a discussion with fellow crew members about the natural resources that they are directly working with during the week. The discussion will focus on:
- uses of the natural resource
- different attitudes toward these uses
- how campers feel about these uses
- how humans depend on the resource
- quality of the resource
- how to determine the quality of the resource

Campers will be able to give examples of different lifestyles effecting the use of natural resources.

Campers will give examples of lifestyle changes that can lessen the impact on resource usage. Examples will take the form of suggested personal changes, personal improvement plans, camp improvement plans, etc.

Campers will explain resource management techniques used in connection with the work projects that they are participating on.

Campers will be able to explain the major responsibilities of the DNR and other agencies working with that resource.

Campers will be exposed to the problems that the DNR faces when managing a natural resource as well as some of the accomplishments of the agency.

The following information will be presented:
- minerals of Wisconsin, value of gravel industry
- fisheries: species in Wisconsin, quality of fishing, commercial fishing economics, management of fisheries
- wildlife: species game and non-game, management of game vs. non-game, quality of hunting and wildlife populations, economics of wildlife hunting and tourism
- forests: quality, management, economics,
- physical geography: glacial history, state sites of uniqueness
- scientific areas: what they are, how to obtain information
- parks; future of park system, quality, tourism in Wisconsin
- soil: make-up, capabilities, soil surveys, how soil is considered in management areas, erosion threats, Soil Conservation Service
- water: water cycle, components, wetlands as filters and flood control, groundwater, uses of water, pollution of water

Goal #4

Develop an awareness of the wide range of attitudes and values that are held toward natural resources. Differences arise concerning how resources should be used, which resources are important, and what degree of resource quality and quantity is needed. A wide spectrum of attitudes and views should be introduced to the campers helping them understand that there are many alternatives and facts to an issue and that it is extremely important to take these into consideration.

Behavioral Objectives

Campers will have first-hand experience talking with people representing different sides of an environmental issue.

Campers will be able to discuss an environmental issue giving examples of the full spectrum of attitudes toward the use of that natural resource and why people hold that attitude.

Campers will develop a defense for a particular attitude and present this material in a simulation presentation.

Goal #5

Build confidence in the democratic process. Provide skills which will enable campers, as citizens, to take responsible roles in the decision making process.

- How citizens can effect decisions.
- Steps involved in communicating a person's viewpoint to representatives.
- Importance of investigating all sides of an issue before reaching a decision.
- General explanation of the legislative process.
- How citizens can keep up with "what is going on" in the legislature and have constructive input in the decision making process.

Behavioral Objectives

Campers will give examples of methods citizens can use to participate in resource management decisions.

Campers will give examples of specific decisions that citizens did have an effect on.

Campers will describe ways to contact their elected officials.

Campers will describe ways to gather information about a resource issue.

After listening to as many sides of an issue as possible, campers will write a letter explaining their personal point of view on an issue. It is the camper's decision on whether he/she wants to send the letter or throw it away. The letter will contain how the camper feels about an issue, why they feel that way and what they think should be done about the issue.

Goal #6

Provide lifetime recreational skills and experiences that will enable participants to enjoy Wisconsin's natural resources to a greater extent with less of an environmental impact on the site.

- Canoeing, map and compass reading, hiking, camping, fishing, hunting
- Discuss the use of high impact recreational activities on a site, i.e., all terrain vehicles, snowmobiles vs. cross country skiing.

Behavioral Objectives

Campers will participate in activities which will provide basic skills in camping, hiking, fishing, and/or canoeing.

Campers will be able to complete an orienteering course getting from point A to point B with a map and compass.

Sample Environmental Education Program Outline

Week 1

Goals/Objectives: Introduce campers to the EE program
Introduce campers to the following concepts:
- Ecosystem
- Community
- Producers, Consumers, Decomposers
- Food Chain, Food Web
- Energy Flow, Energy Pyramid
- Niche
- Complexity
- Interdependence

Weekly Highlights

Sunday: Campers arrive

Monday: Axe and Tool Demonstration
Pre-assessment of Campers: attitudinal scales, interests
EE Introduction: Potential EE experiences, EE program objectives, EE schedule, weekly activities, evaluation techniques

Rest of week:

Work Projects: Work Project Explanation
Natural Resource Explanation and Activities
Ecosystem Investigation Activity

Evening Presentations: Ecosystems - unique characteristics, threatened ecosystems, components of ecosystems

WDNR explanation

Support Activities: Optional activities; hikes to bogs, pond investigations, creative writing, begin planning an interpretive trail along existing camp trails.

Interpretive Displays: Ecosystems
Energy flow, energy pyramid (energy used to feed a human)
Role of YCC (YCC accomplishments, need for YCC)

Weekend Activities: Canoe activities
Swim trips

Hikes: ecosystems present, what to watch for, human impact
Start photography contest
Start planning self-guided interpretive trail

Communication to staff:

- Training session during orientation week to cover EE activities and concepts.
- Handouts covering the upcoming EE activities and concepts.
- Monday morning meeting to discuss the week's happenings and staff needs for the week.

Sample Outline: Coordinator could use to introduce campers to the environmental education program on orientation day.

I. Potential EE experiences

II. Location of EE activities
   A. Work projects
   B. Travel time
   C. Evening presentations
   D. Educational field trips
   E. Weekend activities

III. Program objectives
   A. Understnad inner working of ecosystems
   B. Work with Wisconsin's natural resources
   C. Consider how different lifestyles effect resource use
   D. Become familiar with the DNR
   E. Understand the importance of listening to all sides of an issue and realizing that there are many different attitudes and values toward natural resources
   F. Learn how to participate in the decision-making process
   G. Learn skills like canoeing, camping, hiking, orienteering

IV. EE schedule for the season

V. Evaluation techniques
   A. Activities completed and participated in
   B. Work accomplished on crew
   C. Interviews with counselors
   D. Crew discussions
   E. Educational projects accomplished during the session

VI. Week's EE schedule
   A. Activities
   B. Objectives
   C. Evaluation methods

Work Project and Resource Explanations: Could be presented by work crew counselor and DNR supervisor on the work site.

Explanation of work project and the natural resource crew is working with

- purpose of project
- why this project is a priority
- what was taken into account when this project was developed
- impact/effect of the project
- alternatives to this management practice
- information about the resource being managed
- quality of the resource
- public sentiment and different attitudes toward the different uses and the management techniques used with the resource

Evaluation: Counselors will lead crew discussions about the work project and the natural resource being managed. Discussion will cover project purpose, project need, uses of the resource, management of the resource, lifestyles that effect the resource, and examples to lessen the impacts of these lifestyles.

Sample Outline: Week 2

Goals/Objectives: Adaptations
Succession
Carrying Capacity
Limiting Factors
Abiotic Factors

Weekly Highlights

Sunday Night: Introduction of EE concepts to be covered during the week

Work Projects: Work project explanation
Natural Resource explanation and activities
Ecosystem investigation activity focusing on the above concepts (adaptations, succession, carrying capacity, limiting factors, and abiotic factors) within that ecosystem.

Evening Presentations: DNR explanation
Wildlife adaptations - owls, wolves, beavers
Plant adaptations - sundew, pine cones, etc.

Evening Activities: Hikes
Recreation skills/presentations (backpacking, camping, edible wild plants, photography, fishing)

Interpretive Displays: Scientific areas
DNR case history (Face the Fox)
Adaptations

Weekend Activities: Canoeing, park visit, hikes, special counselor presentations

Sample Outline: Week 3

Goals/Objectives: Soil and Water
Life Styles and Energy Usage

Weekly Highlights

Sunday Night: Weekly EE introduction

Work Projects: Work project explanation
Natural resource explanation
Ecosystem investigation
Soil investigation, use of soil surveys
Water cycle components

Evening Presentation: Energy - future demands, trends, options, trade-offs

Field Trips: Energy systems - solar, electricity, coal, nuclear, wind
- problems, pollution, cost state of the art

Campers will fill out comparison sheets and then develop an energy savings plan for either their own home or the camp.

Evening Activities: Build solar collector, solar water heater

Interpretive Displays: Energy systems
Water cycle
Soil capabilities/considerations

Sample Outline: Week 4

Goals/Objectives: Human Impact
Examples of Human Impact on Soil and Water Erosion, Groundwater Pollution, Wetland Management, Fertilizer and Pesticide Use

Weekly Highlights

Work Project: Work project explanation
Natural resource explanation

Activity: Ecosystem Investigation

Field Trip: Agricultural system - erosion, pesticide and fertilizer use
Industrial effluents - treatment of effluents, percent of effluents, prior to standards, currently with standards, cost of zero percent effluents
Construction site erosion - WHY no erosion control measures
Landfill - cost of disposal, groundwater threats toxic, nuclear wastes, heavy metals
Sewage treatment plant - treatment, cost, cost for improvement to taxpayer
Citizen action - Legislature, letters, organizing, all sides

Evening Presentations: Groundwater Specialist
Overview of groundwater threats
Sources of pollution
Groundwater regulations
Different views on groundwater regulations
What citizens can do

Evening Activities: Group meetings to prepare for the simulation game
Recreation skills

Interpretive Displays: Erosion solutions
Groundwater threats
Trade-offs
Citizen action case study

Sample Outline: Week 5

Goals/Objectives: Trade-offs
Human Dependence
Interdependence
Simulation of Groundwater Regulation Strengthening
Program Evaluation

Weekly Highlights

Work Project: Resource explanation

Activity: Ecosystem Investigation

Simulation: Stiffening groundwater regulations hearing

Board: Agriculture
Natural Resources Manager (wildlife, forestry)
Groundwater Specialist
Soil Conservation Service
DNR Board Member
County Board Member

Groups: Agriculture
Community
Environmental Compromise
Industry
Zero Pollution
Construction

SUMMARY OF SAMPLE ENVIRONMENTAL EDUCATION PROGRAM

Week	Work Project	Educational Tours	Evening Presentations	Evening Activity	Displays	Weekends
1 Campers Arrive Monday: Camper Orientation Axe & Tool Demonstration EE Introduction	Work Project Explanation Ecosystem Investigation Concepts: Community: Producers, Consumers, Decomposers Food Chain, Web Pryamid Energy Flow Complexity/ Stability Niche Interdependence		Ecosystems WDNR Explanation	Hikes to Ecosystems: bogs, ponds, etc. Creative Writing Begin planning interpretive trail for camp	Ecosystems Energy Flow Importance of YCC	Hikes Start planning self-guided interpretive trail Canoe activities
2	Work Project Explanation Ecosystem Investigation Adaptation Succession Carrying Capacity Envir.Infl./Limiting Factors Abiotic Factors		DNR Explanation Wildlife Adaptations: wolves, owls, beavers Plant Adaptations: pitcher plant, sundew, seeds	Hikes to adaptations Investigations Rec./Leisure Skills Photo Contest - best pictures of interpretation	Scientific Area DNR Accomplishments Adaptations Ecosystem & Abiotic Factors	Canoeing to different ecosystem, hikes
3	Work Project Explanation Ecosystem Investigation Soil Investigation Water Cycle Cons. & Lifestyles	Energy Systems: Solar Nuclear Coal Wind	Energy Systems: future demands, trends, options, env. impacts: Acid Rain, Nuclear Waste Energy Shortages	Develop Camp Energy Savings Plan. Measure energy usage of camp.	Energy Systems Water Cycle Soil Capabilities	Integration of Environmental Education into recreational activities.

Week	Work Project	Educational Tours	Evening Presentations	Evening Activity	Displays	Weekends
4	Work Project Explanation Ecosystem Investigation Human Impact Erosion Water Pollution Need for Wetlands	Agric. System Industrial Effluents Construction Site Land Fill Sewage Treatment Plant Citizen Action	Groundwater Specialist Overview of Issue Sources of Pollution Different Views on Pollution Control Trade-off of Pollution Control What Citizens can do	Group meeting for Simulation of Board Hearing on the strengthening or weakening of groundwater regulations.	Erosion Solutions Groundwater Pollution Solutions Trade-offs Citizen Action Case Study	Groups of 8-10 campers will represent an assigned viewpoint to defend and explain to the Board: Agriculture Local Community Env. Compromise Industry Zero Pollution Construction
5	Work Project Explanation Ecosystem Investigation Human Dependence on Environment Trade-offs Evaluation of EE Program	Simulation Board Meeting considering the strengthening groundwater regulations. (Board will be chaired by local professionals from DNR, agriculture, community)				Campers Depart

APPENDIX G
Developing Interpretive Trails

Interpretive trails

They can be a challenging part of a camp's programming

by Jerry Elliott

The word "trail" makes one think of adventure, discovery of the unknown, an opportunity to explore, and a chance to be on "your own." That is, unless one has had to go on a "nature trail!" The magic is often lost in the formal textbook approach to interpretation which is so often used. Since the trail does not meet the campers' needs, the interpretive signs are often vandalized and the trail quickly falls into disuse.

It is possible to develop a self-guiding interpretive trail that will provide the fun and adventure that the campers seek; and the development of such a trail can be done as an integral part of the camp program.

The values of a self-guiding interpretive trail are many. First, it permits the user to travel along the trail at his own pace. It permits one to enjoy and learn in the natural environment when there is no qualified environmental interpreter to lead a walk. Self-guiding trails can be used with a minimum of counselor supervision. The visitor has some assurance that by following the trail he will not get lost. Finally, such a trail offers a teaching-learning resource which, if properly used, is without comparison.

Experience with interpretive trails has shown that the persons who learn the most are those who are involved with the planning and development of the trail. Involvement is one of the keys to learning. If the campers are involved in the planning and development, there is a real opportunity for learning. On the other hand, using a trail where the staff has previously installed plaques, identifying the trees and flowers, encourages a minimum of involvement and usually very little learning.

Development of the trail as a camper project has many advantages. Inventorying the area, laying out and building the trail, developing the trail guide and booklet, provides an opportunity for camper involvement which every program seeks.

Trail development can provide the nucleus for an entire summer's environmental education program. Use of the trail by school and weekend groups throughout the year extends the environmental education opportunities significantly.

Parents and other adults using the trail and learning from it will be impressed; and the camp enjoys benefits from its public relations value.

Choose an area for the trail which has a variety of habitats. If there is a stream, marsh, bog, meadow, old forest, new forest, or rock outcropping within the area, try to run the trail near all of them.

The trail should have easy access on a year-round basis. Its beginning should be near an often used lodge and it should be a loop trail with the end within sight of the lodge, also. It is desirable, wherever possible, to have a figure eight trail with the shorter loop being approximately one-quarter mile in length and the longer loop not exceeding three-quarters of a mile. A trail of this design will permit the visitor to take the shorter loop if desired and will keep him from becoming disoriented at the end when he recognizes the familiar building.

Although an existing trail may not have all of the above features, it can still be valuable as a self-guiding trail. It is important to keep the principles in mind and make the best of what is available.

Trail inventories can be time consuming and very boring. To have a large group of campers attempt an inventory might even prove disastrous to the trail. However, by dividing the campers into small "detective" groups and giving each group a small section of trail, several groups can be supervised by one counselor. When each group of three or four campers has finished, sharing their "finds" with the other groups provides an exciting dimension to the experience.

When an existing trail is used, the first step is to make a rough map. Campers can put their map and compass skills to work as they take bearings, pace off distances and record them to scale on ¼ inch-squared paper.

Divide the campers into small groups with three to four campers and review the mapping procedures. Make sure that they all use the same scale and assign each group to a section of trail not over 150 yards in length. It is extremely important that the mapmakers label each segment of the trail map with the compass bearing and the distance. They should also mark and label any significant landmarks such as streams, large trees, or rocks on their maps. From these small group maps a large master map can be made. It is important to keep the small group maps as they will be needed for the inventory process.

Inventorying the section of the trail which they have mapped might be done as a part of the next session. To make this inventory, each group takes its map and walks along the trail section very slowly looking for things of interest. As they are found, the location is pinpointed on the map and

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Jerry Elliott is an associate professor of Recreation and Parks at Pennsylvania State University.

A well-planned trail takes little maintenance from year to year. What maintenance is needed can be planned as a part of the camp's program. The use of the trail booklet and the trail guide makes it possible to add to, or change, the story each year.

A self-guiding interpretive trail becomes an important program resource when properly constructed and used. □

APPENDIX H
Interpretive Devices

Notes on Exhibit Techniques

by Sue Murphy

This is my collection of notes on exhibit techniques. Some notes are copied directly from other sources. Others are from my own discoveries. I hope they will help you in your exhibit building endeavors.

WHAT IS AN EXHIBIT?

Definition of an exhibit: A form of communication--the visual presentation of not only objects, which may or may not be beautiful are rare, but also of related interpretive materials, in order to communicate information and ideas to the viewers; in addition it frequently has a purposeful "story" to tell (in contrast to a display which is a presentation of objects for their own sake).

An exhibit is the only communication medium wherein the user can learn at his own pace, on his own level, through his own experience.

Robert Francisco

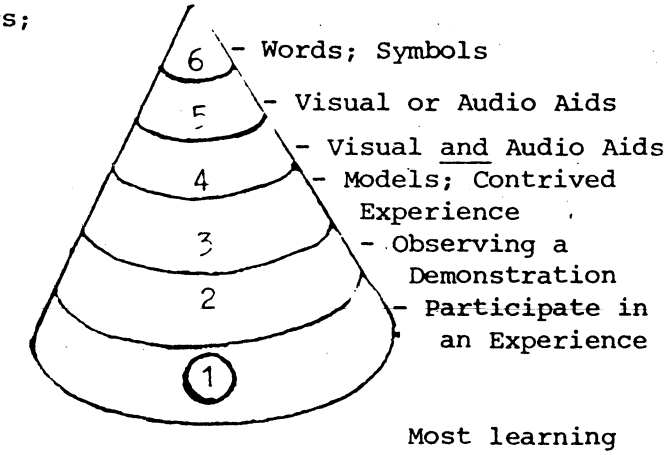
Exhibits should provide an experience, not just information. (You can get information from a book or a lecture at school.)

Exhibits should encourage viewers to discover actual objects. Discoveries of real things either present novel and exciting experiences, or they reinforce knowledge or information that the viewer has acquired through word symbols.

You can read about the immensity of a blue whale, but the idea of its great size really "hits home" if you can stand inside the skeleton of one of these giants in a museum exhibit.

Words are only symbols. An exhibit substitutes the real thing for words.

The Cone of Experience



Most learning occurs at its base.

EXHIBIT INTERPRETATION

Interpretation is:

An educational activity which aims to reveal meanings and relationships through the use of original objects by firsthand experience, and by illustrative media rather than simply to communicate factual information.

Freeman Tilden

For a good interpretive exhibit:

+Encourage the viewer to get involved by letting him manipulate some parts of the exhibit.

+Incorporate the viewer's senses.

+Use original objects. It's better to use the real thing than a model.

+Use three-dimensional modes.

+Whenever possible use objects or topics that provide high intrinsic interest such as snakes, insects, unusually shaped rocks, brightly colored specimens, or topics like life and death.

+Relate both the objects and the labels to the everday lives of your viewers whenever possible. (Blue collar workers may find an exhibit on tree xylem more relevant if it's expressed in terms of water pressure in home plumbing systems.)

+Use active language.

+Never underestimate the intelligence of your viewers, but never overestimate their knowledge of your subject.

INTERPRETATION FOR KIDS

Kids go through a series of developmental phases as they grow which influence their behavior. Development is on a physical level (gross and fine motor skills), and on a cognitive level (perception and learning).

Learning is an active process that comes about through interaction with the environment.

These are Piaget's Stages of Learning:

1) 0-2 years:

Learning is active, through senses. No thinking.

2) 2-7 years:

Classification skills developing (likenesses and differences).
Cannot reverse conjecture. (If a 3 oz. weight is added to a side of a scale and there is only a 2 oz. weight on the other side of the scale, the child is not yet able to come up with the solution if given the problem of balancing the scale.)
Senses are important.
Beginnings of intuitive thought (immediate understanding without conscious use of reasoning).
Start symbolic thought (words represent objects).

3) 7-11 years:

Classification.
Ordering.
Conservation. (The child realizes that a snake keeps its same length whether it is coiled or not.)
Reversibility.
Internal manipulation of concrete data. (Children can classify and order objects in their minds without having to physically manipulate them.)
Inductive reasoning. (A child who learns a concrete fact about one thing can apply that fact in generalizations about other things.)
Increasing interest span.

4) 12-18 years:

Abstract thought.
Concern for reasons and proof.
Deductive thinking. (A child can generalize from hypotheses.)

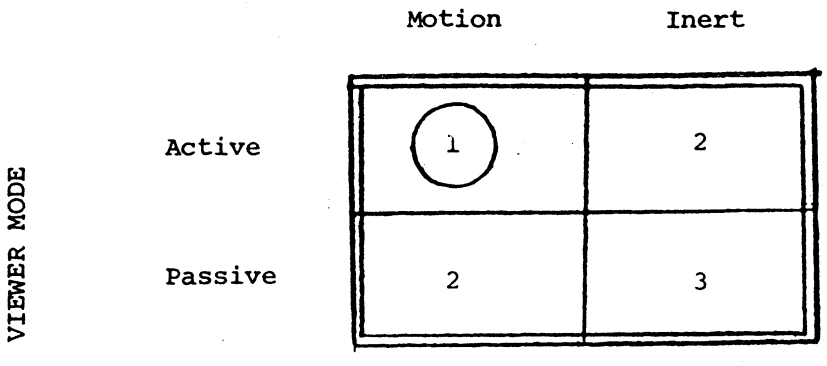
When you are interpreting for children keep these stages in mind so that you encourage the type of learning which children are capable of.

Fantasy is important in children's interpretation.

Action is also important. Let the kids do something.

Here is a model developed by Cherem to categorize exhibits:

EXHIBIT MODE



1 Motion-Active Cell

example: a live turtle exhibit where visitors can handle the turtles

Decreasing Intrinsic Interest

2 Motion-Passive Cell

example: the pendulum exhibit in the science building

More Interpretive Technique Required

3 Inert-Active Cell

example: a mineral exhibit where visitors can handle the specimens

4 Inert-Passive Cell

example: a traditional behind-glass static display

INTERACTION WITH EXHIBITS

I hear, and I forget
I see and I remember
I do and I understand.
Ancient Chinese Proverb

Getting your audience to interact with your exhibit is great. Interactive exhibits not only attract attention, which is a prerequisite to learning, but they also provide immediate feedback to the viewer. Challenge people to answer your questions through discovery.

Some successful interactive devices are:

Question flip-ups (very simple)
Quizboards
Punch boards
Self-scoring latent image response cards
Trainer-tester cards
Self-paced tape cassettes
Computer terminals

Interactive devices can be very elaborate and expensive. Sometimes the more money you spend the better your exhibit will be. However, participation is not just pushing a button to turn on a machine. How the participation interrelates with the subject of the exhibit is all important. Experience is the key. What the visitor experiences should be directly related to the exhibit's message. Some devices such as quizboards are often not too effective because instead of improving exhibit communication, they themselves become games where the object of the experience is to ring a bell or turn on a light, and the exhibit itself is forgotton or ignored.

Make sure your interactive strategy enhances exhibit communication instead of interfering with it.

PLANNING EXHIBITS

Before you do anything else consider the following:

Why?

Is the purpose of your exhibit to change attitudes? to entertain? to teach? (If it is to teach, what are your instructional objectives?)

Does the purpose of your exhibit follow the objectives of the museum or nature center that it will be in?

Will it meet the expectations of the people who come to see it?

What?

What is the exhibit's topic or concept. Pin down the details. Don't try to include too much information.

Who?

Who will see the exhibit? Is your audience heterogenous with respect to age and vocation, or is there a specific target audience you would like to reach?

Consider socio-demographic characteristics of your audience, and the predominant age group. (Most exhibits for the "general public," like the newspapers, are gauged to a 5th or 6th grade reading level.)

How? When? Where?

Is the exhibit permanent or temporary? Will you ever have to move it? (This may effect how much you wish to spend on materials.) If the exhibit is to last a long time, use simple styles and color schemes which will not become outdated.

Where will your exhibit go in the exhibit hall? Consider competition

with other exhibits' themes, crowd flow, glare from windows, reflection from other exhibits, and technical problems of electrical wiring for lighting systems, heating, humidity control, etc.

Think about space. Give your audience enough room to stand back at least five feet from the exhibit.

Is the exhibit vandal-proof?

So What?

How will you evaluate your exhibit once it is placed? Will you use questionnaires, or attitude and comprehension tests?

How cost-effective is the exhibit? Do people really look at it? Do they learn anything? Is it an experience for them?

A successful exhibit must:

1) Attract attention.

2) Hold its audience long enough to...

3) Communicate its message.

To attract attention:

+Use motion

+Use the element of surprise. (Asking people to look into a small opening fitted with a mirror to see the "most dangerous animal on earth" is an idea for a "surprise exhibit.")

+Use questions which cause conflicts in the viewer's mind. Puzzling questions are good attention getters. (An example of such a question: "What do ants grow in their underground farms?")

+Relate titles to the everyday lives of the audience.

+Use eye-catching stimuli. (Analyze creative advertising.)

Use sequencing strategies to help the exhibit viewer to organize the information you present in his mind. Some strategies are:

Chronological order
Parts of a whole
Easy to difficult
General to specific
Cause and effect

If you are doing an exhibit on animals, it has been found that some facts about animals are more interesting than others.

More Interesting:

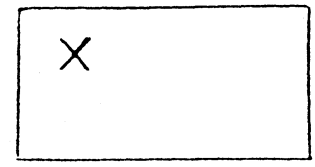
its common name
where it lives
feeding habits
how rare or unusual it is

Less Interesting:

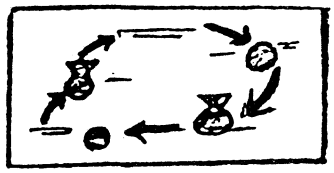
its methods of defense
its size at maturity
its scientific name
whether or not it's edible

DESIGN PRINCIPLES

Focal Point: Your exhibit should have a focal point, a center of interest. Most people start looking at an exhibit or a picture at an area to the left and up a little from the center. This would be a good place to put your center of interest.

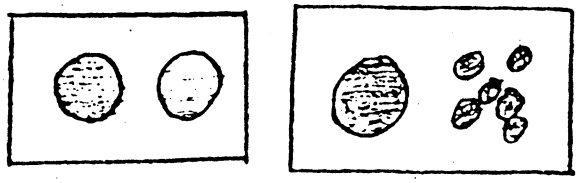


Unity: The viewer's eye starts at the center of interest or focal point and follows a visual path through the exhibit.

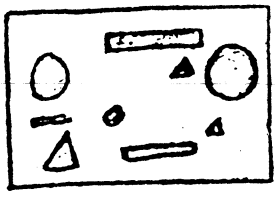


Balance: You can use either symmetrical or asymmetrical balance, but be aware of the fact that in order to have a good exhibit, it should have balance--not too many or too few objects, words, colors, etc. in any part of it.

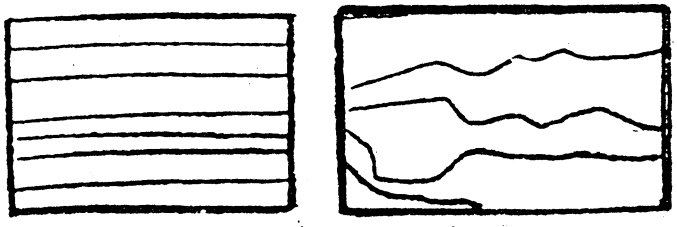
symmetry asymmetry



Repetition: Repeat the shapes and colors you use throughout the exhibit to give it unity and draw the eye around a visual path.



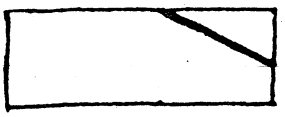
Tension: Tension stimulates interest. Lines interacting with one another create tension.



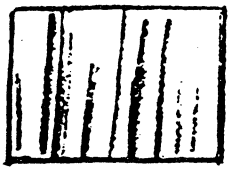
No tension. Boring!

Tension. Interesting!

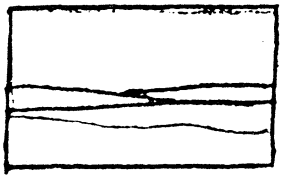
Lines: Don't use strong diagonal lines that cut off corners.



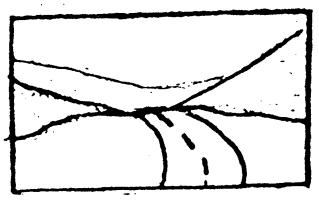
Use lines to help create your mood. Strong vertical lines suggest power.



Horizontal lines suggest peace.



Converging and diverging lines give depth to an exhibit.



LABELS

A Picture is Worth a Thousand Words. The whole idea of an exhibit is to substitute objects for words, so try to use a minumum of labeling, but always enough to get your message across. Don't pack information too densly, but give the essentials in your labels.

Labels are a bridge between the viewer and the exhibit elements.

We are in a non-print age. People expect to get a maximum of information with a minimum of effort. They won't want to read and will glance at your exhibit for only about 30-40 seconds if nothing catches their eye. This

means that you will have to use dramatic main titles which contain about 50-70% of your message.

Remember that popular fiction writers and newspapers gauge their reading level to about 5th or 6th grade.

Titles should only be about 4 or 5 words long, and texts should only contain about 25 or 30 words.

In your titles and texts use:

short sentences
short paragraphs
active verbs
familiar words

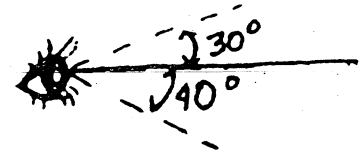
Always keep in mind that exhibit viewers are usually standing and are subject to "museum fatigue." It is very tiring to read on your feet and keep your eyes focused on labels and objects that are at a constant distance away from you behind glass. To combat museum fatigue, provide resting places near the exhibit and arrange the exhibit objects in more than one viewing plane.

The eye favors objects at eye level. The mean adult eye level is 5'2". From a viewing distance of 24-28" away, an average adult museum visitor observes an area only a little over one foot above eye level and three feet below it.

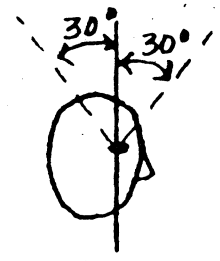
Your title or headline should be no more than a few inches above eye level, and subtitles should be only a few inches below eye level.

Remember the comfortable limits to the range of human eye and head movements when you design your exhibit. Don't expect people to crank their necks or strain eye muscles to read your labels.

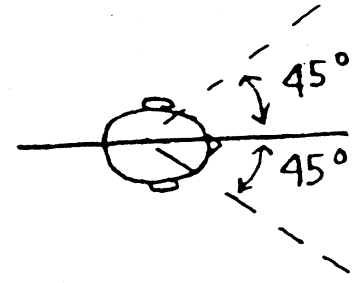
Comfortable Limits of Eye and Head Movement



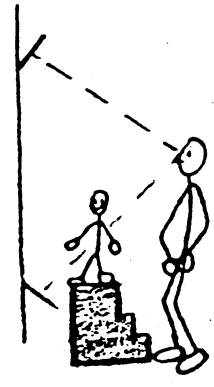
eye: up or down



head: up or down (Bifocals cause people to tip their heads back farther than the comfortable 30 degree limit.)



head: left to right



Tip the top labels down and the bottom labels up so that they are at a 90 degree angle to the eye. (This is the optimum angle for reading.)

Also, use steps for kids in front of the exhibit so that they can see as well as adults.

Color and Labels: The color of the letters in your labels should be in high contrast to the background color. Legibility comes from contrast.

Black words on a yellow background is the most legible combination.

White letters on a black background is a poor combination. The black absorbs too much light and words are hard to read. (There is a 10% reading speed loss.) For one-word labels, white on black is OK, though, because it attracts attention.

Here is a list of letter and background colors: (best legibility: sharpest contrast at the top of the list and poor legibility:weakest contrast at the bottom):

Letter Color	Background Color
black	yellow
green	white
red	white
blue	white
black	white
red	yellow
white	blue
white	red
white	black

Be sure you know the effect a background color has on the letters you put on it. Don't use intense colors for backgrounds.

Pale blue, because it is never quite in focus, irritates some people's eyes, and will even make things seem a little blurred.

Blue is also likely to cause wandering attention if it is not used with highly contrasting colors.

Violet is less visible to older people than other colors because the aging of the lens within the eye produces a yellow filtering which tends to neutralize violet (yellow's complement).

♀ preference: black letters on red background

♂ preference: black letters on blue background

Letters: Don't use fancy letters. They are difficult to read and this discourages people from reading your labels.

Don't use all capital letters. They take 14% longer to read than lower case letters, and they take up to 40% more space.

A combination of capitals and lower case letters is by far the most legible, since the ascenders and descenders form the shape of the word.

Stopped = Word form is present with capital and lower case letters.

STOPPED = No word form when all capitals are used.

Find a lettering book in the LRC and examine various type styles. Pick a simple one. Lower case bold black (a very simple style) is the most legible.

Three-dimensional letters are good for exphasis in titles, but are too difficult to read in texts and labels.

Simplify punctuation. Omit punctuation after the following abbreviations and contractions:

Mr	Dr	Ave	am
Mrs	St	Inc	pm
Ms	Co	No	

Avoid over-capitalization. When in doubt, use lower case.

Keep numbers to a minumum. (Use 1978-9 instead of 1978-1979.)

Size of Letters: Letters in the title or headline should be about 2" in height, or a minimum of 1" in height for every 35' of viewing distance.

Letters in subheads can be ¼" high for a viewing distance of 3', and ½" high for a viewing distance of 6 feet.

Spacing of Letters: For spaces between letters use ½ the thickness of the letter "I". For spaces between words, use the thickness of the "m" or "w". At least the height of capital letters should be allowed between lines.

Spaces between lines should always be greater than spaces between words.

Texts: A line in your text should not exceed 50-65 letters in length. Long lines are hard to read. The length of a printed line in relation to type size can impair readability and comprehension. It's hard to swing back to the beginning of successive lengthy lines.

Large blocks of print discourage people from reading them, so break your paragraphs into smaller sections.

Where symbols can be used, they are almost always simpler and more acceptable than words.

Present objects and labels in easily comprehended units.

An effective way to reach the casual viewer, as well as the viewer who is interested in specific details, with the same exhibit is through gradation of information. Put general information which can be absorbed in a glance in the main titles and headings. More specific information goes in the subheads, and the details can be put into labels and texts.

The exhibit would then satisfy the casual viewer who reads only the main headings to get general ideas, as well as the viewer who is interested in detailed information.

Label and text content should be directly related to characteristics of objects and exhibit objectives.

Avoid difficult language or scientific jargon.

Use brief statements directing visitor attention to the objects themselves.

Use liberal paragraphing and sufficient line lengths to avoid breaking up words.

Labels should be in close proximity to the objects they talk about.

Sufficient lighting is essential for reading labels and texts.

For groups under 12 years old too many labels decrease attention.

Questions: Introductory questions can increase visitor involvement with the exhibit. Questions motivate the viewer and attract viewer attention, but they do not always enhance learning if the answers to the questions are overly obvious.

Label and Lettering Materials: Here is a list of methods you can use to make labels:

Printing press (museum)
Vari-type letters (media lab)
Press-on labels (media lab)
Free-hand or with a LeRoy Set (media lab)

APPENDIX I
Teachable Moments

The educational aspect of camping is one of its most valuable assets. Conscientious camp program directors insist on planning for a wide range of educational opportunities which maximize the chances for learning and change to take place in the camper. In spite of good planning, educational objectives are seldom met completely. Thus, camp program directors are usually looking for means which will strengthen the educational aspect of the camp's program.

One method by which educational objectives can be more completely met is full utilization of the spontaneous teachable moments which arise as a normal part of camp life. Since these moments originate in the camper, they are equally present in any style of camp operation—from the formal, highly-structured to the more informal, loosely-structured.

What is a teachable moment?

A teachable moment is a time when the camper and the situation have made all the conditions right for learning to occur. It is a vulnerable time when the camper is in a receptive mood, and his attitudes and values are susceptible to creative change. The camper has opened the mind's door and invited someone else to come in and share. The value of the teachable moment resides in the fact that the camper is ready to learn because he is asking to be helped. Under these circumstances the most effective and creative learning occurs.

Opportunities for teachable moments come often and in many forms. It may be a camper's comment: "I wonder what made that tree look like that." It may be a point of disagreement withing the group: "Everyone else may want to take the high trail, but I don't think we should." It may be the discovery of something never noticed: I didn't know that about an orb-spider web."

It may be the discovery of a new skill: "I did it!" It may be a question that one had never thought to ask, or never had nerve to ask: Wonder why things have to die?" It may be a failure of some kind: "That has got to be the worst cookout meal I've ever tried to eat!" The list of possible teachable moments is limitless and unpredictable.

Opportunities

Because of the unpredictable nature of the teachable moment, it is difficult to teach leaders how to adequately recognize and respond when they arise. The benefits of these moments are limited only by the inability of the leader to use the teachable moment to maximum advantage. Thus, high on the priority list of every camp director should be time spent with staff helping them to recognize and respond to these valuable teachable moments. When the teachable moment is missed, the opportunity for related learning is missed. Every teachable moment is an opportunity.

Often camp leaders simple do not hear or see what a camper is trying to communicate

It was a wise person who observed that some persons murder opportunity, others take advantage of opportunity, and a few persons create opportunity. For the benefit of our camping experiences, it is helpful to substitute the phrase "teachable moments" for the word opportunities.

How to murder opportunity

The murder weapon most often used to kill the excitement of a teachable moment is insensitivity. Often camp leaders simply do not hear or see what a camper is trying to communicate. A question may be raised or the group may be faced with an issue which simple escapes the leader's attention. The cause may be simply pre-occupation with other things. At worst, the cause is sheer callousness to what is happening. Nevertheless, in any case, opportunity murdered.

Sometimes the murder weapon is insecurity on the part of the leader. An issue may be raised with which the leader is either uncomfortable or unknowledgeable. Rather than expose the personal insecurity, the leader chooses to ignore or sidetrack the teachable moment—opportunity murdered.

Another murder weapon is misordered priorities. The leader may be more concerned about meeting an agenda than meeting the needs of a camper. This homicide may be observed in a comment such as, "We don't have time to stop and talk now. It's time for us to go swimming." Opportunity murdered.

An often used murder weapon is employed by the camp leader who is overly eager to display his knowledge to the impressionable campers. A camper asks a question which opens the door for some creative and probing thinking. The unthinking leader (eager to impress) gives a quick, very factual "answer" which quickly closes the door. Opportunity murdered.

The tragedy of the murdered teachable moment is that it can seldom be revived. The time was right and time can seldom be turned back to recover the mood of receptivity present when the teachable moment first came. Any attempt to inject new life into a postponed teachable moment by use of artificial respiration is a failure. It is unfortunate when a leader murders a teachable moment by failure to respond. The first step in adding the teachable moment to our educational tool kit is to have the sensitivity to recognize it.

How to use opportunity

The next step is to have the security and competence to deal with the teachable moment. Using the teachable

(continued on next page)

moment (taking advantage of the opportunity) also takes many forms since it is a direct response to a specific situation. The form depends upon the situation, the leader, the environment and the nature of the issue.

On some occasions the opportunity may be dealt with in a simple, direct and straight-forward way. This is the most often used. It is also the most often misused. Creative thinking is stifled by a direct answer. Camp leaders need to learn to help a group expand thinking powers by assisting them in the discovery of their own answers. A good method is to ask leading questions which require thinking.

For example, a group may discover a malformed tree and someone asks why it became that way. The leader's temptation is to give a direct answer. However, to take maximum advantage of this opportunity the group leader can ask a series of questions such as: - is this the only tree you see shaped like this? Are there other trees of this species in the area? If so, do they have the same characteristics?

Do you see in the area any evidence which might indicate the cause? Let's brainstorm. What possible causes are there? Of all possible causes we've thought about, which is the most likely? Why? Could it have been prevented?

Was it caused by nature or man? - In light of what you know about ecology, should the tree be left as is or should it be cut? When such a process is followed something more important than the answer is taught - campers develop the ability to think!

Campers seem to have the ability to ask questions to which leaders do not know the answers. This should not threaten the good leader, but should serve as a greater motivation. A sensitive leader may say in this situation, "I'm not sure what made the tree malformed, but let's see if we can find out." The leader and campers become co-searchers for the truth.

Campers will often be able to solve their own problems if the leader is open to their suggestions

In using the teachable moment, a wise leader will want to turn to the group for suggestions. This is especially true of situations involving differences of opinion, dealing with failure, or discipline problems. In these kinds of opportunities, it is wise to be able to collect and evaluate all available data before coming up with a solution. Campers will often be able to solve their own problems if the leader is open to their suggestions. Leaders may also discover that the camper's solution may be superior to their own.

All teachable moments do not necessarily require an answer. Some may require a question. For example, after a bad cookout, the sensitive leader may simple ask, "Well, what went wrong?"

Sometimes even spoken words are not necessary to respond to a teachable moment. It may require no more than a warm accepting smily or an encouraging and affirming hug.

How to create opportunities

A teachable moment is a spontaneous outgrowth of a group or individual experience. The emphasis is on spontaneous. Although one cannot anticipate or manufacture teachable moments, an alert leader can help create an environment so accepting and cordial that campers are more likely to open themselves to desirable change.

If a camper knows that he will be accepted and loved under all circumstances, that he will not be laughed at or belittled if he asks a question that is important to him, that suggestions offered will be given equal consideration along with all others, that he is secure in the group—then the conditions are right for the camper to open himself to possible change. Such self-opening is possible because the individual has sufficient trust that the group will help and support rather than abuse or tear down. Creating this kind of atmosphere makes it more likely that teachable moment opportunities will come.

An alert camp leader may, without being manipulative, encourage and create some situations in which campers are more likely to create teachable moments. For example, a hike through an area victimized by forest fire will almost certainly cause the campers to raise questions. The good leader is constantly seeking situations which stimulate the camper to want to learn.

Many camp leaders are so eager to have their group succeed, that they will go to any extreme to keep them from failure. This attitude may be an injustice to the group. One of the most creative teachable moments may be after a failure. The leader should be willing to let the group fail so long as the failure does not jeopardize the health or well-being of the campers. If handled properly, what happens in the teachable moment of failure may be more creative than what happens after a success. It should be noted, of course, that a group or individual faced consistently with failure should be given the opportunity to succeed.

Many camp leaders are so eager to have their group succeed, that they will go to any extreme to keep them from failure

Learn to use teachable moments

The ability to creatively use a teachable moment may be the most valuable tool available to a camp leader. The ability can be cultivated and should be stressed and practiced in staff training. Camp directors need to be sensitive to the teachable moments which arise in staff training. In cultivating this skill each staff member can:

Learn to listen to what persons are saying.

Keep eyes and ears open to what is happening in the dynamics of the group.

Become acquainted with age group characteristics and the types of questions raised by persons of various ages.

Become familiar with as many camp-related topics as possible.

Learn to help persons clarify issues that are raised.

Learn where to locate authoritative information about subjects with which they are unfamiliar.

Learn when to speak and when to remain silent. □

APPENDIX J
Environmental Simulation Game

a lesson plan for

A LAND USE SIMULATION

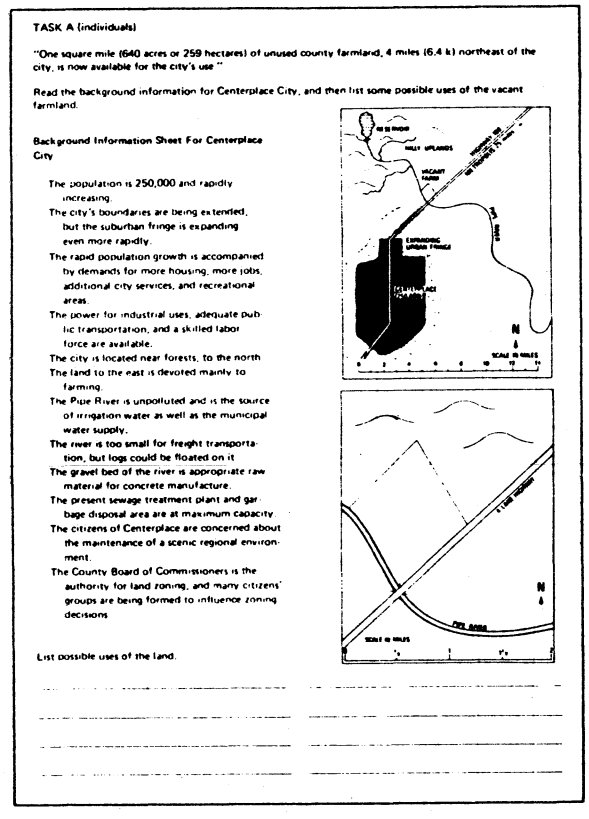
Set the stage for this investigation by reviewing quickly what will take place. For example, "During this activity, we will participate in a simulation game concerning land use in a hypothetical community, analyze what we have done, and discuss some ideas and ways for you to develop your own simulation game about local environmental issues or concerns." The techniques combine elements of simulations, games, and role-playing. Participants assume the roles of decisionmakers in a simulated environment and compete for certain objectives according to specified procedures and rules.

Note to facilitator: **Both the metric and English systems of measurement are included in the lesson plan. If it has not already been determined, you should discuss and decide with the group which system will be used.**

I. NAMING, RECORDING, AND CLASSIFYING POSSIBLE USE OF LAND

1. **Distribute Task A. Read the problem to the group and then have them read the given information on Task A and list possible uses of the land to meet the city's needs.**

2. **"The problem is to identify some possible uses for the 1 square mile (640 acres, or 259 hectares) of county farmland, 4 miles (6.4 k) northeast of the city."**



TASK A (individuals)

"One square mile (640 acres or 259 hectares) of unused county farmland, 4 miles (6.4 k) northeast of the city, is now available for the city's use."

Read the background information for Centerplace City, and then list some possible uses of the vacant farmland.

Background Information Sheet For Centerplace City

- The population is 250,000 and rapidly increasing.
- The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.
- The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.
- The power for industrial uses, adequate public transportation, and a skilled labor force are available.
- The city is located near forests, to the north.
- The land to the east is devoted mainly to farming.
- The Pipe River is unpolluted and is the source of irrigation water as well as the municipal water supply.
- The river is too small for freight transportation, but logs could be floated on it.
- The gravel bed of the river is appropriate raw material for concrete manufacture.
- The present sewage treatment plant and garbage disposal area are at maximum capacity.
- The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.
- The County Board of Commissioners is the authority for land zoning, and many citizens' groups are being formed to influence zoning decisions.

List possible uses of the land.

Investigating Your Environment Series
Forest Service, United States Department of Agriculture
Revised 1978

Questions and Discussion

When most people have started to write down uses on Task A, go ahead with question 1.

1. "What are some possible uses for the undeveloped land?" As people respond, write all comments just as they are said. Instead of paraphrasing if they are too wordy, ask: "How shall I write that on the chart?" List all suggestions, specific or general. Number the items as you go along, to simplify identification later. When you feel that you have enough material, go on to question 2.

2. "Which of these possible uses are similar?" Designate similar uses by letters, symbols, or colors. When most are designated, or the group seems to run out of thoughts, *stop.* Changes items among categories if the participants change their minds. Do not get bogged down in the details of grouping. For example, if some people think one use should be in another category, then put that use in both categories and go on to the next step.

3. "What label could we give to all the items in the same category?" (Recreation, industrial, utilities, housing, commercial.)

II. DEVELOPING AND GIVING PRESENTATIONS

1. Divide the group into the number of land use categories identified, with not more than eight persons per section. Assign one of the categories to each group for them to represent. One way to set up groups is to have the total group count off by the number of categories identified.

2. Pass out Task B. Inform the participants, "You have 10 minutes to list and analyze the advantages and disadvantages of possible uses for the vacant land in the assigned category. You may consider those listed on the board plus any other possible uses you can think of in your category." It is important to stress that this task is to just analyze the uses of the land.

TASK B (in groups)

Group _____ Assigned Category of Land Use _____

Your only task is to analyze and list possible consequences of different land uses within your assigned land use category. Do not decide which is the best use.

Use	Advantages to land/people	Disadvantages to land/people

3. (After about 10 minutes) Tell the groups, "Your next task is to develop a land use plan for the area in your assigned land use category." (About 20 minutes) After each group has started their planning (5-10 minutes), go to step 4. If all the directions are given at first, many groups start drawing a map before considering different land uses.

4. a. "We have just received word that because of the current workload from reading environmental impact statements, the members of the Board of County Commissioners have all resigned. Each group has one minute to elect one member to represent them on the Board."

   b. One of the facilitators takes the new Board members to another room and:

   Passes out Task C and reviews it with them
   Tells them they have 15 minutes until the group meeting starts
   Has them concentrate on evaluation criteria first
   Tells the Board to elect a chairperson to preside during the group presentation
   Instructs the chairperson to read over the announcements at the bottom of Task C to the whole group.
   Group decides which staff person will be the timekeeper.

TASK C (County Board members only)

"One square mile of unused country farmland, four miles northeast of the city, is now available for the city's use."

1. Using this information, your task is to:
   a. Develop criteria to evaluate the proposals.
   b. Develop a system to record your evaluation of each proposal.

Background Information Sheet For Centerplace City

The population is 250,000 and rapidly increasing.
The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.
The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.
The power for industrial uses, adequate public transportation, and a skilled labor force are available.
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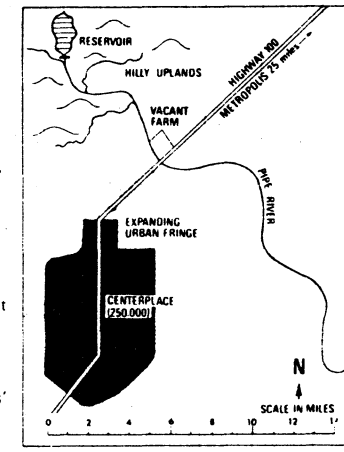
The river is too small for freight transportation, but logs could be floated on it.
The gravel bed of the river is appropriate raw material for concrete manufacture.
The present sewage treatment plant and garbage disposal area are at maximum capacity.
The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.
The County Board of Commissioners is the authority for land zoning, and many citizens' groups developing are being formed to influence zoning decisions.



Group Making Presentation (use category)	Criteria to Evaluate Proposal (Rating)					
	1	2	3	4	5	6

Elect a chairperson to preside during the presentations to the group and to run the meeting in an orderly manner. (5 minutes) Announcements to be made by chairperson:

- Because of time constraints, there will be no rebuttal after presentations.
- The Board may ask two or three clarifying questions of each group after all the presentations.
- You have 3 minutes to give your presentation. You will be given a warning when you have 1 minute left.

c. After the Board leaves the room, make this announcement.

"You have about 15 minutes to finish your plan and develop a 3-minute presentation to be made to the County Board of Commissioners. Your 3-minute presentation must include a visual display, such as a land use map, as a part of your presentation, and more than one person in each group must participate in making the presentation." Pass out markers and large paper to each group.

5. When all groups are ready, have the Board enter the room and sit at the front. The chairperson makes the announcements from Task C and sticks to them, in order to keep the process moving. The timekeeper is to stop all presentations at 3-minutes and give 1-minute warnings.

6. When the presentations are finished, the Board retires for 5 to 10 minutes to select the best proposal.

7. "While the Board is meeting, each group is to develop a list of criteria that they think should be used in evaluating the plans submitted." Pass out Task C to use in developing the criteria.

8. The County Board re-enters the room, reads their criteria aloud, announces their decision, and reads criteria used in making the decision. Board adjourns.

Person in charge must move rapidly to the next question to avoid shouting matches between losing groups. Have Board members return to the groups who selected them. The main purpose is to evaluate the process, not to get bogged down in the content of the issue.

Questions and Discussion

1. "What additional data would you have liked to have for planning your group's proposal?"

List example responses on board: Topography, vegetation, economy of area, railroad, shopping center, adjacent land, climate, soil survey, historical information, flood plain, wildlife, interest of board of control, money available, educational needs, regulations by State, existing zoning, political climate, population information (age needs, race, jobs).

2. "Where would you go to collect information on these topics?"

3. Point out to the group that this is one of the most important parts of the activity because it emphasizes that we need a variety of information and data before we can intelligently make a land management or environmental decision to best meet the needs of people and their environment. This list has many of the elements that need to be considered in studying a local environmental issue or concern. It also includes elements of all the curriculum subject areas (social studies, science, language, arts, etc.). We have to use, therefore, the total community as a classroom or learning environment to collect the information.

4. Discuss any case histories of teachers or groups using this approach.

III. ANALYZING CHARACTERISTICS OF SIMULATIONS

"One group of people working with simulation games has identified *at least* three basic characteristics of most simulation games: (Have on chart)

1. "There is a clearly defined problem.

2. "There are factors that influence the decision.

3. "There are individuals and groups interested in the decision."

IV. DEVELOPING YOUR OWN SIMULATION GAME

1. "The most exciting simulation games are ones people develop themselves, on the basis of local environmental issues in their community, State or region."

2. "Can you think of some current environmental issues in your own community around which you could develop a game?" Call for responses.

3. "For the next 30 minutes, work with one or two other people to develop the format for a simulation game based on a local land use issue or topic of your choice. At the end of the time, we would like to hear from several of you about what you have developed." Have copies of current newspaper articles available if participants want to use them. Pass out Task D.

TASK D (groups of 2 or 3)

DEVELOPING A SIMULATION GAME

Using a newspaper article about a local environmental land use problem, develop the format of a simulation game, considering the following items:

Identification of the problem or issue to be decided upon

Identification of some factors having an influence on the decision

Identification of individual or group roles (those people or groups that will be affected by, or interested in, the problem).

Other things you may want to consider in developing simulation games:

Establishment of conditions for the players (noting procedures, available resources, money, etc.)

Development of specific goals or objectives for players

Inclusion of limits, or rules for what is permissable behavior (time factors, trading, point system, money allocations, etc.).

V. SUMMARY

1. Discuss Task D.
2. "How can you use the techniques in this session in your job situation? In the classroom?"
3. "How could a game like this develop decisionmaking skills in environmental management?"
4. "How can we take this process and use it to involve the public in social and political decisionmaking action projects in the community?"
5. "How can we summarize the use of simulation games in environmental interactions?"
6. "Simulation games can help people to understand problems in the environment and develop awareness and concern about these problems and the skills needed for citizen action and involvement in environmental management."
7. You may want the participants to evaluate the session by writing how they felt about it.

VI. SOME OBJECTIVES

Behavioral Outcomes in Knowledge

1. As a result of this session, each participant should be able to:
   a. Identify and describe three component parts of simulation games
   b. Construct his or her own simulation game based on a current environmental issue
   c. Name and describe at least 10 important types of data needed before making a land management decision
   d. Identify cause and effect relationships that exist in environmental management
   e. Describe alternative solutions to solving a specific problem.

Behavioral Outcomes in Feelings, Awareness, Values, and Action

1. As a result of this session, each participant should be able to:
   a. Describe how the information in Part III could affect their life, community, and the management of the environment
   b. Outline a plan of action to develop their own land use simulation model.

VII. EQUIPMENT NEEDED

Blackboard and chalk or easel and markers
Newsprint or butcher paper (enough for each group to make visual display)
Markers (four colors for each group to make visual display)
Masking tape
Task Cards
Commercial games on display (optional)

The Centerplace city problem has been adapted with permission from the May 1970 Journal of Geography from the article, "A Land Use Alternatives Model for Upper Elementary Environment Education," by Dennis Asmussen and Richard Cole, University of Washington.

The tasks and discussion topics in this lesson are designed so that many can be done individually or in combination, depending upon the facilitators' objectives and time constraints.

It is suggested by the writers that continual plan revision be done by the people who use this plan.

TASK A (individuals)

"One square mile (640 acres or 259 hectares) of unused county farmland, 4 miles (6.4 k) northeast of the city, is now available for the city's use."

Read the background information for Centerplace City, and then list some possible uses of the vacant farmland.

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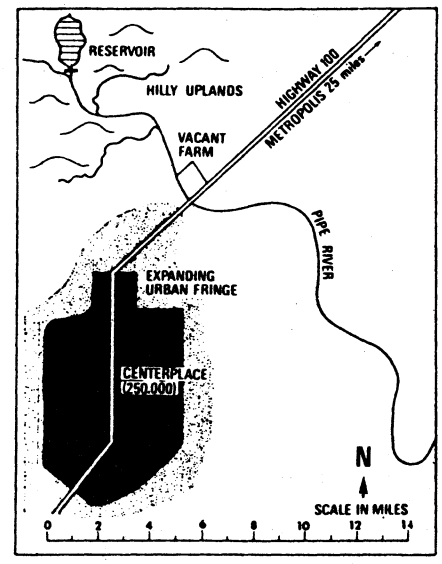
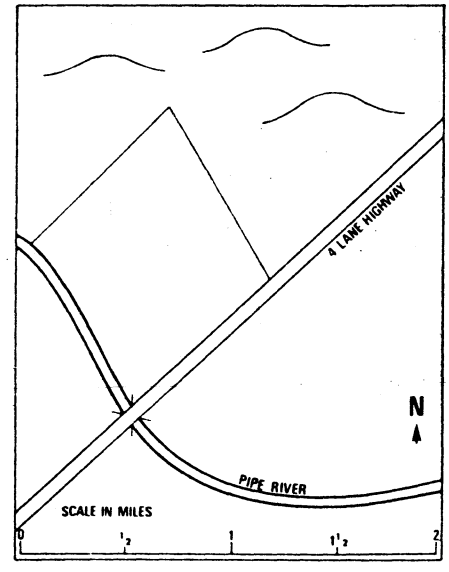




List possible uses of the land.

_____ _____

_____ _____

_____ _____

_____ _____

LAND USE SIMULATION Task Card
Forest Service-USDA

TASK B (in groups)

Group _____ Assigned Category of Land Use _____

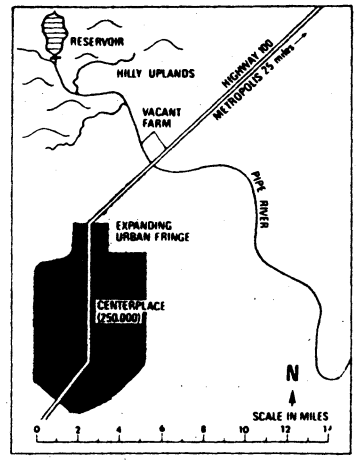
Your only task is to analyze and list possible consequences of different land uses within your assigned land use category. Do not decide which is the best use.

Use	Advantages to land/people	Disadvantages to land/people

TASK C (County Board members only)

"One square mile of unused country farmland, four miles northeast of the city, is now available for the city's use."

1. Using this information, your task is to:
   a. Develop criteria to evaluate the proposals.
   b. Develop a system to record your evaluation of each proposal.



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LAND USE SIMULATION Task Card
Forest Service-USDA

TASK D (groups of 2 or 3)

DEVELOPING A SIMULATION GAME

Using a newspaper article about a local environmental land use problem, develop the format of a simulation game, considering the following items:

Identification of the problem or issue to be decided upon

Identification of some factors having an influence on the decision

Identification of individual or group roles (those people or groups that will be affected by, or interested in, the problem).

Other things you may want to consider in developing simulation games:

Establishment of conditions for the players (noting procedures, available resources, money, etc.)

Development of specific goals or objectives for players

Inclusion of limits, or rules for what is permissable behavior (time factors, trading, point system, money allocations, etc.).

APPENDIX K

Findings from YCC Environmental Awareness Test

SOME FINDINGS GLEANED FROM REVIEWING RESPONSES TO ITEMS BEING TESTED FOR POSSIBLE INCLUSION IN THE YCC ENVIRONMENTAL AWARENESS TEST

Subjects that Youth from 15 to 18 Years of Age Seem to Know Well

I was really quite strongly impressed at the proportion of youth that knew many biological facts and also had a reasonable systemic understanding of biological systems. They seem to have been taught many biological concepts. Those who knew concepts well also were able to answer many other questions right - there were quite high correlations between concept items and the total number right for any given item pool.

Subject Matters and Areas of Concern that the Youth Did Not Know Well

The most striking finding in this category is that many students had an appalling ignorance about energy. The proportion getting questions about energy correct were often around 20 or 30 percent. We had not conceptualized energy as one of the domains of inquiry, but we are beginning to think it should be singled out for special attention because of this appalling ignorance.

We also discovered that youth of this age knew very little about geology and related physical phenomen such as mountains, glaciers, floods, volcanoes, oceans, and climate.

Similarly, youth of this age know very little about land and land use problems and about farming. Land is the basic resource for all ecological systems and it is curious that these youth know so little about this topic while they know relatively much more about biological systems and how they work.

Closely related to these last two points is the fact that youth of this age know very little about mineral resources and particularly about the possibility of encountering mineral resource shortages in the future.

Perhaps because of these sizable areas of ignorance, most of these youth were unable to make complex systematic connections among forces and phenomena in the biosphere. For example, hardly any of the students, even the best ones, recognized that increased burning of fossil fuels could increase the carbon dioxide level in the atmosphere which in turn could generate an overall warming trend of world climate which in turn could melt substantial portions of the polar icecap and flood many of the world's great cities. Admittedly that is a very complex connection to make, but most of these youth missed systemic connections that were much simpler than the one just mentioned. We all know that environmental knowledge is highly systemic knowledge; yet, little or nothing of this is taught in the schools.

Another gap is that these students have very little understanding of the history of technological impacts. Many of them know that we have pollution and other environmental

problems now but are not aware how these problems were developed as our social systems evolved. As we shall see below, this lack of knowledge of the history of technology is accompanied by a great faith in the capability of science and technology.

While youth of this age have some reasonable knowledge of environmental problems in the United States, they have very little knowledge of environmental conditions in other countries. There was also comparatively poor knowledge of worldwide environmental problems such as population growth, desertification, water and mineral shortages, and so forth. This was accompanied by almost total lack of knowledge about international efforts to solve world environmental problems such as are represented by the United Nations Environment Program and various U.N. sponsored international conferences.

There was a modest level of awareness of which agencies of government (national, state, or local) have the responsibility for resolving various environmental problems. Most misperceptions were biased in the direction of believing that nearly all of these problems were handled by the Environmental Protection Agency. Most youth were aware of that agency and assigned it a great many functions, several of which don't belong there.

Attitude Tendencies of Youth 15 - 18 Years Old

The evidence is loud and clear that there is a great love for nature in these youth. I would suspect that the

strong biology teaching they get in school is somewhat responsible for this.

Another strong tendency is a great faith in the capability of science and technology, not only for providing a good life for people, but also for solving environmental problems.

Somewhere along the line these young people have been taught that they have a personal responsibility for environmental protection in contrast to assigning that responsibility to the socio/political system. One could even think that the assignment of responsibility for environmental problems to the personal behavior of people is somewhat misplaced; it surely seems a bit naive. Despite this strong assignment of personal responsibility, the proportion reporting having taken environmentally protective action was much smaller; typically no more than half of these youth reported consciously acting to protect the environment. This would seem to be an area where there would be considerable room for improvement.

By Lester W. Milbrath

APPENDIX L

Attitudinal Test

Statements on Attitudinal Test

Respond to the following statements with SA (strongly agree), A (agree), D (disagree), SD (strongly disagree, or DK (don't know).

1. A forest that is managed for timber production has little use for other pruposes such as recreation, wildlife, pure water.
2. It is not possible for a forest to produce timber, water, recreation, and wildlife.
3. The largest portion of forest land in West Virginia should be placed in preserves to provide enjoyment for future generations.
4. The most important use of West Virginia's forest land is to produce game and fish for sportsmen.
5. Forests are for people and should be managed to provide all goods and services, timber, water, recreation, etc.
6. Clearcutting is a poor forest practice when viewed in a total forest management sense.
7. The most important use of West Virginia's forest land is to provide a place of beauty for people.
8. Society should not concern itself about how forest lands are allocated for use. Decisions should be left to the professional forester.
9. Selection cutting is a poor forest practice when viewed in a total forest management sense.
10. The most important use of West Virginia's forest land is to produce timber products for people.

11. Rational forest policy will recognize the costs as well as the benefits.
12. The most important use of West Virginia's forests is to provide a place of recreation for people.
13. Timber harvesting should not be allowed in West Virginia.
14. The wood industry of West Virginia manages its timber land to produce timber in such a way as not to destroy the other values.
15. Timber harvesting should be allowed on forested lands that are managed for that purpose.
16. The most important use of West Virginia's forest land is to provide all goods and services normally available from forest land.

Burrus-Bammel, 1978

APPENDIX M

Conceptual and Factual Knowledge Test

True/False Questions Testing Conceptual and Factual Knowledge

1. A windstorm blows down trees on several acres of forest land. No changes will occur in the forest since trees were the only part destroyed.
2. Water, sunlight, and soil are all necessary ingredients to the growth and development of forest plants, but play only a minor role in producing adequate numbers of hawks, bobcats, and other such animals.
3. Soil is a non-living part of the forest ecosystem.
4. One effect of cutting trees on the stream ecosystem is to increase the quality of soil material that it carries.
5. Insects and other micro-organisms that occur in the forest ecosystem are a menace to its existence.
6. Natural systems are separate and apart from social, political, and economic systems. That is, there is no relationship of one to the other.
7. West Virginia's forest industry plays a major role in making forest management possible in many privately owned woodlots.
8. Soils, elevation, moisture, temperature, and compass direction have little effect on the kinds of trees, plants, and animals that occur on that site.
9. Inventorying the forest includes recording of: tree and other plant species, quality of site relative to tree growth, topographic features and man-made structures, etc.

10. Properly located and constructed logging roads will reduce the quantity of soil material in forest streams.
11. The most desirable habitat for the white tailed deer and ruffed grouse is created by heavy selection harvest cuts or clearcuts.
12. Knowledge about the forest resource and its relationship to the other aspects of our life is necessary before good forest policy can be developed.
13. In West Virginia, it is usually necessary to replant with seedlings after timber has been harvested.
14. Forest fires that burn along the surface of the forest floor do not damage the larger trees.
15. An increment borer is a forest insect pest that occurs in West Virginia.

Burres-Bammel, 1978

APPENDIX N
Federal YCC Environmental Awareness Test

180

1977

YOUTH CONSERVATION CORPS

ENVIRONMENTAL AWARENESS APPRAISAL

Hello:

This booklet contains questions about some of the things you will be learning this summer in our YCC Environmental Awareness Program. Your answers to these questions at the beginning of camp will tell us what things you already know and that will help us make your learning experience more worthwhile. Your answers to these questions at the end of camp will tell us how well we were able to help you learn the things you didn't know.

We are not grading you, so don't get all uptight. We are interested in what you know and what you have learned in YCC so that we can grade <u>ourselves</u> on the job we have done.

Thanks for your help,

Your YCC Camp Staff

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PART I

1. Some resources are in danger of being "overused" and thus will become unavailable to future generations. Which one of the following is in the most danger of being overused?

   1. Coal 2. Solar energy 3. Water

2. More natural resources are used by the average citizen in a wealthy country than in a poor country.

   True False

Match the following examples of different types of resource use with the definition given that type of use or management on the right.

EXAMPLE	DEFINITION
3. Improving the technology of oil refining to get more useable oil per barrel of raw (crude) oil	A. Exploitation: A type of use geared to short-term gain, usually of an economic nature
4. Maintaining Grand Canyon in its natural state	B. Conservation: A type of use in which resources can be consumed but attention is given to getting the best use for everyone concerned including future users
5. Restoration of cliff dwellings in Mesa Verde	
6. Overgrazing range land	
7. Harvesting timber with no attention given to regeneration	C. Preservation: A type of use or management in which resources are preserved by limiting uses to those which do not have adverse effects
8. Endangering a species through killing to obtain fur for coats	

9. Which one is NOT an example of "sustained yield management"?

   1. Harvesting trees on a rotation basis
   2. Recharging ground water supply
   3. Mining peat from a swampy area
   4. Matching hunting quotas to wildlife population

10. A herbicide refers to:

   1. A chemical used to kill plants
   2. An animal that used other animals as a source of food
   3. A poisonous plant
   4. A spray for controlling insects

11. Fire is sometimes used as a tool in forest management.

   True False

12. "Clearcutting" (i.e., cutting all of the trees in a timber sale area) is a practice in forestry which should never be used.

   True False

13. It is possible to establish natural areas and wildlife sanctuaries within large cities.

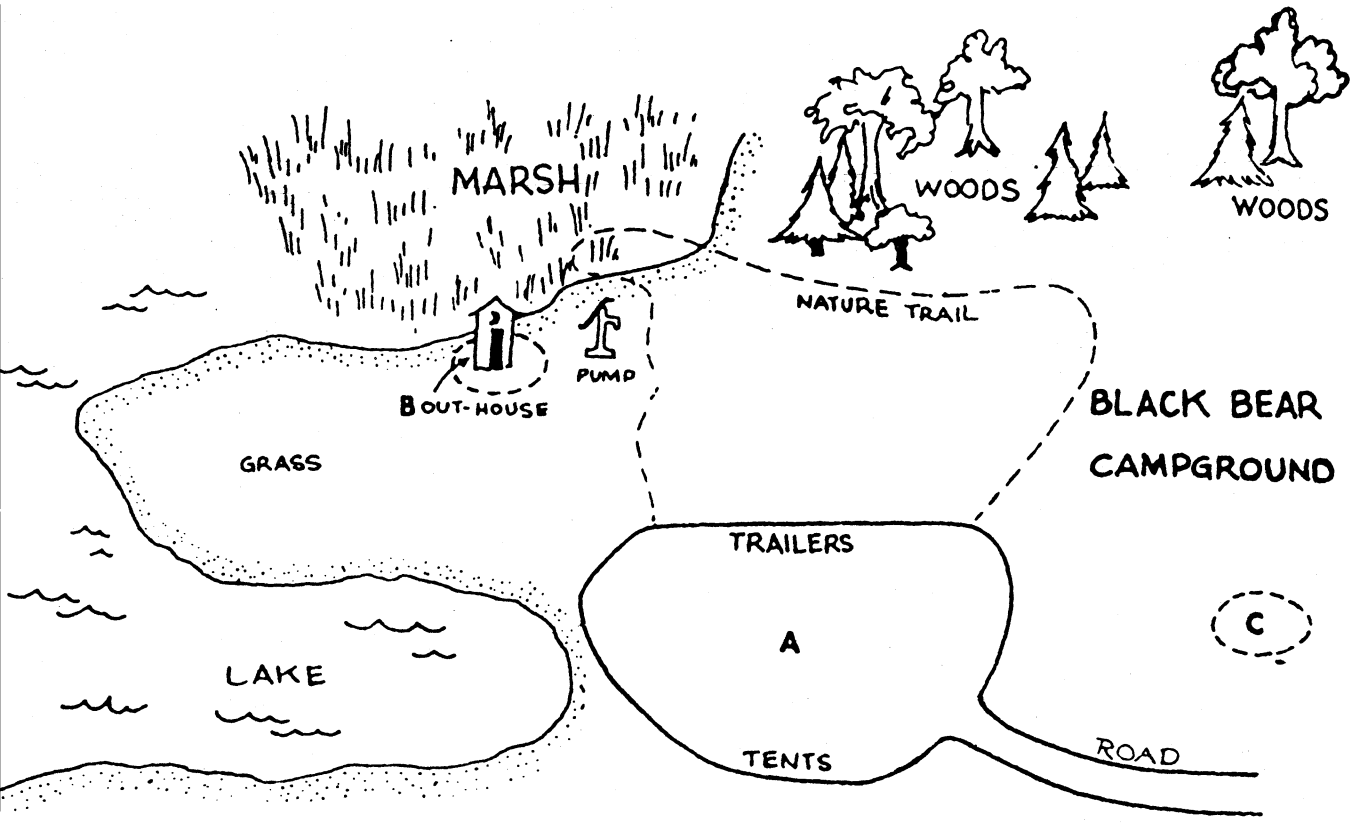
   True False

14. Biological control refers to:

   1. Control of pests with chemicals
   2. Using a pest's natural enemies to limit its population
   3. Creation of organic fertilizer by composting and biological action

15. There would be no water pollution if man did not exist.

   True False



The park ranger has decided that the above campground has been over-used and should not be used at all for the next four years. After four years of "rest" what would you expect to find for each of the following?

16. The variety of wildlife?

1. Greater than Before
2. The same as Before
3. Less than Before

17. The aspect?

1. Better than Before
2. The same as Before
3. Worse than Before

18. Before re-opening the campground, new out-houses will be put in. Is it best to retain them in Area B or move them to Area C.

1. Leave them in Area B
2. Move them to Area C
3. It makes no difference

Most of our actions have some impact on the environment, but it is difficult to determine whether the impact is so great that we should avoid the action.

To help make a decision, we need to ask questions related to a number of environmental concerns. Below are some of these concerns and some sample questions based on the concern. For each question pick the one best answer and mark it on your answer sheet.

Environmental Issue: *To what extent does the activitiy or product consume natural resources?*

19. You are at a lake and looking for summer fun; which activity would consume the most natural resources?

    1. Swimming 2. Sailing 3. Water Skiing

20. You travel to work every day; which of the following means of transportation would consume the most natural resources?

    1. Travel alone in a compact car

    2. Travel alone in a large car

    3. Travel with others in a compact car

21. A group of teenagers are looking for some fun one evening; which activity would consume the most natural resources?

    1. Drive around town in a car

    2. Sit around a table and talk

    3. Play a game of basketball

Environmental Issue: *Are the resources that are being used renewable or non-renewable?*

22. Which method of heating a house uses the smallest amount of a non-renewable resource:

    1. Coal 2. Oil 3. Solar (sun)

6

Environmental Issue: *Is the product biodegradable so it will decompose after we dispose of it?*

23. Which type of napkin is least biodegradable?

    1. Paper 2. Cotton 3. Synthetic fiber

24. Which type of food packaging is most biodegradable? (Assume the same size package)

    1. Foil wrapper 2. Plastic bag 3. Paper bag

Environmental Issue: *Does the activity show a concern for the future as well as the present?*

25. A small town is beginning to expand rapidly. The city council is wondering what it should do. Which one of the following actions would show the least concern for the future?

    1. Let everybody build houses where and how they want

    2. Establish building codes which specify the plumbing, electrical, and construction materials to be used

    3. Set aside certain areas of land in the town which can be used only for parks and natural areas

PART II

26. Succession refers to:

    1. The aging process of a plant community in which one group of species is replaced by another over time

    2. The natural aging process of a particular plant community

    3. The fact that successful species will survive

    4. The movement of one fish after another up a river

27. The maximum number of organisms which an area can support indefinitely and in good health is called the:

    1. Carrying capacity
    2. Critical zone
    3. Saturation level
    4. Ecological apex

28. In ecology the term limiting factor is:

    1. An anti-pollution device
    2. Something preventing the maximum growth or development of a population of plants or animals
    3. Any extinct species
    4. The maximum number of campers permitted to use a campground

29. A Food Web is:

    1. A related group of food chains
    2. A special part of a spider's web
    3. The transfer of food energy from one plant to another in the nitrogen cycle
    4. The part of a duck's foot that collects food for duck foot parasites to feed on

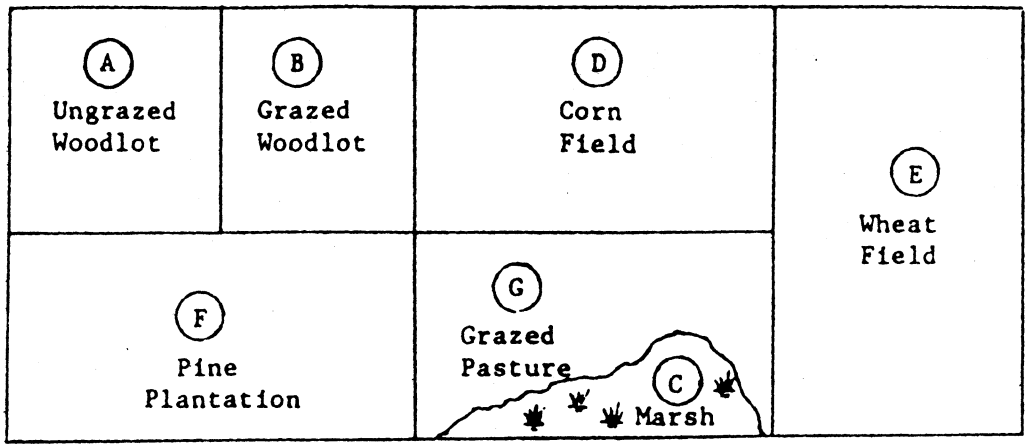
30. Biomass is the total weight of the living organisms within a specified area.

    True False

31. There is little competition in a stable ecosystem.

    True False

8



FARMER JONES' PROPERTY

The next five questions all refer to the above figure. Choose the one best answer and mark it on your answer sheet.

32. In which location would you expect to find the greatest variety of wildlife?

1. In the middle of area A
2. Where areas A and F come together
3. In the middle of area F

33. Which one area would probably have the greatest number of different types of plants?

A D F E

34. Which area represents a monoculture?

A D B C

35. In which area is succession proceeding at the fastest rate?

G C E D

36. In early spring where would you expect to find the least biomass?

A F C D

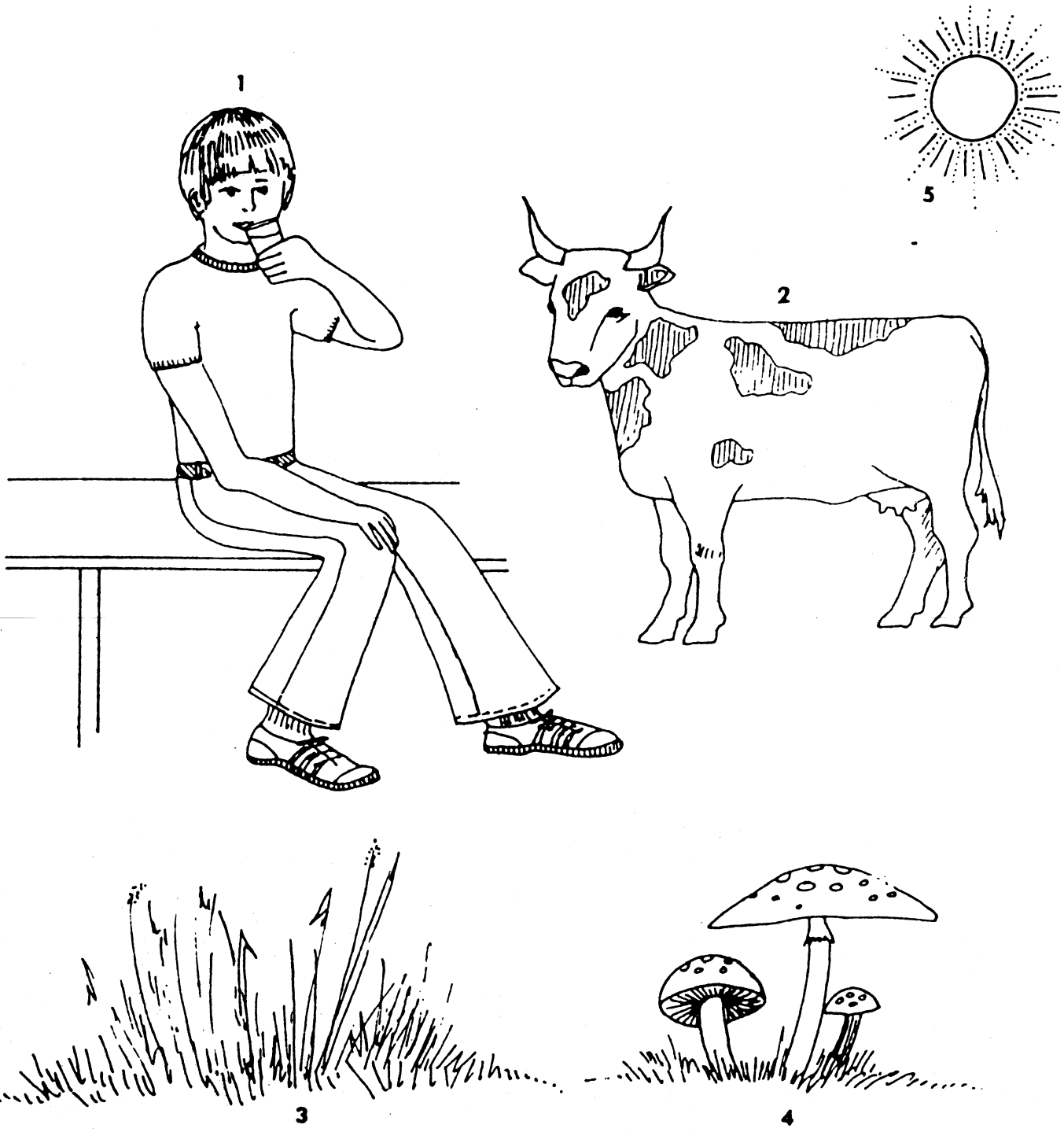
37-40. Illustrated Food Chain. Included in these five drawings are <u>four</u> links in the food chain. Match the picture with the name given below.

37. Producer

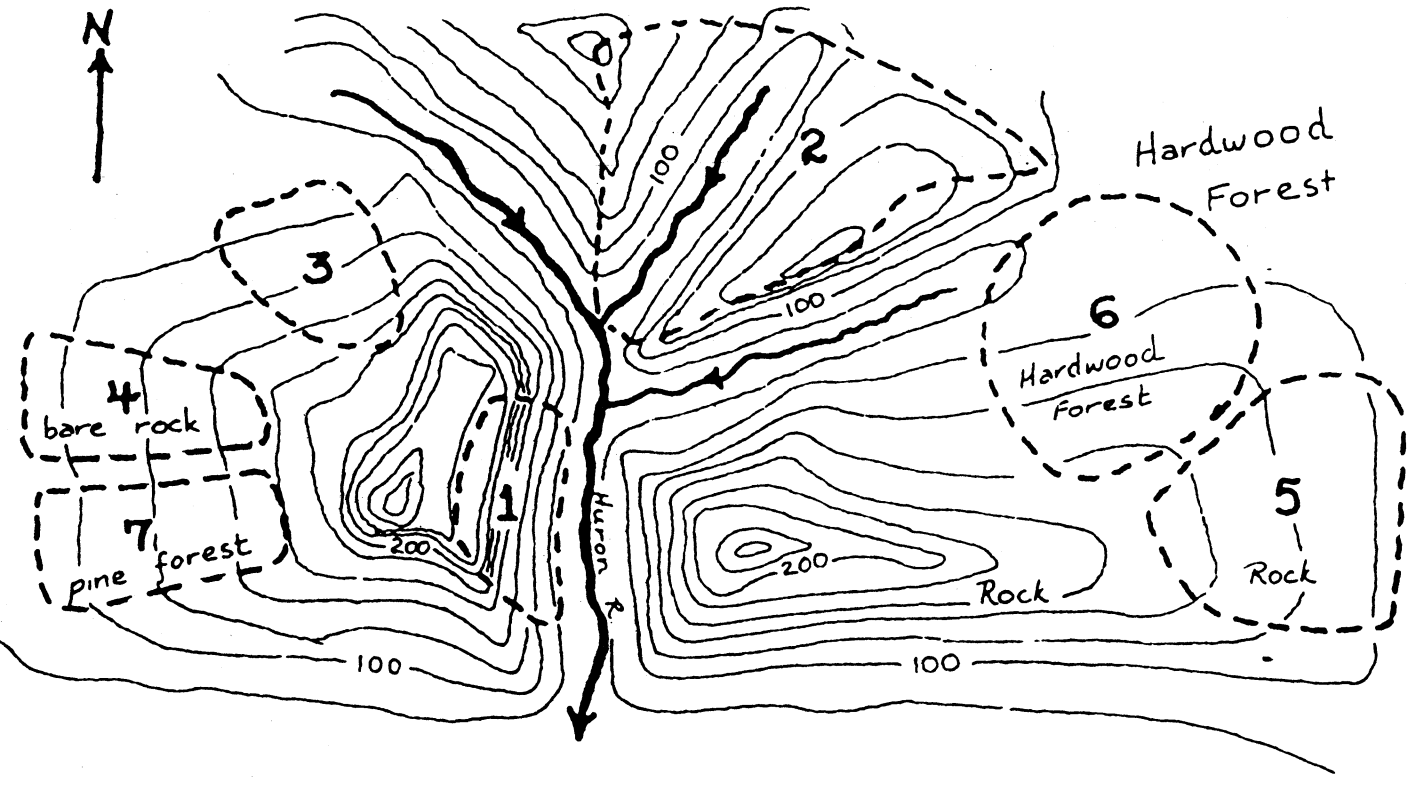
38. Primary Consumer

39. Secondary Consumer

40. Reducer



10



The next five questions refer to the above map:

41. Which area best fits the definition of a watershed?

    2 3 4 7

42. Which slope is steeper, 1 or 5?

    1 is steeper 5 is steeper

43. There will be less runoff in area 7 than in area 4. Which one of the following is NOT a reason for this?

    1. The humus acts as a sponge

    2. Difference in slope

    3. Infiltration into the soil

    4. Interception of trees

44-48. The figure below illustrates with arrows the various stages in the water cycle. These stages are named in the list below. Match the arrow with its name.

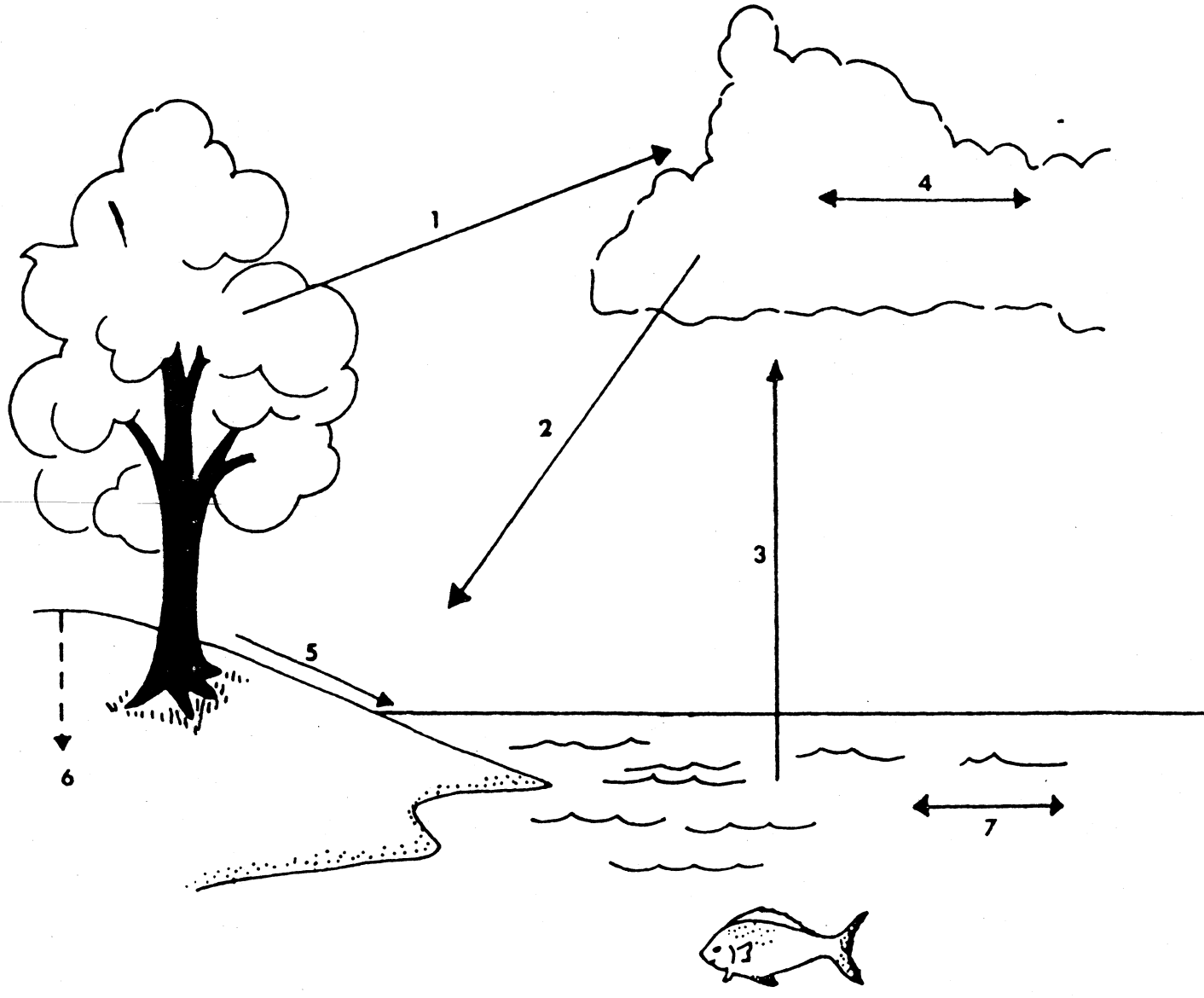
44. Evaporation

45. Transpiration

46. Precipitation

47. Condensation

48. Run-off



12

49. Which of the following energy sources is in most danger of being depleted or used up?

1. Fossil Fuel
2. Thermal Power
3. Hydroelectric Power
4. Nuclear Power

50. Our major energy sources in the United States come from non-renewable resources.

True False

Plants, humans and other animals have many things in common. Accordingly there are a number of ecological concepts for which we can find examples in all three domains.

51-54. Match the following plant examples with the concept on the left.

CONCEPT	PLANT EXAMPLES
51. Symbiotic relationship	A. Number of trees per acre
52. Specialization and Division of Labor	B. Lichen
53. Competition	C. Swamp in which tamarack grows
54. Habitat	D. Roots, trunk, leaves of one tree
	E. Trees dying from over-crowding

55-58. Match the following animal examples with the concept on the left.

CONCEPT	ANIMAL EXAMPLES
55. Symbiotic relationship	A. Bees and flowers
56. Specialization and Division of Labor	B. Fox and bobcat
57. Competition	C. A colony of bees
58. Habitat	D. Cave in which bats live
	E. Rabbit and frog

59. Among wildlife, competition is always between members of <u>different</u>, rather than the <u>same</u>, species.

True False

60. It appears that several species of wild birds are laying soft-shelled eggs which do not hatch. The reason for this is:

1. Accumulation in the birds of long-lasting chemicals from pesticides and herbicides
2. The side effects of forest fires
3. The depletion or loss of calcium in the soil in certain areas
4. Natural evolution

61. The <u>producers</u> in food chains are always green (chlorophyl) plants.

True False

62. <u>Climax species</u> are the first group of plants to inhabit an area following a major ecological change.

True False

63. If people would be more careful, there would be no forest fires.

True False

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1977 YOUTH CONSERVATION CORPS

ENVIRONMENTAL AWARENESS TEST ANSWER SHEET

INSTRUCTIONS: Mark all of your answers on this sheet. Do not write in your test booklet. Circle the one answer you think is correct for each question.

PART I

Q.1	1	2	3	
Q.2	True		False	
Q.3	A	B	C	
Q.4	A	B	C	
Q.5	A	B	C	
Q.6	A	B	C	
Q.7	A	B	C	
Q.8	A	B	C	
Q.9	1	2	3	4
Q.10	1	2	3	4
Q.11	True		False	
Q.12	True		False	
Q.13	True		False	
Q.14	1	2	3	
Q.15	True		False	
Q.16	1	2	3	
Q.17	1	2	3	
Q.18	1	2	3	
Q.19	1	2	3	
Q.20	1	2	3	
Q.21	1	2	3	
Q.22	1	2	3	
Q.23	1	2	3	
Q.24	1	2	3	
Q.25	1	2	3	

WRITE YOUR NAME ABOVE

Part I ____

Part II ____

TOTAL ____

PART II

Q.26	1	2	3	4			
Q.27	1	2	3	4			
Q.28	1	2	3	4			
Q.29	1	2	3	4			
Q.30	True		False				
Q.31	True		False				
Q.32	1	2	3				
Q.33	A	D	F	E			
Q.34	A	D	B	C			
Q.35	G	C	E	D			
Q.36	A	F	C	D			
Q.37	1	2	3	4	5		
Q.38	1	2	3	4	5		
Q.39	1	2	3	4	5		
Q.40	1	2	3	4	5		
Q.41	2	3	4	7			
Q.42	1	5					
Q.43	1	2	3	4			
Q.44	1	2	3	4	5	6	7
Q.45	1	2	3	4	5	6	7
Q.46	1	2	3	4	5	6	7
Q.47	1	2	3	4	5	6	7
Q.48	1	2	3	4	5	6	7
Q.49	1	2	3	4			
Q.50	True		False				
Q.51	A	B	C	D	E		
Q.52	A	B	C	D	E		
Q.53	A	B	C	D	E		
Q.54	A	B	C	D	E		
Q.55	A	B	C	D	E		
Q.56	A	B	C	D	E		
Q.57	A	B	C	D	E		
Q.58	A	B	C	D	E		
Q.59	True		False				
Q.60	1	2	3	4			
Q.61	True		False				
Q.62	True		False				
Q.63	True		False				

Y.C.C. ENVIRONMENTAL AWARENESS TEST SCORING SHEET

PART I

1	Q.1
True	Q.2
B	Q.3
C	Q.4
C	Q.5
A	Q.6
A	Q.7
A	Q.8
3	Q.9
1	Q.10
True	Q.11
False	Q.12
True	Q.13
2	Q 14
False	Q.15
1	Q.16
2	Q 17
2	Q 18
3	Q 19
2	Q.20
1	Q 21
3	Q.22
3	Q.23
3	Q.24
1	Q.25

WRITE IN THE NUMBER OF PART I ITEMS CORRECT IN THE SPACE TO THE LEFT

ADD THE SCORES

PART II

(Part II -- 38 questions)

Q.26	1
Q.27	1
Q.28	2
Q.29	1
Q.30	True
Q.31	False
Q.32	2
Q.33	A
Q.34	D
Q.35	C
Q.36	D
Q.37	3
Q.38	2
Q.39	1
Q.40	4
Q.41	2
Q.42	1
Q.43	2
Q.44	3
Q.45	1
Q.46	2
Q.47	4
Q.48	5
Q.49	1
Q.50	True
Q.51	B
Q.52	D
Q.53	E
Q.54	C
Q.55	A
Q.56	C
Q.57	B
Q.58	D
Q.59	False
Q 60	1
Q.61	True
Q.62	False
Q.63	False

APPENDIX O
Daily Accomplishment Chart

To aid the EEC in keeping track of what goals and activities took place on what crews throughout the week, the daily accomplishment chart is provided. The EEC can keep a record of each crew's daily progress as well as subjects covered during meal time discussions, evening activities, weekend activities, and educational displays that were present.

Work Crews	Monday	Tuesday	Wednesday
Forestry			
Fish			
Wildlife			
Wild Rose Fish Hatchery			
Hartman's Creek State Park			
Side-Camp			
Meal Time Discussion			
Evening Activities Presentations			

Thursday	Friday	Saturday	Sunday	Weekly Displays

APPENDIX P
Sample Evaluation Forms

Evaluation Forms

Manual Evaluation

Evaluation of Behavioral Objectives

Evaluation of Environmental Education Program

- weekly evaluation by campers
- weekly evaluation by staff
- weekly evaluation by camp administrators
- weekly evaluation by Coordinator

Evaluation of Behavioral Objectives (to be done by Coordinator)

1. What problems did you find when you were developing the behavioral objectives?

2. Were the problems specific to certain goals? (If so, what were they?)

3. Were you able to measure whether campers successfully achieved the behavioral objectives?

4. How (if at all) will you change your behavioral objectives for next session?

5. What additional help or information would you like to have in regard to developing behavioral objectives?
   Additional information in the manual?
   Additional time spent during training session with DNR Environmental Education Coordinator?

6. Additional Comments.

Sample Camper's Evaluation of Environmental Education Program

The evaluation by campers could be done on Friday afternoon while returning to camp from the work project. Questions 8 - 12 could be answered as a group with the entire work crew providing suggestions for activity and program improvement. A person within the van could keep track of the suggestions to be given to the Coordinator.

Sample Camper's Evaluation of Environmental Education Program

Week ____ Work Crew _____

1. Overall this week's EE activities were:
   A. Fantastic
   B. So So
   C. Put me to sleep
   D. Other _____

2. EE activities were:
   A. Too difficult to understand
   B. Understandable
   C. An insult to my intelligence
   D. Other _____

3. Time devoted to EE was:
   A. Too much
   B. Just right
   C. EE, what's that
   D. Other _____

4. My crew leader's attitude toward EE was:
   A. Enthusiastic
   B. Neutral
   C. Didn't care
   D. Other _____

5. The EE Coordinator's time spent with us:
   A. Wasn't adequate
   B. Adequate to cover information
   C. Wish he would leave us alone
   D. Other _____

6. The EE Coordinator's attitude was:
   A. Enthusiastic
   B. Neutral
   C. Didn't care
   D. Other _____

7. Opportunity for discussion was:
   A. Adequate
   B. Not enough
   C. Too much
   D. Other _____

8. What activities were most interesting?

9. How can we make activities more interesting?

10. What was the most important thing you learned this week?

11. How did this week help you understand the environment?

12. What did you want to learn about but were not able to?

Sample Counselor's Evaluation of the Environmental Education Program

This evaluation could be completed on Firday in conjunction with the counselor's daily reports.

Sample Counselor's Evaluation of Environmental Education Program

Counselor's Name_____ Work Crew_____

Activities that were held during the week list:

Please rate the following on a 1 - 5 code:

5 = excellent, 4 = good, 3 = fair, 2 = poor, 1 = very poor

NA = not applicable

1. Student's grasp of major objectives of activity.

   ____ activity name_____

   ____ activity name_____

   ____ field trip_____

   ____ evening presentation_____

2. Student's overall reaction to the week: ____

3. Objectives that camper's had a hard time grasping?

4. Camper's who need help?

5. Suggested improvements for activities:

6. What additional materials/information would you like for preparing for or leading activities?

7. What help would you like in understanding or utilizing the environmental education opportunities of your work site?

8. Do you want help leading activities?

9. Any problems with education equipment? (What additional equipment could you use?)

10. Suggestions for improving activity.

11. Additional comments and improvement suggestions on:
    - Coordination and scheduling of Environmental Education Program:

    - Communication of program schedule to staff:

    - Success of integrating environmental education into the work project:

Sample Camp Administration Evaluation of Environmental Education Program

Week____

Comments and suggestions for improvement on:

1. Overall reaction of campers to program:

2. Coordination and scheduling of program:

3. Communication of Environmental Education Program schedule and contents to staff:

4. Environmental Education Program content:

5. Additional comments and suggestions:

Sample Coordinator's Environmental Education Program Evaluation Outline

I. Description of Environmental Education Program Week

A. Work Projects:

1. Educational activity
2. Behavioral objectives met
3. Evaluation techniques used
4. Camper evaluation responses (summarize)
5. Counselor evaluation responses (summarize)
6. Problems that arose with activity
7. Success of integrating environmental education into the work project
8. Methods of improving activity
   a. Changes
   b. Additional information needed
   c. Equipment needed
   d. Changes in communicating activity to staff and campers

B. Field Trips:

1. Topics covered
2. Objectives met
3. Description of visits
4. Coordination of field trip
5. Camper reactions
6. Staff reactions

C. Evening Presentations:

1. Topic
2. Objectives met
3. Quality
4. Educational/worthwhile
5. Should the presentation be scheduled for next year?

D. Educational Displays:

1. Theme
2. Design

E. Weekend Activities:

Objectives met

F. Additional Events:

II. Comments concerning the content, coordination, communicating, and improvement of the environmental education program. (This can include comments of campers, counselors, camp administrators, evening presenters, and DNR project supervisors.)

III. Additional information, equipment or training that might improve the environmental education program.