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ABSTRACT

This resource guide is intended for use by Youth Conservation Corps (YCC) staff members to incorporate environmental awareness into all aspects of the YCC program. Information is provided to assist the staff members in developing programs appropriate for individual programs. No firm rules or instructions are intended. Sections included in the guide are: (1) environmental awareness implementation; (2) ecological/environmental concepts; (3) work/environmental awareness opportunities; (4) special emphasis areas; (5) environmental investigations; (6) environmental awareness program materials; (7) assorted ideas of potential use to YCC staff; and (8) appendices. (Author/RE)

UNITED STATES YOUTH CONSERVATION CORPS

YCC is

a place to be
a place to see
a place to learn
a place to teach
a place to work
a place for fun
a place for thinking and reflection
a place for success and frustration
a place for making friends
that will last forever

But really, YCC is YCC, and there is nothing quite like it.

Muscatatuck YCC Camp, 1975

WARNING: ENVIRONMENTAL AWARENESS SPECIALISTS HAVE DETERMINED THAT REMOVAL OF THIS MATERIAL FROM THE CAMP WILL BE HAZARDOUS TO THE HEALTH OF NEXT YEAR'S PROGRAM.

It is important that a permanent file of environmental awareness materials be kept at your camp.

THE YOUTH CONSERVATION CORPS ENVIRONMENTAL EDUCATION RESOURCE GUIDE

The Youth Conservation Corps Environmental Awareness program is constantly changing and growing. Each year it gains in strength and diversity as it incorporates the experience of those people who have made it work in the past. While no single document can keep pace with this growth, there is still a need to provide a resource of workable ideas that will help both new and experienced staff members plan their program.

The purpose of this resource guide is to assist in developing a quality Environmental Awareness program. The material included in the guide was developed by a task force of YCC staff members from materials successfully used in camps. The previously published sourcebook "People and Natural Resources" and the pocketbook have been incorporated into this looseleaf form and will no longer be published separately. This new resource guide has been developed so that is can be used by all YCC staff members to incorporate environmental awareness into all aspects of the YCC program. In it you will find no hard and fast rules. Rather information is provided which will assist you in developing your individual program.

It is our intention for this resource guide to grown and improve each year with the addition of new materials from the field. Please take advantage of this opportunity to help shape the future YCC program by sharing environmental awareness materials that have worked for you. Send copies of your materials to:

Environmental Education Specialist
U.S. Department of Interior
Office of Youth Programs
18th & C Streets, NW
Room 2425
Washington, D.C. 20240

Environmental Education Specialist
U.S. Department of Agriculture
U.S. Forest Service
Auditors' Bldg.-Room 2117-A
14th & Independence Ave., SW
Washington, D.C. 20250

Through your contributions the YCC program can continue to improve.

Many people have worked hard to prepare this guide. They include the Environmental Awareness Task Force and those who took time from their busy summer schedules to send in materials and ideas that work for them. Our thanks to all of you for your time and interest in improving YCC.

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Tell me, I'll forget. Show me, I may remember. But involve me and I'll understand.

—Chinese proverb

YCC ENVIRONMENTAL AWARENESS

What is it?

The law that established YCC stresses three equally important objectives for the overall program:

1. Accomplish needed conservation work on public lands.
2. Provide gainful employment for 15 through 18 year old males and females from all social, economic, ethnic and racial classifications.
3. Develop an understanding and appreciation in participating youths of the nation's environment and heritage.

The YCC Environmental Awareness (E.A.) program accomplishes the third program objective and is a vital component of YCC. It should help enrollees acquire knowledge about relationships among various elements of the natural world and between man and that world. It should help them acquire at least an elementary understanding of the interrelated factors--scientific, technical, social, and cultural which influence man's use of resources. It should show them that man can live in harmony with the land, provided he learns to choose wisely from among the often conflicting alternatives available to him in managing the environment. The YCC work/environmental awareness experience can better prepare young people for this task by helping them understand the importance of their role in making decisions about the environment and how these decisions affect the future.

YCC Environmental Awareness Goals and Objectives

Six goals with specific objectives have been developed for the YCC environmental awareness program.

Goal #1

To increase awareness of ecological principles that govern the environment.

Objectives

1.1 Identify the basic elements of the ecosystem within the area encompassed by the camp activities.

1.2 Describe the interrelationships among these basic elements (Objective 1.1), such as the food chain, energy cycle, and water cycle, etc.

1.3 Identify and describe the effects of work projects, recreational activities, and camp living on existing ecological interrelationships.

1.4 Discuss natural phenomena (fire, flood, earthquake, insects) and their effects on the environment.

1.5 Describe how people and current management practices affect and are affected by these natural phenomena (e.g., flood control, fire).

Goal #2

To better understand man's social, economic, historical, cultural, and physical relationships with the environment.

Objectives

2.1 Assess the present conditions of the environment in terms of existing and potential problems.

2.2 Compare and contrast past and present economic, social and cultural demands, and their effect on the environmental management decisions.

2.3 Analyze those past and present environmental factors (Objectives 2.2) and predict future trends and conditions (e.g., population, natural resources, basic needs, technology).

2.4 Identify the demands being placed on renewable and non-renewable resources at camp and in the home environment.

2.5 Describe and assess man's (people's) reasons for manipulating the environment.

Goal #3

To increase awareness of the wide range of attitudes and personal values relating to the environment.

Objectives

3.1 Identify and define the policies and attitudes of some of the environmental groups, sportsmen's groups, equestrian groups, bicycling groups, etc.

3.2 Identify participants' feelings and concerns about their effect on the environment at camp and in their homes.

3.3 Recognize individual differences of opinions, values, backgrounds and goals involved in the camp programming effort.

Goal #4

To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Objectives

4.1 Identify basic human needs for survival, and discuss the degree to which each participant's lifestyle exceeds these needs.

4.2 Identify factors that affect the quality of the camp environment.

4.3 Describe and discuss the participant's effect on the camp environment.

4.4 Analyze the effect that each participant's consumptive habits have on specific resources.

4.5 Discuss ways of changing consumptive habits to make better use of resources in the camp and home environments.

Goal #5

To experience problem solving and decision making processes which are applied to environmental management concerns.

Objectives

5.1 Describe and analyze the facts and the diverse opinions on a current environmental issue.

5.2 Use small group problem solving methods to reach a consensus on a current environmental issue.

5.3 Involve all camp members in the refinement of camp programming using small group problem solving methods (e.g., priorities of work projects, scheduling of recreational activities, etc.).

Goal #6

To increase understanding of the overall benefit of the YCC work program on the environment.

Objectives

6.1 Describe the basic differences and similarities of each land management agency involved in YCC.

6.2 Discuss the planning and decision-making steps the agency used in arriving at the management decisions for the area of the work projects, and how the outcome may have differed from other land-use agency management plans.

6.3 Use small-group problem solving methods to plan and carry out the work projects so as to consider environmental impacts on the area, state, region and nation.

6.4 Analyze the reasons for and the benefits of each work project by:

1. Identifying the contribution that each work project makes to the overall management of the area, state, region and nation.

2. Discussing the benefits that the work project makes to society.

3. Describing how the work project helps the agency accomplish its overall management objectives.

These goals and objectives are purposely very broad in order to apply to the diverse ecosystems and agencies with which YCC works. The camp staff must work together to plan their environment awareness program to meet these objectives in the context of their own area and agency. This planning is not the exclusive domain of the Environmental Awareness Coordinator. In order to integrate the program with the entire YCC experience, each staff member must take part in planning the environmental awareness program to fulfill the E.A. goals and objectives.

In addition there are five basic environmental concepts which enrollees should understand. They are:

Life is supported by energy	ENERGY FLOW
All life is interdependent	INTERDEPENDENCE
Life changes and adapts to changing conditions ..	ADAPTATION
All life has diversity	DIVERSITY
All life has order or cycles	CYCLES.

Section II deals with these [redacted] concepts.

THE CONCEPT OF E.A. INTEGRATION

The E.A. program must relate directly to work projects, recreation, interpersonal relationships and all aspects of camp life. This is YCC policy. The E.A. program will have more significant and enduring effects if it is a part of the entire YCC experience. This integration is very important and cannot be overemphasized.

Work Project Integration

Each camp must recognize that one fourth of the total available work time must be devoted to environmental awareness. It should not, however, be restricted to a scheduled time period each day or week. Priority must be given to integrating E.A. with the work projects. This E.A. integration makes the work projects meaningful to the enrollees and raises questions and provides answers about resource management. In addition, it increases work motivation and provides the opportunity to study ecological principles in action while doing meaningful work. Because some goals and objectives (1.3, 6.2, 6.3, 6.4) are directly related to work projects, they can only be accomplished through integration of E.A. and work. Therefore, work projects should be chosen for their potential for E.A. as well as their importance to resource management. To reach these objectives (1.3, 6.2, 6.3, 6.4) and develop effective integration the enrollees must understand:

1. Why certain projects are important to the management of the environment.
2. How the project fits into the environmental management plan of the park, forest or work area.
3. What skills, tools and supplies are needed to do the job.
4. What the environmental considerations are, including compromises, tradeoffs and benefits.
5. How the project benefits the larger community or the nation.
6. How a work experience develops team skills.

Enrollees who understand these six points and participate in an integrated work/E.A. program are motivated to accomplish high quality work.

Camp Living Integration

As stated above, E.A. can also be integrated into all other aspects of YCC. This is true in both residential and non-residential programs. Many of the environmental and group living experiences that occur in the 24-hour residential day also occur in the 8-hour non-residential workday. Non-residential staff members must be made aware of this and recognize opportunities for E.A. integration.

Recreation

Ordinary recreation activities can be environmentally oriented if enrollees are encouraged to consider their choices and alternatives. Camping trips can be arranged in areas with different biotic communities affording opportunity for comparison of differences and similarities in resource management. New and varied ecological principles can be observed, inventoried and discussed.

Even an organized recreational activity such as baseball is conducive to E.A. Enrollees can be given the opportunity to choose a baseball field based on location, slope, soil type, compaction, drainage, etc. Craft projects constructed from available natural materials can lead to discussions of Native American resource use. Recreation alternatives (sailing vs. motorboats, hiking vs. motorcycles, etc.) can be considered in light of environmental impact, including noise, energy consumption, wildlife disruption, etc. Additional "Great Ideas" to assist in integrating E.A. and recreation are located in Section VII.

Environmentally Aware Living

The residential and non-residential living experience can include environmental awareness activities such as maintaining a compost pile, using water wisely, avoiding use of non-biodegradable materials and disposable items (such as styrofoam cups) or serving an eco-meal (see page 399). The newly learned concepts from these activities at camp should be related to the enrollee's home situation in order to be meaningful. See Section VI for additional ideas on environmentally aware living.

Field Trips

Too many YCC camps rely on field trips for their entire E.A. program. If scheduled they should reinforce resource management and ecological concepts related to work projects. They should introduce, reinforce, or complement projects the enrollees are or will be working on. They can expand the awareness of the enrollees to the activities of different agencies and groups in the area. However, they should not be your entire environmental awareness program! Field trips do not provide an integrated work/E.A. program.

If conducted, field trips should be timely, fitting into the sequence of the summer activities as much as possible. Not all enrollees need to go on all field trips. Participants can share their experiences with the others. Plan the field trips carefully. Good planning includes transportation, travel time, lunch, safety, breaks, etc. The objectives, attitudes, feelings, and awareness expected to be accomplished by the trip should be identified and discussed by staff and the trip hosts. Group sizes can make a world of difference. Small groups will give enrollees the opportunity to ask questions and discuss points of interest. (Crew leaders, counselors, and environmental specialists should have several lead questions in mind to start a good discussion.)

PLANNING YOUR ENVIRONMENTAL AWARENESS PROGRAM

The first part of this guide was written to inform you of the national environmental awareness goals and objectives and the philosophy of integration. Now we want to take you into the real world of your own YCC camp.

I. Before you can effectively plan an integrated E.A. program for your camp, you will need to meet with your direct supervisor to:

A. Understand the mission of the agency sponsoring your camp. General information is found in Appendix A, "Agency Roles." Specific information about your particular agency site is available through your Camp Director or Project Manager.

B. Know how YCC fits into the organizational structure of your agency. It will simplify your life if you understand who is responsible for specific functions in your agency.

C. Acquire a basic knowledge of the geographic area in which your YCC camp operates. In camps working over a large area, you may have to settle for a large-scale map with major drainages and roads high-lighted.

D. Establish an understanding of camp philosophy, ground rules and performance requirements you will be expected to meet.

E. Determine what E.A. supplies and equipment are on hand, can be borrowed or purchased. (Don't overlook your agency as a resource!)

F. Staff Roles in E.A. Discuss the following E.A. position descriptions and adjust if necessary to meet the needs of your camp staff organization. Identify by name who on your YCC staff has been assigned responsibility for each role. These staff roles are based on the standard organizational structure of most YCC camps. Many camps will not have some of these positions. When this is the case, the development as well as the implementation of the E.A. program becomes the responsibility of the crew leaders in cooperation with other staff members.

1. YCC Project Manager. The project manager:

a. Is responsible for setting priorities to meet agency goals while coordinating and providing direction to the YCC program.

b. Assumes a position of leadership in E.A. through:

1) Direction to camp staff members and agency employees.

2) Selection of an ample and varied supply of work projects with E.A. potential.

3) Support for the integration of E.A. into all YCC activities.

2. YCC Camp Director. The camp director:

a. Is responsible for all aspects in the operation of a YCC camp, including E.A.

b. Provides general guidance to the E.A. Coordinator by:

1) Establishing the total summer program and working with the E.A. Coordinator to integrate the E.A. program within the camp framework.

2) Reviewing and approving all E.A. plans prior to implementation.

3) Providing a communication link which supports integration of E.A. into the entire YCC program.

4) Demonstrating personal interest in the E.A. program through participation.

3. E.A. Coordinator (E.A.C.). The E.A. coordinator:

a. Is responsible for the preparation and implementation of the YCC E.A. program and must work with the Camp Director to implement it within the total camp framework.

b. Is responsible for training staff members in E.A., supplementing their background, experience and training to give them the skills they need to effectively fulfill their roles in E.A.

c. Is responsible for developing curiosity, enthusiasm and interest in the environment among the other staff and enrollees.

d. Is responsible for developing and maintaining an atmosphere of cooperation and good communication in accomplishing the E.A. program.

e. Is responsible for maintaining a record of E.A. accomplishment and evaluating the E.A. program at the end of camp, leaving this information in a permanent file for next year's camp.

4. YCC Work Coordinator. The work coordinator:

a. Is responsible for the work project accomplishment portion of the YCC program.

b. Successfully meets the work production goals while taking into account:

1) That E.A. is an integral part of the YCC work program.

2) The need to cooperate and communicate with the E.A.C. to develop and implement projects with E.A. potential.

3) The responsibility to provide E.A. background information on projects and agency goals.

4) That work motivation is provided by positive E.A. values.

5. YCC Crew Leader. The crew leader:

a. Is responsible for the enrollees during the workday.

b. Successfully implements the E.A. plan prepared by the E.A.C. by:

1) Communicating and cooperating with the E.A.C.

2) Integrating E.A. and work on a daily basis, taking advantage of learning moments, rest breaks, lunchtime and scheduled E.A. periods.

3) Developing interest, curiosity and enthusiasm in enrollees regarding their environment.

6. Other Staff Members. Other YCC staff members responsible for specific assignments such as recreation, group living, cooking, etc., also have E.A. responsibilities, including:

a. Coordinating and communicating with the E.A.C. to support sound environmental practices in everyday camp operations.

b. Developing interest, enthusiasm and curiosity in enrollees regarding their environment in non-work related activities.

II. During the next planning stage, concentrate your efforts on acquainting yourself with the environmental awareness potential of the available work projects. The major element common to all YCC camps (residential and non-residential) is the work program. The environmental awareness and work programs must be developed together to ensure integration. Start by:

A. Establishing a good working relationship with the staff member responsible for coordinating the work.

B. Reviewing the available projects to see if each has the potential for the enrollees to learn concepts presented in the E.A. goals and objectives.

1. If the available projects all have strong E.A. potential, your agency is integrating E.A. into the earliest stages of YCC planning.

2. If you find that some of the available work projects lack the E.A. potential to meet the YCC goals and objectives, find out why they were chosen for YCC to do:

   a. Are they an agency priority--a "must" project scheduled to accomplish agency goals?

   b. Were they chosen because they were the only projects for which materials were available?

   c. Were they considered the only "safe" projects within the limitations of the Child Labor Laws or agency guidelines?

   d. Did someone forget to consider the need to integrate E.A. into the work program?

III. Once you understand whey the work projects were chosen, you may need to negotiate to increase the E.A. potential of the program.

A. Through conversation with your direct supervisor, the YCC project manager and the work coordinator you may be able to eliminate some projects which do not contain E.A. potential.

B. If you cannot eliminate them, here is where your creativity will be needed.

1. You may be able to compromise, e.g., accepting one project with low E.A. potential in return for another with high E.A. potential;

2. You may be able to supplement the work projects by studying the area in which the project is located.

IV. In addition to integration of E.A. into work projects, recreation, group living and spike camps provide E.A. opportunities. As in the work area you need to:

A. Establish good, working relationships with staff members responsible for these areas.

B. Find out what resources and learning opportunities are available.

C. Use your imagination freely in finding ways to include E.A. in these activities.

By now you should have a good feel for your agency, camp philosophy, staff roles and available work, recreation, and group living. The next section will deal with implementing E.A. in your camp. But first some cautions:

1. *YCC is not an opportunity to spoonfeed enrollees your values. It is an opportunity to make young people environmentally aware and cognizant of their own role in understanding environmental problems and making knowledgeable decisions in environmental areas.*

2. *YCC is not an 8-week condensed version of a 4-year college environmental curriculum. Be realistic about your goals for the summer.*

3. *YCC is an opportunity to build on the enrollee's background by giving them experiences they may not have had. However, be sure that initial exposure to new experiences is positive, not overwhelming. Take a one-step-at-a-time approach. Don't ask an enrollee who has never been camping to attempt a solo backpacking trip the first time out. (For further comment on overzealousness, see page.*, "camping trips.")*

4. *The YCC E.A. goals and objectives are all equally important. Goals and objectives #1 and #2 are relatively easy to accomplish. Goals #3 through #6 are more difficult to achieve. A concentrated effort will need to be made to meet these more difficult goals.*

5. *The E.A. program is not the exclusive domain of the E.A.C. All staff members have E.A. roles.*

IMPLEMENTATION

As you start your E.A. planning process, please keep in mind the following:

1. It is more important that enrollees understand broad environmental concepts than specific ecological and biological facts. Section II discusses these environmental concepts.

2. A small nagging voice should ask, "Why am I asking the enrollees to do this environmental activity?" If the reply is, "I don't know"--Be careful! Activities without a purpose become time fillers and do not constitute a valid YCC E.A. program. This is alright as long as your realize they have no relationship to your stated E.A. objectives.

3. In many cases, the E.A. Coordinator will not be doing the actual teaching. The materials must be planned and prepared for crew leaders to implement. Crew leaders must be trained to fulfill their E.A. role.

4. The E.A. goals and objectives are within the reach of YCC enrollees. However, you will need to motivate the enrollees in order for them to accomplish them successfully.

5. The amount of E.A. material available is overwhelming. You will need to limit yourself to material which will meet the YCC goals and objectives and which is relevant to your individual camp situation.

In order to effectively implement a YCC E.A. program, you need a framework or a system to record and track what you plan to accomplish. How you do this is up to you, but it must be established prior to camp opening to be most effective. There are several steps involved in establishing a framework.

1. List all work projects.

2. Identify the national E.A. goals and objectives which can be taught through each project.

3. Identify the goals and objectives which cannot be taught through work projects.

4. Outline the means to reach these non-work oriented objectives.

5. Develop an approach for teaching E.A. at work sites. Approaches may include lesson plans, instructions to crew leaders, checklists, etc.

Two approaches to E.A. implementation will be discussed here: Activity Sheets and Scorecards. Use them if you feel comfortable with the

approach. Adapt them to meet the needs, strengths and weaknesses of your camp staff. Develop your own approach if neither one suits you.

Activity Sheets

Activity Sheets are tools which have been used successfully in YCC camps. They are usually prepared by the E.A.C. to be used by other staff members to conduct E.A. at the work site.

Types of Activity Sheets

Two types of Activity Sheets have been developed:

Work Activity Sheets - These cover E.A. learning which is directly related to a specific type of work; i.e., fencing, litter pick-up, etc.; regardless of the geographic area where the enrollees will be working. For example, the same litter pick-up activity can be used in a forest, a park, or on a street. Work Activity Sheets are located in Section III of this Guide.

Area Activity Sheets - These cover learning which is directly related to specific sites, habitats or areas in which the crew will be working; i.e., meadow, forest, beach, street, etc. A sample of an Area Activity Sheet can be found on page 17 of this Guide. (The Environmental Investigations in Section IV provide a good base for Area Activity Sheets.)

The two types of Activity Sheets can be used together, as in the following typical YCC situations:

Urban - A YCC crew is picking up litter in a city zoo. The E.A.C. gives the crew leader a Work Activity Sheet on litter pick-up and an Area Activity Sheet on the zoo. Using these two Activity Sheets together, the crew leader can effectively lead the enrollees to meet the E.A. goals and objectives.

Rural - A YCC crew is building a fence through a meadow. Their crew leader uses a Work Activity Sheet on fencing and an Area Activity Sheet on meadows to lead the enrolles to meet the E.A. goals and objectives.

Identification of Activity Sheet Needs

Once the work projects and E.A. goals and objectives have been outlined, the E.A.C. should make a list of the projects and their locations. An example of a short list would be as follows:

Type of Work	Location of Work
Fencing	Geyser Basin
Litter pick-up	Campground
Fencing	Meadow
Litter pick-up	Geyser Basin

From this list the E.A.C. would be able to identify needed Activity Sheets--two Work Activity Sheets (fencing & litter pick-up) and three Area Activity Sheets (geyser basin, campground & meadow). The E.A.C. may be able to find Work Activity Sheets in Section III of this Guide which will suit the camp's specific needs with little or no adaptation. However, other Work Activity Sheets and your Area Activity Sheets will need to be developed at the camp level.

Development of Activity Sheets

As you prepare Activity Sheets, keep in mind that they will be limited by:

- The amount of time you have to prepare them.
- The amount of time the crew leader and the enrollees have to accomplish them.
- The experience level of the staff in your camp, especially the crew leaders.

Activity Sheets should be varied, practical, and as brief as possible for use in the field. Materials needed should be listed and available. "Hands'on" activities which require active enrollee involvement should be used. They allow enrollees to ask questions and discover answers for themselves without a lecture approach. The environmental investigations and activities in Sections IV and V of this Guide can be effectively used to encourage enrollee involvement.

Flexibility must be encouraged. Staff members and enrollees need to be allowed room for interpretation and individual development.

Content of Activity Sheets

Introduction

Before the project begins the enrollees need to know what they are doing and why. This introduction provides the tie-in with the E.A. goals and objectives and explains how the project fits into the land management plan of the host agency. It should include a discussion of the effects of the project on the environment, and give the enrollees other information they need before they begin the project.

Body

The body lists the activities, investigations and discussion the crew leader can use to lead the enrollees to meet the E.A. goals and objectives. It should list the needed material and resources and approximate time frames for each activity.

Summary

At the end of the activities and the work project, the summary should allow the crew leader and the enrollees to summarize the learning. The enrollees need to understand how the learning can be transferred and applied to other areas of their lives, such as home, community and the world at large.

SAMPLE

TYPE OF AREA: *Red Rocks State Park* Activity Sheet

Your crew will be on/near this area during your work project--so use this Activity Sheet in conjunction with the Activity Sheet for the fence building project and accomplish as many of these objectives as is feasible.

OBJECTIVES:

1. *Increased knowledge about the local geology.*

2. *Identified environmental impact upon an area as the result of public misuse and determined methods of correction and/or prevention of this misuse.*

METHODS TO ACCOMPLISH OBJECTIVES: (as per the numbers above)

1. *This beautiful area provides a rare opportunity to really check out geologic features and to relate these things to the surrounding area. Get into some activities of observation (talk about safety before you climb!) and see how much you can figure out before you get involved in geology terms. Be sure to notice color changes in different layers of rock and the impact water has had on each of these layers. If you need some help in developing a questioning strategy for this investigation we can work together on it.*

   Content Information: Paleozoic Era, Pennsylvanian Period (300 million years old!), Fountain Formation, Intrusive Igneous rock containing calcite, quartz, and siltstone.

2. *The oil puddles are obvious, so someone will probably mention them! Use this (planned!) learning moment to focus on other obvious signs of misuse (4-wd tracks, broken bottles). What land use management policies could prevent further misuse?*

   Some ideas might be:

   Close the area
   Control access to the area
   Which alternative would be most acceptable? (To the agency, to the public, etc.)

Scorecard

The Environmental Awareness Scorecard is one method of planning and mapping out an integrated work program. It was developed by Jerome Johnson of the University of Michigan in 1975, and is presented here as an optional tool for your use whether in full or in part. There are two key terms in the scorecard program: Behavioral objective and scorecard.

A behavioral objective is a statement which describes an action to be performed by a learner. In the case of YCC, a behavioral objective is an action which a YCC enrollee must perform to fulfill a goal of the E.A. program.

There are three basic elements in a behavioral objective which must be clearly specified:

1. The terminal behavior expected of an enrollee.
2. The conditions under which the behavior is to be performed.
3. The standards for acceptable performance.

The following is an example of a behavioral objective which contains all three elements:

(Element 1) (Element 3)
The enrollee will verbally explain at least 3 of the 4 stages
(Element 2)
of succession a lake undergoes, using Sprinkler Lake as an example.

A scorecard is a simple record of the camp's objectives. Each enrollee tracks his or her progress on the scorecard by having a staff person initial each objective when it is satisfactorily accomplished. An example of a camp scorecard is on the following page.

The YCC E.A. goals and objectives have been written in very general terms so they will apply to all YCC camps no matter in which part of the country they are located. In using the scorecard approach E.A. coordinators need to develop specific objectives for their own camps. The set of behavioral objectives developed and listed on a scorecard defines the camp's E.A. program. A well-written set of behavioral objectives results in a program tailored to take advantage of the unique strengths of the staff, the available resources and the scheduled work projects.

An example of the steps taken in the scorecard approach is as follows:

Step 1. List the YCC E.A. goals and objectives that can be met by a particular project. For example, digging a pit toilet.

SAMPLE SCORECARD

Camper's Name _____

ENVIRONMENTAL LEARNINGS SCORECARD

	Date and Staff Initials
SOILS	
1. Using a soil sample kit: a. Correctly draw a sample of soil. b. Identify the pH, nitrogen, phosphorous and potassium levels in the sample.	_____
2. Correlate flora with soil type, identifying two species that correspond to each part of the pH range.	_____
3. Explain what indicator species tell you about soil pH in an area.	_____
4. Define succession.	_____
5. Indicate 3 ways man can influence plant succession.	_____
6. As a part of a sedimentation study, determine the fractions of each soil type (sand, silt, clay, humus) in the study area.	
INTERDEPENDENCE	
1. Define term and recite "key phrase."	_____
2. Using 3 examples, describe the relationship between man and trees or animals.	_____
3. Using 3 examples, describe the relationship between YCC enrollees and Park Service employees.	_____
4. Describe at least 3 ways in which the natural environment and Washington State's economy are interrelated and interdependent.	_____
5. Describe at least 3 ways in which a lumber mill is related to a supermarket.	_____
6. Describe at least 3 ways in which Rainier, the mountain, is interrelated with the surrounding natural and man-made environments.	_____

Goal No. 1 - To increase awareness of ecological principles that govern the environment.

Objective 1.1 - Identify the basic elements of the ecosystem within the area encompassed by the camp activities.

Step 2. Develop plans for the crew leaders which include the activities and resources needed to achieve the E.A. objectives. For example: "Show your enrollees how to analyze soils using the LaMotte soil testing kit." Draw samples from 5 different areas of the camp. Teach the enrollees the basic characteristics of soil.

Step 3. Write a behavioral objective. An example would be: "Using the LaMotte soild testing, kit, the enrollee will analyze samples of soil and identify texture, structure, pH, temperature and color. The enrollee will also specify two ways in which man can alter each of these five soil characteristics."

Step 4. Add this behavioral objective to your camp scorecard.

Advantages of the Scorecard Approach

1. The scorecard approach forces E.A. Coordinators, Camp Directors and Crew Leaders to think through in detail the entire E.A. program prior to the arrival of enrollees. In the process a staff must share and reach some consensus of philosophies of education, ecological priorities, and the fundamental knowledge base for a program in environmental awareness.

2. This approach also helps spread E.A. responsibilities, interest and participation throughout the staff.

3. The responsibility for E.A. learning is also transferred to the enrollees through the scorecard process. It becomes their responsibility to complete the behavioral objectives and seek out a staff person to obtain certification when the objective can be demonstrated.

4. The scorecard allows the E.A.C. to continually assess the progress of the program and take corrective action if necessary.

5. A summary of the scorecard can be a helpful diagnostic tool to improve the E.A. program for a succeeding year. It will help identify strengths and weaknesses in the program.

Implementation of the Scorecard Program

In order to implement the scorecard program, the E.A. Coordinator should review the YCC goals and objectives, the scheduled work and

after hours program, the available E.A. resources (people, equipment and supplies) and prepare a draft set of behavioral objectives and a scorecard.

During the staff pre-camp training program, one day should be scheduled for the E.A.C. to work with the rest of the staff to develop the final version of the scorecard. At this time staff members, expecially crew leaders, must also be trained and given clear, concise teaching plans. The staff should review each objective on the draft and make changes and additions, if necessary. The process is time-consuming, but effective in developing staff participation and commitment to the E.A. program. The final set of behavioral objectives should be realistic and achievable, leading to a feeling of successful completion and achievement on the part of the enrollees.

As a part of this process, the camp staff must agree and remain consistent on what constitutes successful completion of a behavioral objective. They must decide if a "group of enrollees" may reach an objective, or if individual enrollee action is required.

If the staff has extensive E.A. background, the E.A. Coordinator may only need to prepare a skeleton draft, leaving development of specific behavioral objectives to the staff.

Optional objectives may be included on the scorecard and enrollees may also be encouraged to write personal objectives to identify their personal YCC goals, e.g., to learn how to use specific tools or prepare for a camping trip, etc.

To increase enrollee involvement in the E.A. program, enrollees may be given the opportunity to write individual or group behavioral objectives for the last work projects of the program. In addition, an enrollee critique of the year's behavioral objectives will assist in improving the E.A. program for the following year.

The scorecard should be introduced to the enrollees when the staff feels they are "ready." This helps avoid the negative "schoolroom" or "testing" attitude. Introducing the scorecard after the E.A. program is underway gives enrollees a positive feeling of success as they mark off the items already accomplished.

In order to gauge progress, the E.A. Coordinator may wish to maintain a master scorecard on which to post camp progress. This helps the staff make necessary adjustments in the timing and content of the E.A. program, provides an effective on-going evaluation tool and assists in developing the program for the following year. (See page 24.)

A Guide to Scorecard Content

A good scorecard should include objectives in three areas: *Thinking/Reasoning Skills; Actions and Feelings.* The YCC E.A. goals and objectives cover these three areas.

Thinking/Reasoning Skills: Many behavioral objectives tend to cover only "regurgitative" types of information. People tend to think that these objectives are only of the following form:

Example 1: Name 10 species of plants along the nature trail.

"Regurgitative" objectives test for mastery of facts and may be a necessary part of any environmental awareness program. They usually contain verbs such as *identify, describe, define, recite, list,* etc.

Behavioral objectives should also cover higher-lever thinking and reasoning skills. They usually require some synthesis or problem solving and use such verbs as *analyze, explain, compare, propose, defend, discuss, share, correlate, predict, estimate, interpret, plan and relate.*

Example 2: Find 3 specimens of the same plant growing in different places along the nature trail. Notice differences, if any, in the way they are growing. Explain why you think these differences occur.

Example 3: Make similar growth comparisons along the trail and develop an interpretive plan for the trail from your observations.

Staff should recognize that there is a certain knowledge base that is required before enrollees can work at the problem-solving level. Intelligent comparisons of plant growth patterns first require understanding some basic facts about plants and their growth requirements.

Actions: Scorecards should also cover behaviors which require active involvement: collect, locate, do a soil or water analysis, or conduct a visual examination. These involve a thinking component but the emphasis is on the action.

Example 4: Design and construct the interpretive signs for the plants along the trail.

Feelings: Attempts should also be made to include very elusive and hard-to-express emotional goals. This often involves communicating feelings.

Example 5: In a short article for the camp yearbook, express your feelings about the new nature trail.

This simple chart is one way of assessing the degree to which a camp's scorecard through these three kinds of behavioral objectives meets the E.A. goals and objectives.

MATCHING THE NATIONAL GOALS & OBJECTIVES
WITH THE WORK PROGRAM & THE CAMP SCORECARD

Work Project (1)	National Goals and Objectives (2)	Describe activities to be used in accomplishing objective (3)	Describe how you will tell when accomplished (Behavioral Objective) (4)

If column 2 contains all the E.A. goals and objectives, you are on the right track.

EVALUATION

The evaluation process in any camp should cover two areas: On-going and end-of-camp evaluation.

On-going evaluation should allow the camp staff to assess and adjust the E.A. program as the summer progresses. It should answer the following questions:

1. Are we meeting our stated goals and objectives?
2. Is the staff, especially the crew leaders, comfortable with our methods of implementing E.A.?
3. What are the enrollees learning?
4. What adjustments do we need to make to improve our program?

End-of-camp evaluation shows whether or not the camp staff reached their stated objectives. It will help improve E.A. program for the following year and assess the learning that has taken place over the summer.

Any approach to evaluation is appropriate as long as it includes both on-going and end-of-camp evaluation. If the scorecard approach is adapted to include a Master Scorecard, it can be used as an effective evaluation system. A master scorecard can chart the progress of all enrollees or work groups. It can be updated once a week or more frequently to identify the objectives that have been achieved. The E.A.C. can then see at a glance where changes can be made and where problems exist. At the end of camp it supplies information on the overall success of the program and serves as the foundation for making improvements for the following year.

No matter what system you use, leave a written evaluation of the program in the permanent E.A. file. It will give you or a new E.A.C. a good start in the next year.

ARRANGING SCHOOL CREDIT FOR YCC PARTICIPATION

Providing school credit for YCC participation will increase the motivation of the enrollees in both work and E.A. areas. Many camps can arrange educational credit for YCC E.A. programs through local or state school systems. However, there is no standard method for making these arrangements. Because the public education policy in each state or community is different, the camp staff must assume the responsibility for credit negotiations. A well-planned E.A. program and a thorough evaluation system for that program are essential prior to negotiations with any school district. The following methods have worked for some camps:

Method 1. In a non-residential program, the E.A.C. contacted the school districts in which the enrollees were registered. The E.A.C. provided the high school guidance counselor and the principal with a list of the camp's E.A. objectives and work projects, and a written description of the program which included the number of hours spent on E.A. The guidance counselor assigned the program a subject name and 3 hours of credit and arranged for each YCC enrollee from that district to receive credit.

Method 2. A petition was sent to the Commissioner of Education in the state capital. It requested that YCC be given standing as an accepted work/learning program through the state's school districts. The petition included the E.A. goals and objectives, a copy of the YCC Law (93-408), the number of hours spent on E.A. over an eight-week period (usually 80), a description of the YCC program and a sample certifying form which could be given to each enrollee after completion of the program for delivery to the school district. The state education office then sent a letter to each school district which included a copy of the petition, assigned a subject area and gave a credit hour rating to the program.

Method 3. In a residential camp, the E.A. Coordinator wrote letters to the principals of all high schools in which the camp's enrollees were registered. The letter requested that credit be arranged for the enrollee involved and included the information in #2 above.

Method 4. The certifying letter on the next page was given to each enrollee at the end of camp. The enrollee then became responsible for presenting this letter to the proper authorities to arrange their own credit.

Example of a Credit Letter

Date:

To Whom It May Concern:

This certifies that _____ was an active participant in the Youth Conservation Corps summer work/education program at Hahns Peak Ranger District, Routt National Forest, in Steamboat Springs, Colorado, from June 25--August 25, 1978.

Pursuant to directives under Public Law 93-408 (1975), this 8-week program included approximately 30 clock-hours of supervised individual instruction in environmental issues and conservation.

The objectives and activities for the program were formulated in accordance with national guidelines published by the Departments of Interior and Agriculture, by Environmental Education Instructor Jeff Creamer and other staff members. These were carried out on work crews or in field trips by leaders who had significant experience in outdoor or in formal education.

The objectives of this program are shown on the reverse side of this page. A complete description of activities implemented in this program may be obtained by writing to the District Clerk, Hahns Peak Ranger District, P.O. Box 1212, Steamboat Springs, Colorado 80477. This program has provided the equivalent of approximately 1/4 Carnegie units (120 clock-hours), if deemed acceptable within the guidelines of your high school or secondary school program.

Very sincerely,

D. Jeff Creamer
Environmental Education Instructor
Hahns Peak YCC Camp

SUMMARY

This chapter has discussed YCC environmental awareness policy, listed the E.A. goals and objectives and environmental concepts. It has outlined procedures for planning, operating and evaluating your camp's E.A. program. Your responsibility is to meet the E.A. goals and objectives using whatever method works for you. However, the following points are important in any program.

1. The entire E.A. program should be based on environmental concepts (Section II).

2. The E.A. program should be designed to meet the national E.A. goals and objectives within the context of each camp's setting and agency.

3. Enrollees need to be actively involved in planning as many aspects of their YCC experience as possible.

4. Planning, both prior to camp and throughout the summer, is necessary for a successful, integrated environmental awareness program.

5. Recreational activities, camp procedures, meals, etc. all have potential for environmental awareness.

6. Environmental awareness should begin with the local setting and then be broadened to relate to the total environment.

7. All camp staff members, especially crew leaders have roles in the E.A. program and must be comfortable with whatever approach you use.

8. Integration of E.A. with the work projects is essential. Non-residential and residential programs are alike in this respect.

9. The E.A. program should emphasize the development of a personal environmental ethic.

ECOLOGY and MAN

"Man cannot make principles; he can only discover them."

Thomas Paine
1794

ECOLOGY AND MAN

Environmental Concepts

As stated earlier, it is very important to stress understandings of concepts in the environmental awareness program. Enrollees must be able to apply their YCC learning to their home environment. Concentration on concept development will help enrollees transfer their learning to more generalized understandings and leave them with a more lasting knowledge of our environmental problems.

There are five very basic environmental concepts from which ecological principles can be taught. These five concepts are so basic that a crew leader who has no biological background will be able to help enrollees understand them.

They are:[1]

Life is supported by energy	ENERGY FLOW
All life is interdependent	INTERDEPENDENCE
Life changes and adapts to changing conditions ..	ADAPTATION
All life has order or cycles	CYCLES
All life has diversity	DIVERSITY

Energy Flow

The most important of these five concepts is that life can only exist when energy flow is maintained. In this energy flow, sunlight is transformed (fixed) by green plants into glucose (food). This energy is then transferred in ever-decreasing amounts from green plants to food consumers (those organisms which cannot make food from sunlight) to food decomposers (those organisms which obtain their food from the dying of others). Humans in today's world often get their energy from food that is packaged and sold in stores. This makes it difficult for many people to see that we are ultimately still dependent on the natural world for food. It is also difficult for enrollees to understand that energy cannot be recycled. It is used up by the plant or stored by it for future use in the form of plant tissue. An animal eating

[1]The Cooperative Extension's 4-H Environmental Awareness program is based on very similar concepts. Their E.A. booklet is available by writing to:

Extension Publications Division
Cornell University
College of Agriculture and Life Sciences
Roberts Hall
Ithaca, NY 14853

Other concept oriented approaches are:

Steve Van Matre - Sunship Earth
Barry Commoner - The Closing Circle
National Park Service - NEED program

that plant uses up or further stores the energy, again in the form of tissue. Eventually, however, all the energy is lost.

Interdependence

In the process of getting energy, all organisms interact with each other and their environment. They depend on each other for their very lives. This includes man. This concept of interdependence can be illustrated in a city as well as in a natural setting. City people are dependent on one another for their food, shelter, electricity, heat, etc. They are also ultimately dependent on the natural world for these things. Enrollees may not understand this dependence. The importance of clearly showing this connection between the city dweller and the natural world cannot be overemphasized.

Adaptation

Because all organisms are interdependent, they constantly change and find new, more successful ways of solving problems. They make this adaptation to their surroundings by changing themselves and/or altering their surroundings. There are several examples of adaptation in the section on Ecological Principles.

Cycles

As organisms grow, they use life's nutrients, taking them from the earth in an orderly fashion. As organisms die these nutrients, unlike energy, are returned to the earth for reuse. For life to continue, the earth's nutrients must be recycled to be used over and over again in the formation of new life. Every organism (every tree, bird, insect, human) is thus made from elements that were once part of other living things. This order to life can be seen in the carbon cycle, oxygen cycle, and other cycles which will be discussed in the Ecological Principles section.

Diversity

The great diversity in life forms results from the ability of plants and animals to adapt to changing conditions. This diversity ensures that life will exist even though certain species might die out. The differences which exist in living things make all life more successful.

These five basic concepts can be illustrated in any environment and should form the basis of your program. It is much more important for the enrollees to understand these concepts than the specific biological characteristics of their work environment. The ecological principles which are discussed in Part 2 follow from these five basic concepts. Remember to relate them to the enrollee's home environment or to ask them for illustrations of the same principles in different environments. For example, without diversity in the careers and jobs of

people, we would not have the services and materials we need for survival. What would happen if everyone was a farmer? Who would provide medical services? These five concepts should be repeatedly illustrated and stressed throughout the summer in all aspects of YCC. Part 2 of this section will give some specific illustrations of basic ecological principles which relate to these concepts.

Ecological Principles

One premise of the YCC environmental awareness program, as stated in the initial introduction of this Resource Guide is that each YCC program is, and should be, unique. There are, however, basic biological/ecological principles which are applicable to all program areas. The principles and concepts on the following pages are designed as an aid only. E.A. Coordinators will have to relate these to their own particular camp and environment.

Ecosystems

The living organisms in an environment are constantly interacting with each other and with the non-living components of their environment. An ecosystem includes all the living components in a prescribed area, all the non-living components and all their interelationships regardless of the size of the area. The entire earth can be considered an ecosystem. A small pond is also an ecosystem.

Communities

The living organisms (plants and animals) within an ecosystem make up biotic communities. Communities are groups of plants and animals which function as a unit within a prescribed area. This community concept is one of the most important ecological principles because it emphasizes the fact that diverse organisms function as a unit in an organized manner. It is the study of the organization and interrelationships in biotic communities that present some of the most fascinating aspects of ecology. The rest of this section will deal with the principles which govern the functions of biotic communities.

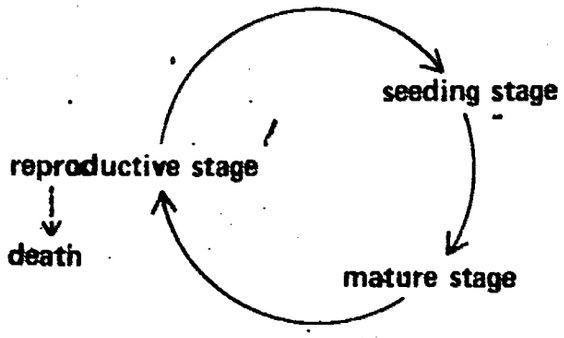
Habitat and Niche

Within a community every organism has a habitat (address) and a niche (profession). Habitat refers to the place where the organism lives and niche refers to its function within the community. Many different organisms can occupy the same habitat, but they cannot perform the same function (occupy the same niche) within the community. The niche concept is extremely complex and can include an infinite set of parameters (including habitat). For YCC purposes we have taken a rather simplistic approach. The eagle functions as a predator (food web niche) within the community, but its habitat could be a craggy precipice.

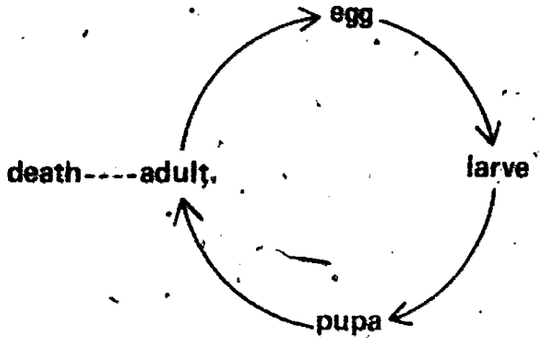
Cycles

Life Cycles: All plants and animals go through a life cycle having a beginning (birth), a period of growth and development, and a period of

reproductive maturity followed by death. The life cycle of a plant might be:



Insects might have a life cycle which consists of:

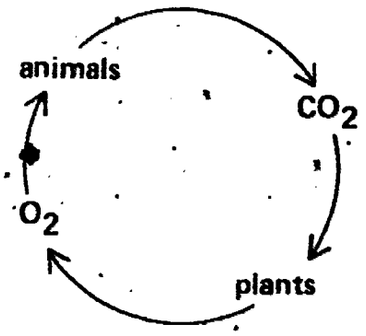


This insect life cycle could last a few weeks. Humans might have a life cycle spanning 70 years, and bristle cone pines have been known to live thousands of years. Death does not necessarily occur immediately after the adult stage in all cases, but it is a definite part of the life cycle.

Oxygen Cycle: The food-making process which occurs in plants (photosynthesis) has a by-product, molecules of oxygen. As glucose (sugar) is formed from water (H_2O) and carbon dioxide (CO_2) in the presence of sunlight, oxygen from the water molecules is released into the air. Since all plants and animals, including man, need oxygen to live, and since no animal can release oxygen, the supply soon would be exhausted

if the plants did not continuously replenish it. The cycle, in very simplified form, may be sketched like this:

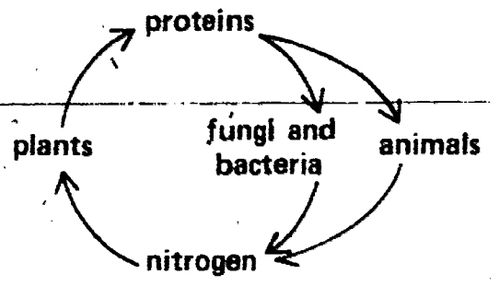
Oxygen Cycle



Green plants are, therefore, the foundation upon which the rest of life is built, for they are the source of all our food (energy) and the oxygen. All enrollees should understand this concept.

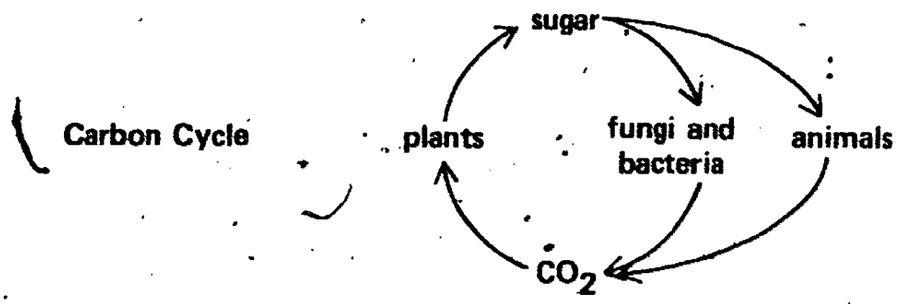
Nitrogen Cycle: Plants utilize nitrogen in the growth process and store it in the form of protein. One plant which utilizes nitrogen in such a manner is corn. If the corn is being raised as an agricultural crop, it may be harvested and stored by the farmer to be fed to cattle. While the corn is stored, a mouse may use it as a food supply and a cat, in turn, may utilize the mouse for food requirements. Assuming the cat is not eaten by a larger animal, it dies and begins to decompose. During this decomposition process, the protein (containing nitrogen) which has been carried throughout the cycle is broken down by bacteria and fungi into a useful form of nitrogen which is again available to the corn plant. The nitrogen cycle may be sketched in this manner:

Nitrogen Cycle



The enrollee should understand that nitrogen changes form as it moves through the cycle, but is never destroyed.

Carbon Cycle: The carbon cycle is also related to plant and animal relationships. Plants use carbon dioxide (CO_2) in their formation of glucose (sugar). They breakdown CO_2 into its components, carbon and oxygen. The oxygen is released into the air and the carbon is stored in the plant's tissue. Carbon is then contained within the plant body and can serve as food for animals or be returned directly to the soil when the plant dies and decays. As a by-product of burning plant energy animals return carbon dioxide to the air and the process repeats itself. The carbon cycle may be sketched like this:



The enrollee should understand that carbon, like nitrogen, takes many forms and is used in different ways as it moves through plant and animal systems. However, use does not destroy it.

Nutrient Cycle: The nutrient cycle is the way in which materials are returned to the ecosystem to support new life. For example, plants and animals eventually die and their remains decay or decompose, usually by bacterial action, and these materials become available as nutrients for new life. Another example: A farmer might spread manure on his fields. The manure came from livestock fed on plants grown from those same fields. The E.A.C. should provide other examples relative to the camp's location that will give the enrollees a clear understanding that the nutrients available in the earth's ecosystem are constantly being recycled and that this concept is basic to providing the quality of life as we now know it.

Biotic Succession (An Example of Adaptation)

Biotic succession is the gradual replacement of one biotic community with another over a period of time. All over the earth, wherever life can be supported, biotic succession goes on. The starting point in any biotic succession is a pioneer community able to colonize and inhabit any bare surface. The end product in succession is known as a climax community. This, as a relatively stable community, is able to maintain itself over long periods of time and to regenerate and replace itself without marked further change.

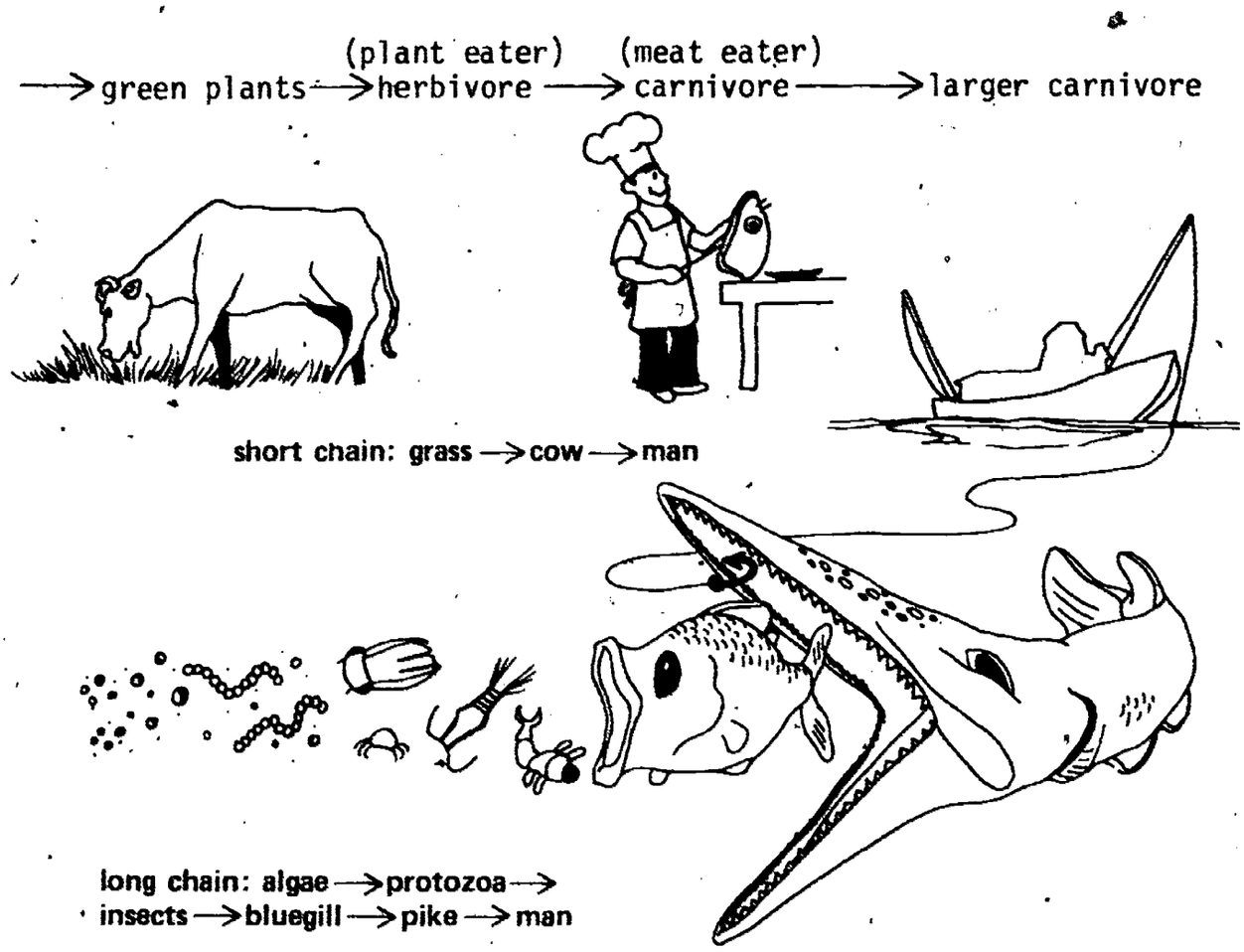
A lake or pond tends to be invaded by aquatic plants which are replaced in time by partially submerged reeds and rushes and these in time by sedges and grasses. The acquatic succession is made possible by the accumulation of soil materials washed into the lake. Eventually, unless the process is disturbed, each lake changes to a pond, the pond to a marsh, the marsh into a meadow or forest.

Succession has an analogy in the development of urban environments. Farmlands may be invaded by small towns which in turn become urban areas. These urban successional stages are comparable to biotic succession, but are not as predictable since man controls what the climax community will be.

Succession on a given area may take hundreds of years to progress from pioneer plants through the intermediate stages to the climax vegetation. A human lifetime is not long enough to witness all the successional stages which may occur in a given area.

Food Chains and Food Webs (Examples of Energy Flow)

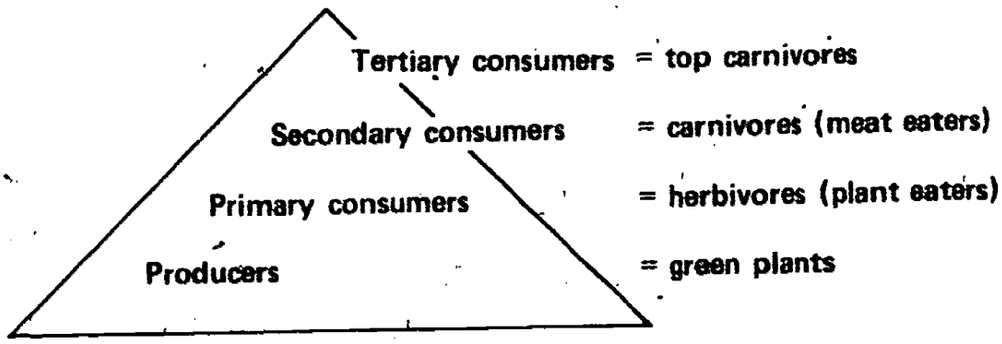
The basic relationship within the biotic community is the food chain. A food chain is a chain of organisms which are linked by their feeding habits. Food chains follow a general pattern:



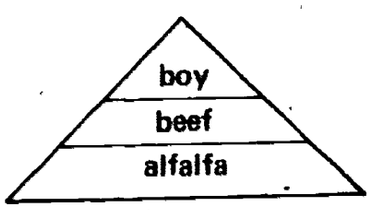
A food web is a number of interrelated food chains.

Biomass

The biomass of the community is the total quantity of living organisms of all species in an area at a given time. For example, All the living material found within a square acre would be the biomass for that area. If you determine the mass (weight) of the alfalfa grown on the acre, you would know the biomass of the alfalfa, not the biomass of the acre. The biomass of the acre must include all living things: the organisms in the soil, the insects on the ground, the plants growing in the soil and whatever animal happened to be walking across the acre at the moment being discussed. The number of individuals within a community is determined by the amount of energy available from green plants and by the efficiency with which individuals of the community convert this energy to a form useful for maintenance, growth, and reproduction. The relationship between biomass and energy use is often shown in a food pyramid.



In the biotic pyramid the greatest numbers of organisms (the greatest mass) and the greatest amount of food energy are to be found in the lowest levels of organisms, the green plants. As energy is transferred up the pyramid, it is lost in carrying out necessary life processes. Food consumption, digestion, and utilization are just a few of the processes which consume available energy within a food pyramid. The biomass of the top carnivores is thus much less than the green plants in that same area.



Pyramid of Biomass on 10 acres

105 lb. boy
2,250 lbs. beef
17,850 lbs. alfalfa

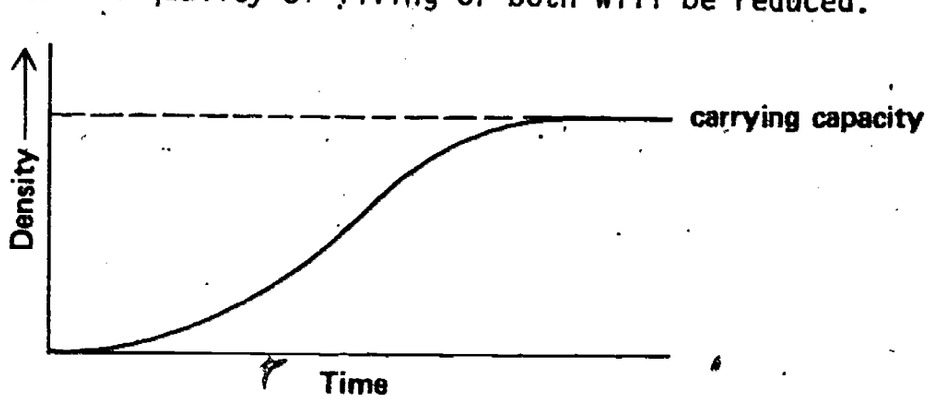
Ten acres of farm land can supply 17,850 pounds of alfalfa. If the alfalfa is used as feed, it will support only 2,250 pounds of beef which supplies only 105 pounds of boy.

Carrying Capacity

Any environment has a limited amount of resources, including energy, and can, therefore, support only a limited amount of life.

As a population of individuals increases in numbers, it also increases in density. More individuals in an area mean more demands on the available resources. When the resources are serving as many individuals as possible, and those individuals are living in optimum conditions, the environment has reached its carrying capacity. The carrying capacity determines how many organisms can be maintained and in what condition at any one time.

As shown in the figure below, density can increase until resources are being used at their maximum. The population will then level off. If density rises above the carrying capacity, either the number of individuals or the quality of living or both will be reduced.



In 1906, Arizona's Kaibab Plateau supported 4,000 mule deer in its forests and meadows. Also in that year the area was made part of the Grand Canyon National Game Preserve. Public hunting was stopped, and government officials began a compaign to eliminate predation. Thirty wolves, 554 bobcats, 781 mountain lions, and 4,889 coyotes were killed in the next few years. With no human or animal predation, the deer herd shot up to 100,000 in 1924. That was too many for the environment to support, and deer started dying of disease and starvation by the thousands. Eighty to ninety percent of the forage was destroyed completely. Today, the herd has lowered its numbers to 10,000, the vegetation has returned, and ecologists are using the Kaibab deer herd as a classic example of a population surpassing the carrying capacity of its environment.

Limiting Factors

An organism or a population of organisms will continue to grow until some aspect of its environment causes it to stop growing. Whatever factor limits the reproduction of a population or the growth of an indivual is known as a limiting factor.

Limiting factors can be divided into two categories: physical and biological. Physical factors which might limit population growth would

include climate and weather, the lack or the overabundance of water and minerals, the suitability of terrain, plus many other factors. Biological factors including competition, predation, parasitism, disease, and other interactions within or between species that are limiting to growth or increases in numbers.

A tree will cease to grow when essential soil nutrients are no longer available in required quantities. Particular tree species within a forest will cease to reproduce when forest floor conditions become undesirable for seed germination. Animals too will be affected by availability of food, water, and shelter.

Natural Phenomena

The study of natural phenomena (wild fire, earthquakes, flood, drought, severe weather) is very important for effective resource management. We may also learn how to control the negative effects of our practices on the environment. For example, by studying geology, weather and climate, we may learn to predict earthquakes, droughts, and wind storms in time to decrease damage. The E.A.C. should discuss the possible effects of a natural disaster as it relates to the land management policy of the host agency with the enrollees. Enrollees should be led to understandings of how people and the environment affect and are affected by natural phenomena.

The Role of People in the Natural World

One of the challenges of YCC is to relate these environmental concepts and ecological principles to the role of people in the natural world. The following discussion has been developed to assist in this process.

Environmental Manipulation

The history of civilization clearly shows that people have always controlled and manipulated the environment. True manipulation began when people changed from nomadic hunting societies to sedentary agricultural communities. The domestication of animals, clearing and cultivation of the land, and selection of certain plants to grow in specified areas were all a part of this manipulation.

The industrial revolution, followed closely by the transportation revolution, gave man an even greater ability to control and manipulate the environment. One result of this has been the increased rate of consumption of nonrenewable resources.

In recent decades these efforts have resulted in large increases in the uses of machinery, fossil fuels, fertilizers, insecticides, and herbicides. This has released many people from living off the land directly. However, it also resulted in enormous fossil energy inputs .....six to ten calories of energy input for each calorie of food energy output.

People have also found it necessary to invade the natural ecosystem and restructure it with buildings, roads, factories, cities, etc. In some areas little remains of the natural ecosystem. Many activities undertaken to fulfill a particular human purpose (for example, building a road) generate unanticipated consequencies. An important aspect of E.A. is being aware of these consequences and their long-term effects.

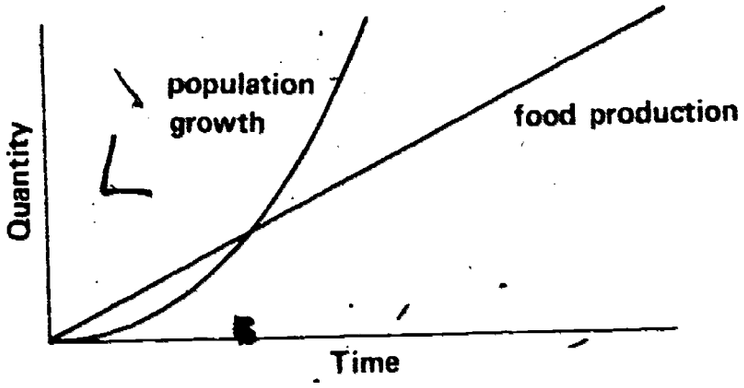
Because of human technological and industrial advances, many human "wants" are now considered "needs." At one time electricity was a "want"--now it is a "need" in our society. In many parts of the world it is still a "want." If we would scale down our "needs" to a more basic level, the earth's carrying capacity for the human species could be increased. To ensure that the enrollees understand the concept of needs vs. wants, the E.A.C. should discuss what their basic needs are.

In addition, this can be incorporated into the work project. For example: Trail construction--Is this a need? Why? Painting a building--Is this a need? Why? Other examples could be found in the Activity Sheets Section of the Resource Guide.

Limitations to Environmental Manipulation

Even though people have been moderately successful in manipulating and controlling the environment there are limitations. One limitation is a direct result of population increases. The carrying capacity of the

earth, particularly its ability to support the human species, is threatened by enormous growth rates in the human population and accelerated use of energy and other resources. Malthus has said that "as populations increase geometrically, food increases arithmetically." Graphically:



This is true of any renewable resource (a resource that can be replaced). People are able to manipulate the environment so as to produce many renewable resources in large quantities at an accelerated rate. Because renewable resources have been made so readily available, human demands on those resources have increased at the same time that world population has increased. It is inevitable that a time will come when production of renewable resources cannot keep up with demand. At that time, the carrying capacity of the earth will be exceeded.

Given these limitations, it becomes obvious that present growth rates cannot continue. With present populations already growing at a high rate 3 or 4 doublings constitutes an enormous increase. A population that grows at the rate of 1% will double in 70 years, at 2% it will double in 35 years, at 7% it will double in 7 years. This is called the rule of sevens. In a natural situation a species that exceeds itself beyond its habitat's carrying capacity must eventually decrease itself through death. But often in this process, some of the basic carrying capacity of the ecosystem has been destroyed. The use of chemicals, pesticides, herbicides, insecticides, as well as tools powered by fossil fuels has already resulted in undesirable by-products that have drastically reduce the quality of habitats in many areas.

The consumption of nonrenewable resources such as oil has resulted in the creation of replacement substances or in the search for more of the resource. It is obvious that we are decreasing the carrying capacity of the earth for other species as well as for ourselves.

Another limitation is our inability to see long term effects and to use technology to manage the environment without error. While people are constantly striving to improve their land management practices, much time and effort is spent in correcting past decisions, made in haste, resulting in undesirable environmental impact. Products are constantly put on the market and then removed because of some serious flaw, e.g., aerosol cans.

We must learn to control our consumption levels and recognize our limitations by: (1) Finding ways to reduce consumption of resources by using these resources more efficiently; (2) Substituting renewable

for nonrenewable resources; (3) Avoiding consumption patterns which result in non-biodegradable waste, and (4) Insuring recycling and reuse of waste.

Waste (the Result of Use)

Waste is a direct result of man's use of the Earth's renewable and nonrenewable resources. Therefore, one of the most important concepts that enrollees need to learn is Barry Commoner's idea that everything goes somewhere. There is no such place as "away." If any type of environmental ethic is to be developed by the enrollees, the entire camp staff must deal with this on a daily basis. The enrollees will never accept a "do as I say, but not as I do" attitude or performance from the camp staff. Examples of strengthening the "use makes waste" concept could be: reusing paper bags to carry lunches; the use of washable eating utensils rather than disposable ones; or in recreation activities, the discussion and decision to play volleyball (or other nonresource-using activities) rather than going for a motorboat ride.

It is important for an E.A.C. to make sure that the camp staff, as well as the enrollees, understand that use makes waste, but that there are ways to deal with this waste and limit its quantity. It is impossible to imagine a YCC camp that does not generate waste. Turn this problem into an opportunity by involving the enrollees in discussions on how to handle their own wastes, as well as how to reduce its quantity.

Depending upon circumstances, the E.A.C. can encourage visits to the city dump and/or recycling facilities, as well as provide viewing opportunities of the wastes generated by one of the nation's big four (agriculture, manufacturing, mining, and transportation).

It is a responsibility of the E.A.C. that enrollees leave camp with an understanding of both the ways that human activities generate wastes and the types of waste involved. Each enrollee should have an opinion about: (1) recycling and reuse; (2) use of nonbiodegradable products; (3) disposal of dangerous products that reduce the quality of life (nuclear wastes and toxic chemicals).

Environmental Involvement

One of the challenges facing the staff, as well as the E.A.C., of any YCC camp, is the development in the enrollees of a desire to be involved in environmentally critical issues. It is important, of course, not only to have the desire, but the knowledge and ability to recognize and respond to these issues. Only through concentrated effort on the part of the camp staff can the enrollees have real opportunities to help make decisions as well as live through the results of those decisions.

Any type of role-playing, environmental game, or related activity that involves the enrollees in decision making at the camp level is excellent training. A suggested activity would be the simulation game

"Center Place City" found in the Environmental Investigations section of the Resource Guide. If it is true that we fear or distrust the unknown, then by having an understanding about how decisions are made we can remove the fear and/or distrust or participation in sessions where public input is sought before a decision concerning an environmentally critical issue is made.

The point can be made that we are presently living with decisions made in the past over which we have had little or no control. Example: tax laws, traffic regulations, school attendance requirements. In reality, the fact that the enrollees are in a YCC camp at all is the result of a group decision made several years ago by Congress--an example of a decision made at the National level. In addition, there are state-hosted YCC camps resulting from a group at the state level deciding that it was a worthwhile project.

This should give the E.A.C. a springboard to discuss decision making processes at all levels of government. It should also demonstrate that in order for environmental questions to be resolved in such a way that the ecosystem (the earth) is given long range protection, it is necessary for interested, knowledgeable parties to be involved.

Attitude change is an important aspect of the YCC program. Hopefully, the enrollee's life style will change because of the YCC experience. Interest in environmental questions and policy decisions should be enhanced. Whenever possible, the E.A.C. should incorporate discussions of these matters into the work project. Discussions of carpooling, use of electric can openers, current environmental issues, or of species once common to the area are examples of topics that could be used.

It is important that the enrollees leave the YCC experience and influence others simply through behavior. For example, the enrollee might ride a bike to school instead of driving a car encouraging others to do the same; or the enrollee might pick up litter, thereby influencing others. The enrollees should also be encouraged to make as many decisions at the camp level as possible. An example would be enrollee input into selection of work projects. Successfully meeting the YCC goals and objectives often depends on enrollee involvement.

WORK E.A. ACTIVITY SHEETS

TIMBER MANAGEMENT

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Timber Thinning--Lodgepole Pine (Pinus Contorta)*

Environmental Relationships that could be taught: (EA Goals and Objectives)
At the end of this work project, crew members should have:

1. *Developed the ability to name at least 5 factors associated with superior trees in a stand and to recognize these superior trees. 1.1*
2. *An increased understanding of TSI* management practices and the economic, social & economic implications of this management. 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 6.2, 6.4*
3. *Developed skills in thinning trees. 6.3*
4. *Knowledge concerning the characteristics and growth of lodgepole pine. 1.1, 1.2*
5. *Knowledge concerning a clearcut. 2.5*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Look at stands of Lodgepole as you walk and drive into the work area. Compare dense with more open stands. Discuss the differences and the reasons for these differences.*		
2. *Compare increment cores from thinned and unthinned stands. Examine a cross section of a tree showing release after thinning. Discuss the uses of a tree--don't forget to talk about its value as it is growing in this area.*	*increment borer*	
3. *Determine which trees are superior trees in the stand to be thinned and tag those trees. (Decide what criteria you will use as a group: Examples--4' spacing, height of trees, etc.)*		
4. *Make a Dichotomous Tree Key to identify these species--if you have not already discussed how a tree grows, do it now. Also be sure to cover the serotinous characteristics of this tree.*	*Resource Guide, page 362*	

Continuation Sheet WORK PROJECT *Timber Thinning--Lodgepole Pine (Pinus Contorta)*

Activity	Materials & Resources Needed	Approximate Time Frame

5. *What advantages might there be to a clearcut?*
Natural regeneration with serotinous trees, wildlife habitat improvement in sterile forests, disease control.

Related concepts:

renewable vs. non-renewable resources
sustained yield
pioneer species
climax species
dominant trees
co-dominant trees
suppressed trees

**Timber Stand Improvement*

CAMP NAME & NO. _____
DEVELOPED BY _____

WORK PROJECT *Urban Forestry*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *The structure of a tree is related to function.*
2. *Trees in an urban environment have an effect on beautification, noise abatement, traffic control, temperature modification, air filtering, property value, screening, wildlife.*
3. *The urban environment has a direct effect on trees through air pollution, soil compaction, disruption of drainage patterns, injuries (sustained by machines, chemicals and animals), construction, temperature modification.*
4. *Trees have a social, economic, historical, cultural and physical effect on people.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *What is urban forestry?* 2. *What effect do you think trees have on an urban environment? How? Why?* 3. *What effect does the environment have on the trees here? How? Why?* 4. *What are some of the things that we might do to help the trees in our area?* 5. *How can more trees be planted in an urban area?* 6. *Who is responsible for the trees in the area?* 7. *How much money does it cost to plant and maintain a tree in the city?*	*Film from Environmental Action Coalition of New York--"To Help the Trees"*	
Discuss structure and function of: root hairs, roots, trunk, branches, leaves		

Continuation Sheet WORK PROJECT *Urban Forestry*

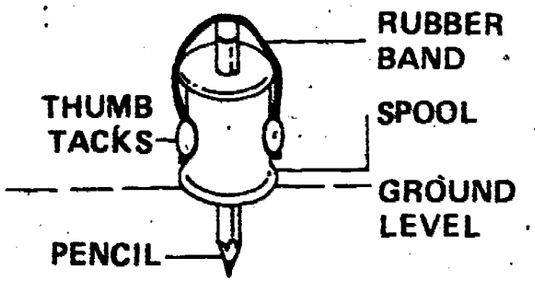
Activity	Materials & Resources Needed	Approximate Time Frame
Do "Observing and Classifying Tree Leaves"	*Resource Guide, page 362*	
Add a discussion of differences between conifers and deciduous trees.		
Send the enrollees out to trees in the area and have them list other characteristics that could be used to identify trees.		
Bring in people for urban forestry who are responsible for it.		
Photosynthesis - $CO_2 + H_2O = CH_2O + O_2$		
Place a leaf in a plastic bag and tie it securely. *Open up bag in 24 hours.* *Why is there water there?* *What is happening?*		
Do this in a couple of locations: The Cross Section Investigation in Forest Investigations and compare deciduous and conifers.	*Forest Investigation, 177-183* *Tasks A & B, page 185*	
Include an identification of: *outer bark* *inner bark - phloem* *cambium* *wood - sap wood - xylem* *heartwood*		
Make a list of 10 trees		

Continuation Sheet WORK PROJECT *Urban Forestry*

Activity	Materials & Resources Needed	Approximate Time Frame
Send out enrollees to collect: twigs, cones (list of 5 conifers) seeds		
Bark rubbings--Place a piece of paper on bark and rub with crayon. Do this for 10 different kinds of trees.		*20 minutes*
State as many examples as possible in the work area of how trees benefit the environment: beauty; cut down noise on highways, etc.; used on medians to cut down on light glare; used as shade; catches dust and dirt; increases property value; blocks, makes privacy; produces oxygen		
State as many things that the urban work area does to harm the trees: pavement and buildings reflect heat; pavement blocks H_2O; machines bump into trees; dogs urinate on trees		
How can we correct some of these problems?		
Go through the classified section of newspaper. Compare number of ads for houses with and without trees. Or compare prices.		*20 minutes*

Continuation Sheet WORK PROJECT *Urban Forestry*

Activity	Materials & Resources Needed	Approximate Time Frame
Bring a real estate agent in to discuss how trees affect the price of property.		
Filtering:		
Clean off a few leaves. Return each day and see how long it takes for dirt to accumulate. Compare areas.		
Wash off a few leaves from an area. Let the water settle. Compare areas.		
Soil Compaction and Water Absorption	*Tin cans with both ends removed, pail of water, watch*	*1-2 hours*
Have the enrollees select 2 or more trees with different levels of soil compaction, i.e. in a populated area, a heavily-used playground, bus stops, lawn, etc. They will then compare the relative levels of soil compaction and water absorption ability of the soil.		
Force 1 end of the empty can 1/2 inch into the soil, fill can to the top with water from the pail and record the time necessary for all of the water to sink into the soil. Repeat in other locations and record the results.		
Place spool on ground to be tested so that spring tension of the rubber band forces the point of the pencil into the ground. Record the different relative depths of pencil penetration.	*Sharpened pencil, marked at 1/2 inch intervals, sewing thread spool, 2 thumbtacks, large rubber band.*	

Activity	Materials & Resources Needed	Approximate Time Frame
Compare the penetration depths with the rate of water absorption. Are there similarities? What effect does soil compaction have on water absorption? What effect might soil compaction have on the growth of the tree? How might we improve the water absorption ability of the soil around here?	*Construct:* 	
Temperature modification of trees *Have the crew compare and record the temperature at ground level in exposed areas and in the shade of trees of different foliage density.* *What effect do trees have on ground level temperature? Why?* *What effect does the density of tree foliage have on temperature? Why?* *When might we want to have trees of greater or lesser foliage density (summer, winter)? Why?* *What effect might trees have on the energy needed to heat or cool buildings and homes?* *Have the enrollees in a park or other public area determine the correlation between where the people tend*	*thermometer*	*1/2-1 hour*

Continuation Sheet WORK PROJECT *Urban Forestry*

Activity	Materials & Resources Needed	Approximate Time Frame

to congregate in the park and the trees that grow in the park.

Contact a local arborist of a tree care service company or a city forester and have the value of planting or caring for a tree discussed. As a tree gets larger, determine how much more expensive it is to replace.

Contact the local historical society to determine if there are any trees in the community which have historical designation.

Have the enrollees think of the cultural values of trees that they have been exposed to, in school, etc.
Ideas: Paul Bunyan and Babe, the blue ox;
Seeds for revolution with King's Broad Arrow Act;
Romantic legends of loggers;
Famous landscape paintings;
Trees in state flags;
etc.

Have the enrollees think of the physical effects trees have on people.
Ideas: Identify with the outdoors and nature;
Represent strength and beauty;
Represent security;
etc.

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Trees*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Increased general knowledge about how a tree grows, the effect of man and natural forces upon its growth and alternative management practices for its use. 1.2, 2.5*
2. *Specific knowledge about this particular type of tree. 1.1, 1.4, 1.5, 2.1, 2.2, 2.3, 6.2*

(This activity sheet can be used whenever a crew will be learning about a particular tree species. A dominant stand of the tree is recommended in order to easily identify species characteristics.)

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Complete Forest Investigation. If your crew has already done this, some of the activities could be repeated - or - you can review as a crew, the things you have learned during the investigation.	*Forest Investigation, pages 177-188*	*2 or 3 sessions*
Personalize the knowledge gained through the Forest Investigation for this particular tree in some of the following areas:		
A. How can we tell the difference between this species and others?		
The Dichotomous Tree Key is one excellent way to accomplish this identification.	*Resource Guide, page 362*	
B. Have each crew member go alone into the tree area and record their observations about each of the following items:		

Continuation Sheet WORK PROJECT *Trees*

Activity	Materials & Resources Needed	Approximate Time Frame

Factors Affecting the Growth of these Trees:

1. *Natural phenomenon? (Fire, flood, etc.)*
2. *Climatic conditions (moisture, temperature variations in this area, etc.)*
3. *Man-made effects (thinning or pruning, recreational use)*
4. *What sightings or evidence do you find of plants or animals in this area?*

When everyone gets back together (in about 15 minutes), discuss how the things they observed affect the growth of this species in this location.

C. *Using an increment borer, carefully demonstrate and explain the use of this instrument; then let the crew members use the borer to extract cores and answer the following questions: (or use a cross-section--a stump perhaps)* — *increment borer*

1. *What can you say about how the growth of this species is affected by overcrowding?*
2. *Based on the bark and wood structure, how fire resistant do you think these trees are?*
3. *How would you describe the general growth patterns of these trees?*

Summary: Thinking back on the things we have learned today, what are some summary sentences that would describe these trees?

Continuation Sheet WORK PROJECT *Trees*

Activity	Materials & Resources Needed	Approximate Time Frame

What are some ways they are of benefit to:

1. *this area*
2. *man*

Content Words:

deciduous	*coniferous*	*climax community*
aspect	*ecosystem*	*biological control*
biotic	*abiotic*	*sustained yield management*
community	*limiting factor*	*renewable resources*
parasitism	*succession*	

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Timber Management (Slash Disposal)*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1.2
1.5
2.5
5.1
6.4

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Monday:		
Group Leader will discuss goals and methods of slash disposal *Sample questions:* *1. What is slash? Answer: Residue from logging operations* *2. Why dispose of slash? A: Fire hazard, beautification* *3. How can we utilize slash? A: Animal habitat, private firewood material, soil enrichment (rotting, burning)* *4. How can we dispose of slash? A: Burning, brush piles for small mammals, spread to rot* *5. What method has our Agency selected for this area and why?*		*1 1/2 hours*
Tuesday:		
Wildlife as it relates to slash disposal. Do Tasks A, B, and C of the Animal Investigation (221-234).	*Resource Guide, pages 237-239*	*3-15 minute sessions*

Continuation Sheet WORK PROJECT *Timber Management (Slash Disposal)*

Activity	Materials & Resources Needed	Approximate Time Frame
Wednesday:		
Disposal in a selective cut area: 1. *What is a selective cut? Answer: Cutting the mature trees to increase growth in remaining stand--removal of undesirable trees.* 2. *In what circumstances do we use selective cutting?* 3. *What effect does this method have on the local environment?*	*local Forester*	*30-40 minutes*
"Even-aged management" --avoid use of the word "clearcut" until after discussion. 1. *What is even-aged management? Answer: Cutting all useable timber in one operation.* 2. *In what circumstances do we use even-aged management? Answer: Old overmature stands with no reproduction, limited access, for more efficient operation, for ease of replanting, for disease and parasite control.* 3. *What effect does this method have on the local environment? Answer: Increases vegetation diversity, changes succession, possibly effects soil erosion, increases animal habitat.* 4. *Discuss clearcutting as opposed to selective cutting.*		*1 1/2 hours*
Thursday:		
Start Forest Investigation (observing and inferring with cross-sections), Tasks A, B, and C	*Resource Guide, pages 185 and 186*	*2 hours*

Continuation Sheet WORK PROJECT *Timber Management (Slash Disposal)*

Activity	Materials & Resources Needed	Approximate Time Frame
Friday:		
Complete Forest Investigation		*2 hours*
Study Rotten Log, Task E	*Resource Guide, page 187*	
Communicate awareness through Sketching & Writing, Part V	*Resource Guide, page 181*	
Interpreting Past Events, Task D	*Resource Guide, page 187*	
Short Activities:		
a. Small groups build survival shelter	*Resource Guide*	*1-2 hours*
b. Design different kind of animal shelter		*1/2 hour*
c. Food chain game		*10 minutes*
d. Population games	*page 373*	
	pages 339 and 348	

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Timber Management (Tree planting)*

Environmental Relationships that could be taught: (EA Goals and Objectives)

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Monday:		
a. *Agency personnel gives introduction to project with some demonstration. Enrollees do sample tree planting.*		*45-60 minutes*
b. *Mini impact statement (group leader discussion).*	*Resource Guide, page 361*	*35 minutes*
Tuesday:		
Observation and Inferring with Cross-Sections	*Forest Investigation, pages 177-183*	
A. Task A	*Page 185*	*10-15 minutes*
B. Task B	*Page 185*	*30 minutes*
C. Task C (Parts 1 and 2)	*Page 186*	*60 minutes.*
	Note: EAC or Group Leader must prepare some material ahead of time (1.5 hours)	

Continuation Sheet WORK PROJECT *Timber Management (Tree planting)*

Activity	Materials & Resources Needed	Approximate Time Frame
Wednesday:		
A. Complete Task C (Parts 3 & 4)	*Page 186*	*1 1/2-2 hours*
Thursday:		
Study of Rotten Log		*hour*
A. Task E	*Page 187*	
B. Do Communicating Feelings through Sketching and Writing, Part V	*Page 181*	
Friday:		
Field trip to different forest habitats, compare. Have enrollees do things, i.e., animal signs, borings, tree identification	*Book: Trees of North America Increment Borer*	*1-2 hours*
Field trip to a different forest habitat and have enrollees do:		
a. identify tree species and a few main plant species		
b. observing and measuring Animal Sightings & Evidences	*Task A, page 237*	
c. Inferring with cross sections, Task C, (Parts 1 & 2)	*Page 187*	
Take your own tree boring cores on site.	*Increment borer*	

CAMP NAME & NO: _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Tree Planting--Seedlings*

Environmental Relationships that could be taught: (EA Goals and Objectives)
At the end of this work project crew members should have:

1. *Discussed the impact that this work project will have on the environment. 2.5, 2.1, 2.4*
2. *Observed the structure of a tree and learned of its growth patterns and requirements. 1.3, 6.4*
3. *Last but not least--developed the skills of planting seedlings. 6.3*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Take a look around and talk about: *How you think the area used to look;* *How it looks now;* *How you think it will look in 25 years.*		
How will our work affect this area in the following categories? *Wood (hope it's obvious)* *Water (erosion control . . .)* *Wildlife (protection, homes . . .)* *Recreation (shade! aesthetics . . .)* *Range (overstory and understory grazing relationships . . .)*		
How does a tree grow??? *(some excellent pamphlets are available for visual aids)*	*Conduct Forest Investigation, pages 177-188 in a mature stand*	
Why are we planting on north-facing slopes? *What would happen if . . .* *Air pockets were left around the roots of the seedlings?*		

Continuation Sheet WORK PROJECT *Tree Planting--Seedlings*

Activity	Materials & Resources Needed	Approximate Time Frame

The top of the seedling breaks?
The roots were exposed to 3 seconds of breeze and sun?

Emphasize safety precautions for this project and appoint a safety officer to enforce safe working practices.
Gloves prevent blisters!
Pulaskis need room to operate!

Friendly competition between crews is OK, but:

The chance of a tree growing in a particular spot is NOT doubled if two (2) seedlings are placed together in one hole!

Related terms and concepts:

conservation	*overstory*
exploitation	*understory*
carrying capacity	*pioneer species*
competition	*climax species*
multiple use	*bengay*

RECREATION DEVELOPMENT, MAINTENANCE/LANDSCAPING

CAMP NAME & NO.
DEVELOPED BY *EA Task Force*

WORK PROJECT *Litter Pickup*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *To increase awareness of a wide range of attitudes and personal values relating to the environment.*
2. *To analyze the litter problem and describe several solutions.*
3. *To describe the economic impact of litter.*
4. *To become familiar with the problems of solid waste disposal.*
5. *To become familiar with the ideas of biodegradable & nonbiodegradable materials.*
6. *To become familiar with the concepts of renewable & nonrenewable resources.*
7. *To become aware of the effect of litter on the environment.*
8. *To describe how picking up litter aids the agency in overall management objectives.*
9. *To increase the awareness of the recycling potential in the area.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
INTRODUCTION: This project should need little explanation! Make sure they know how long and how much litter they will be picking up. You could ask the following questions: *1. What is litter?* *2. Why are we doing this?* *3. Who does it if we don't?* *4. Why does the litter exist here? Explore the current societal attitudes about litter.* *5. How might we reduce the amount of littering done here?* *6. How much do you think it would cost to have someone else do this?* *7. What can we do with this after we pick it up?*		*20 minutes*
Accomplish as many of the following activities as you have time for during this work project. Arrange the sequence and timing to fit the needs of your crew.		

Continuation Sheet WORK PROJECT *Litter Pickup*

Activity	Materials & Resources Needed	Approximate Time Frame
Litter and the Environment		
I. Why is it illegal to litter? *-Litter creates an eyesore (aesthetics)* *-Undesired types of wildlife are attracted to the area (rodents, starlings)* *-May present dangers to animals (including man)*	*Litter*	*45 minutes*
II. Define the word habitat with your crew. What are some examples of a habitat? *Examples: Burrow - gopher* *Anthill - ants* *Den - coyote*		
1. Find a piece of litter that is a habitat or can be used to make a habitat. (Picking up litter can be a trade-off). *Examples: paper - maggots* *bottles - snails* *string & birds (for nests)*		
2. Now find a piece of litter that can harm a habitat. *Examples: polaroid papers - poison* *string - entangles* *plastic - clogs* *broken glass - cuts* *spray cans - poison* *rotten food - poison*		

Continuation Sheet WORK PROJECT *Litter Pickup*

Activity	Materials & Resources Needed	Approximate Time Frame
III. Consider the host agency's land management plan as it relates to litter control--What are the alternatives to doing this project? *How can you as YCCers help to change the current attitude towards littering?*		
Litter as a Cultural Key *Much of what we know about ancient civilization is based on the investigations of the litter that they left. Through the study of these litter "artifacts" archeologists are able to tell us how the people looked, what they ate and wore, how they played and worked, and how they worshipped.* *Have the crew assume the role of archeologists studying the "artifacts" they have collected. Then have them describe as much as they can about the people and culture that generated these "artifacts":* *How do these people look?* *What do they eat?* *What do they wear* *What do they wear?* *How do they play?* *What work do they do?* *How do they worship?* *What else can you tell about them?*	*Collection of litter*	*1 hour*
Litter Art *Create an object of art out of litter.*	*Litter*	*30 minutes*

Continuation Sheet WORK PROJECT *Litter Pickup*

Activity	Materials & Resources Needed	Approximate Time Frame
Advertising Litter *Cut all the advertisements from a magazine that are about products which encourage littering. Also, cut out the advertisements that don't encourage littering. Which type do you have more of? Based on these results, what do you think the attitude about litter might be of people who read these magazines?* *(Do this activity with TV commercials)*	*Magazines*	
Discuss the National Returnable Bottle Bill *How could it/How does it affect:* *1. Our work here?* *2. The YCC camp?* *3. The community?*		*20 minutes*
(These next 3 activities are effective when they're done in sequence)		
Classifying and Measuring Litter *Sort some litter into separate piles based on discernable characteristics, then talk about:* *1. Why did you sort it that way?* *2. What can you do with each pile?* *3. If there appears to be no value to the piles, ask: How can we resort the piles so they can be useful? Examples: glass, aluminum, paper, etc., or according to time, location, content, etc.* *4. You could weigh each pile on the scales, then compare similarities and differences*	*Scales* *Litter*	*45 minutes*

Continuation Sheet WORK PROJECT *Litter Pickup*

Activity	Materials & Resources Needed	Approximate Time Frame
5. *Can you identify the source of the litter, i.e., the company that produced the product?* 6. *Can you make an impact on this source? How about a letter to the editor of your paper identifying the source of the largest percentage of litter? Be sure to send a carbon copy to the president of the source!*		
Biodegradeable or Nonbiodegradeable? *What constitutes a nonbiodegradeable object as opposed to a biodegradeable one? (List some of each)* *Bury different types of litter, then dig it up each week and observe.*	*Use a plot of soil around the camp or work-site*	*Approx. 6 wks.*
Renewable or Nonrenewable *What constitutes a renewable resource as opposed to a nonrenewable resource? (List some of each)* *Conduct some research to find out where raw resources come from. Who are the current world suppliers of these raw materials?*	*Library*	*1 hour*
Related Field Trips: 1. *Visit an auto dump and discuss recycling cars. What are some alternatives?*		*45 min, plus travel*

Continuation Sheet WORK PROJECT *Litter Pickup*

Activity	Materials & Resources Needed	Approximate Time Frame
2. *Stop by a sanitary landfill. What impact does the landfill have on the local area?*		*45 min. plus travel*
3. *Visit a recycling plant (paper, aluminum, glass). Could your crew recycle items?*		*45 min. plus travel*

CAMP NAME & NO.
DEVELOPED BY *EA Task Force*

WORK PROJECT *Landscaping.*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Man changes the natural environment to suit his own needs.*
2. *Man creates environments which he must take care of.*
3. *Man's changes on the land can have more than an immediate effect on the local environment.*
4. *Different plants have different needs.*
5. *It is best to work with the existing natural environment and not destroy it.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Discuss how ornamental plants are different from "wild" plants which occur in the natural environment.* *Facts: Ornamentals are selected/developed by man.* *Ornamentals are planted in selected areas for their characteristic flowers, form, leaf color, etc.* *Most were developed from "wild" plants.* *Some are sheared/pruned to keep them from retaining their natural form.* *List some of the different types of ornamental plants:* *ground cover* *flowering trees* *shade trees* *shrubs* *annuals/perennials* *turf*	*Go to the horticultural book section of the local library*	

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
Discuss the reasons for developing ornamental trees/shrubs: *beautification* *shade* *fruit production* *fragrance* *attract wildlife*		
2. *Discuss why many of the spring flowering ornamental trees are a good example of man's development of ornamental plants.*		*10 minutes*
Fact: Many of the spring flowering trees were developed from fruit trees although they no longer bear edible fruit. *Examples: flowering cherries* *flowering peaches* *flowering plums* *flowering quince*		
Activity: Have the enrollees go to a local tree nursery where they can view different ornamental trees/shrubs and see how they are grown and taken care of.		*4 hours*
3. *Discuss the earliest plants that man developed/cultivated.* *Examples: cereal grains--corn, barley, wheat, rice* *trees--figs, dates, olives*		*10 minutes*
4. *Discuss the significant effects man's cultivation of plants has on civilization.*		*20 minutes*

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
Facts: People stopped being nomadic. *People settled in permanent areas.* *More complex social order of people developed.*		
5. *Discuss the reasons for developing ground covers:* *Grow in shaded areas that other plants don't do well in.* *Prevent soil erosion.* *Beautification*		*10 minutes*
6. *Discuss what annual/biennial plants are.*		*10 minutes*
Facts: An annual plant completes its life cycle in one year. *A biennial plant completes its life cycle in two years.*		
Study the different ornamental annual/biennial plants in the area and determine their different biological features. *Examples: pollination process* *type of flower* *root structure* *where the species comes from*		
Activity: Have the enrollees visit a greenhouse where annual/biennial plants are grown so the methods of propagating these plants can be seen.		*3 hours*
Activity: Have the enrollees go to a botanical garden or arboretum so the various ornamentals can be discussed by a horticulturalist or have one come to your worksite.		*4 hours*

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
7. *Discuss the characteristics of grasses.*		*30 minutes*

Facts: Monocots

All important cereal grains are grasses
Examples: corn
wheat
oats
barley

Control soil erosion

Some are weeds
Examples: quackgrass
wild oats
foxtail

Some are lawn grasses
Examples: Kentucky Bluegrass
redtop

Some are pasture grasses
Examples: timothy
Kentucky Bluegrass

Study the biological characteristics of grasses. *20 minutes*
pollination process
type of flower
type of root structure

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
Discuss why special grasses were developed by man for lawns. *Beautification around homes* *Prevent soil erosion* *Grow under special environmental conditions*		*10 minutes*
Activity: Have the enrollees go to a local golf course and have the turf manager explain the different grasses that are used and the different characteristics of each grass type.		*2 hours*
Activity: In a lawn area, have the enrollees find the common weed species which are present. Explain the uses of the various weed plants that are found.		*1 hour*
Activity: Many ornamental plants will regain their natural shape if not altered by man. Have the enrollees find two plants which are the same in species but one has a different form due to man's horticultural practices. *hemlock tree and hemlock hedge* *yew tree and yew hedge* *sheared junipers and wild junipers* *pruned fruit tree and unpruned fruit tree*		*30 minutes*
9. Before the enrollees actually prune a tree, have them give reasons why pruning is beneficial to trees: *stimulates new growth--more fruit* *eliminates bad/diseased branches*		*15 minutes*

Activity	Materials & Resources Needed	Approximate Time Frame
eliminates weak/rubbing branches *gives neater, stronger appearance* *allows a tree to heal its branch cuts sooner, so decay is reduced*		
Activity: Have an arborist from a tree service company or from the Parks Department visit the work site and explain the different methods used in caring for trees.		*1 1/2 hours*
Activity: Leave a portion of a lawn unmowed and watch the plants as they develop. Identify the different species as they mature. Discuss how mowing interferes with the natural plant growth process.		
Animal Activities:		
10. Activity: Locate any signs of animals present in the lawn such as gophers, mice, moles, shrews and explain their life cycles.		*20 minutes*
Activity: After a rainstorm, locate the castings of earthworms and discuss how they play an important part in enriching the soil.		*15 minutes*
Facts: Worms digest the organic matter in soil and expel organic matter which feeds plant roots.		

Activity	Materials & Resources Needed	Approximate Time Frame
They aerate the soil with tunnels which allows water penetration. They build up the soil.		
Activity: After a heavy rainstorm, have the enrollees measure off 3 foot square plots on the lawn and count the number of worm castings in the plots. Then measure the area in square feet of the lawn. The plots will represent a percentage of the total lawn area of which this % factor should be used times the number of castings found in the plots to give an indication of the worm population in the soil.		*25 minutes*
Soil Activities:		
11. Activity: Dig a trench in the ground for a soil profile. Explain the various soil layers that are present. Discuss the characteristics of soil--texture; structure, types. Have the enrollees dig soil profiles in different areas.	*Soil Investigation, pages 209-222 Tasks A, B, and C; pages 217 & 218*	*1 hour*
Activity: Using a soil-testing kit, have the enrollees determine the pH of the soil and how it can be corrected. Discuss how soil pH can be increased by adding lime and decreased by adding sulphur.	*Soil testing kit*	*30 minutes*

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Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
Discuss the forms of lime, where it comes from and why the pH of the soil is vital so that nutrients can be made useable by the plants.		*20 minutes*
Activity: Point out the different plants which have different pH requirements. *Examples: Rhododendron, Azaleas, Oaks, Hemlocks, Blueberries — Favor acid soils*		
Activity: Using soil testing kits, have the enrollees test the soil for the major elements nitrogen, phosphorus and potassium. Explain what effects these elements have upon plant growth.		
12. *Activity: Using plant tissue testing kits, have the enrollees determine the micronutrients in the plant. Explain what effects these elements have upon plant growth.*	*plant tissue testing kits*	*25 minutes*
13. *Activity: Have the enrollees go to a garden store and record from a bag of fertilizer its nutrient content, application rate, precautions to observe and manufacturer. Explain where these elements found in the fertilizer are obtained by the manufacturer.*		

Composting Mulching

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
14. *Activity: After explaining how to prepare a compost pile, have the enrollees make one from some of the plant materials that are raked--grass, leaves etc. Then discuss organic and inorganic fertilizers. Explain the nitrogen, phosphorus and potassium cycles in the soil.*		*30 minutes*
Activity: Have the enrollees use some of the coarse plant material as a mulch. Discuss the importance of using mulches.		
Fact: conserves soil moisture		
enriches the soil		
minimizes weed growth.		
Activity: The enrollees can place a thermometer under the mulch, on top of the mulch, and on the adjacent grass and check the temperatures in the morning, noon and afternoon of each day and by keeping a temperature chart, observe the effects of mulching on soil temperature fluctuations.		
15. *Discuss how the over-application of lime and fertilizer can be detrimental to the environment.*		*20 minutes*
Facts: Beneficial plants are restricted in their growth or are killed.		
Excessive runoff into lakes, streams, etc. can cause algae blooms which cause water pollution.		
The ban of phosphates in detergents.		

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
16. *Activity: Using a water testing kit, have the enrollees test the water they are using on the ornamental plants. Discuss where the source of water is which is coming from the faucet and how it gets there. It may be possible to have the enrollees tour a city reservoir and have its operation explained.*	*water testing kit*	*30 minutes*
Pesticides		
17. Discuss what are pests and pesticides.		*25 minutes*
Topics: various types of pesticides-insecticides, herbicides, etc. *forms pesticides can be applied in;* *how to properly apply pesticides;* *environmental safety considerations;* *dispose of empty cans properly;* *don't overapply;* *don't apply under wrong conditions.*		
Activity: Have the enrollees go to a garden store after they each have selected a particular type of pesticide. Have them record the pesticide's components, safety precautions, directions for use, manufacturer, restrictions, etc.		
Discuss the problems which have resulted from the overuse of pesticides or the use of persistent toxic chemicals.		*25 minutes*

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame
Facts: DDT linked with the decline of Eagles, osprey, etc. PCB is making fish unedible from the Hudson River in New York.		
Discuss the alternatives to using pesticides through biological controls such as natural predators, diseases or disrupting sexual processes.		*20 minutes*
Activity: Contact the local Agriculture Extension Agent for the county and have him give a talk to the enrollees about the local pests, pesticides and biological controls.	*Agriculture Extension Agent*	*1 1/2 hours*
15. In a park or public area, determine the areas that are frequented by the most people and determine the environmental damage that is being done.		*1 hour*
Examples: soil erosion *soil compaction--poor water seepage* *exposed tree roots* *death/deterioration of plants*		
Have the enrollees think of ways to repair the damaged areas in the park.		
Have the enrollees develop landscaping plans that would more evenly distribute people over the park, so that the park is better utilized and the more delicate areas protected.		*1 hour*

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame

Example: Use plants that attract people elsewhere;
Use protective plants that people can't penetrate

Hedges:

19. Discuss why man originally planted hedges.

Reasons: Created living fences to control livestock;
Privacy around estates;
Control flow of people;
Property boundaries.

Determine why the hedges were planted on the YCC worksite and how they could be planted elsewhere to improve the environment.

Examples: Noise reduction;
Protection around fragile areas;
Attract wildlife;
Wind protection;
Control foot traffic.

Activity: Have a landscape designer give a presentation of how the natural environment is altered to suit mankind.

Topics: Landscape designing process
How landscaping plants are selected;
Proper placement of plants in the landscape;
Conservation benefits of landscaping.

Continuation Sheet WORK PROJECT *Landscaping*

Activity	Materials & Resources Needed	Approximate Time Frame

Discuss the different biological characteristics of:

landscaping trees/shrubs
winter hardiness
sunlight requirements
soil needs
exposure tolerance
mature spread

Activity: *Go to an area which has been totally cleared for a housing development and an area in which the houses have been fitted into the natural vegetation and the topography of the land. Observe the advantages of having construction blend into the existing natural environment.*

Activity: *Have the enrollees observe desirable landscaping projects in the area, such as:*
trees along the streets;
trees in parking lots;
landscaped strips along roads, streets, etc.
community garden areas

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VISITOR SERVICES

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Painting Picket Fence around Cemetery*

Environmental Relationships that could be taught: (EA Goals and Objectives)

Refer to YCC Source book for Environmental Awareness Goals and Objectives. Goals & Objectives accomplished as a result of these activities include:
Goal #2 objectives 2.2, 2.3, 2.4, 2.5
Goal #3 objectives 3.2, 3.3

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame

Caution to Work Leader:

Remember in working in or around a cemetery that you have an opportunity to offend many people if you fail to be very discrete. Use care, and through discussion, set ground rules for your activities. Don't start work around an area as critical as a cemetery without some activity that emphasizes the special care necessary.

Reflect on these subjects by asking the enrollees:

1. *Why is the cemetery located here?*
2. *How should we act?*
3. *What are some acts that could offend others?*
4. *List things that we should do during our work period here.*

This discussion could, and should, continue until a group of useable guidelines are established. Encourage enrollees to establish their own rules. Restrict your input to keeping the discussion on track. Discussions can be held on site or before you reach work location.

During your periods of work, consider these points for discussion in order to meet your EA goals. Expand these activities as necessary; don't be limited by suggested questions or activities. Think up your own.

Continuation Sheet WORK PROJECT *Painting Picket Fence around Cemetery*

Activity	Materials & Resources Needed	Approximate Time Frame,

Read paint can labels, discuss use of chemicals in our present environment.
Is oil-based paint necessary?
Why use white paint anyway?
Answer: 1. *Fence was white before;*
2. *Graveyard fences are always white;*
3. *White is a spiritual color.*

If these fences are always white, maybe it's because the first settlers didn't have any other color. They did have whitewash (made from lime) and thereby set a precedent.

If we were going to change the color of this fence, what color would you recommend? Why?
1. *Blue-green--restful*
2. *Black-gray--somber*

Do we need to paint the fence anyway? Why does a graveyard need a fence?
1. *To preserve, beautify.*
2. *To demonstrate care.*
3. *There has always been one.*
4. *Fences show ownership.*

Is there a better (or different) way to show cemetery boundaries?
1. *Living fences, hedges, etc.*
2. *Stone walls.*
3. *Chain link fences.*

Continuation Sheet WORK PROJECT *Painting Picket Fence around Cemetery*

Activity	Materials & Resources Needed	Approximate Time Frame

What are advantages and disadvantages of each proposal? Have enrollees divide into groups and defend the different possibilities.

Litter pickup around fence and general area will open possibilities of other discussion.

Refer back to the reading of the label on the paint can.

Besides the paint, what other chemicals did we use yesterday (at work, at home)?

1. *Solvents*
2. *Cleaners*
3. *Oil, gas for vehicles*

Could we have saved, reused, or substituted other materials? Give examples.

How can we use the empty paint cans?

1. *Clean out and use to carry tools.*
2. *Label and store small items*
   a. *nails*
   b. *bolts*
   c. *buttons*
3. *Store used brushes.*
4. *Pick up small litter.*

Alternate questions:

If the discussion leads there:

Continuation Sheet WORK PROJECT *Painting Picket Fence around Cemetery*

Activity	Materials & Resources Needed	Approximate Time Frame

1. *What did the early settlers use for buckets?*
2. *How were buckets like these used if not for paint?*
3. *This paint can be expected to last 7 years. How long do you think whitewash will last?*
4. *As time permits, lead discussions toward enrollee realization of present-day use of nonrenewable resources.*
   a. *Plastics made from oil*
   b. *auto fuels*
   c. *manmade fibers*

Have enrollees working in teams of 4-5, determine:

1. *Total # graves*
2. *oldest grave*
3. *Years, ages, sex of graves*
4. *Summarize and report findings*
5. *How many graves will this graveyard hold?*
6. *What happens when this occurs (which way is the best to grow)?*

What are some things we can learn from:

1. *This cemetery*
2. *Any cemetery*
   a. *history of area*
   b. *ethnic background of people living here*

Why do we care for the dead? Accept all answers. What are some other rituals associated with death that you know of?

Continuation Sheet WORK PROJECT *Painting Picket Fence around Cemetery*

Activity	Materials & Resources Needed	Approximate Time Frame

1. *Irish wake*
2. *Above ground crypts (New Orleans)*
3. *Burial at sea*
4. *Cremation*
5. *Some society groups just abandon the dying--no body disposal at all*
6. *Pharoahs--special persons--special treatment (Egypt)*
7. *Many others*

Summary Questions--

What have we learned concerning _____ *this week?*

1. *Respect for others (feelings, values)*
2. *The environment of this graveyard.*
3. *About the history of the area, county,* _____.
4. *How others, ourselves feel about death.*
5. *The (best) way to do things. Hopefully, the enrollees will have realized that alternatives exist to almost any problem.*

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Recreation Cleanup (Picnic grounds & campgrounds)*

Environmental Relationships that could be taught: (EA Goals and Objectives)

At the end of this project, enrollees should have:

1. *An understanding of land use management practices as they relate to cultural and social changes. 2.1, 2.2, 2.3, 6.2*
2. *An increased understanding of the need for control of people using public land. 2.4, 4.1, 4.4, 4.5, 6.4*
3. *A continuing awareness of man's ability to affect the environment--positively or negatively. 2.5*
4. *Increased knowledge about local biotic and abiotic features. 1.1, 1.2*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Dig out some old maps and talk with local history buffs to find out how this land was used before these recreation areas were developed. Go back as far as you can. What were some reasons for the changes up to the present date?		
Check out different recreation areas and compare their method of trash control. ("Pack Ur Trash", Agency collection, etc.). Which method do you think works better? Why?		
What are some ways people can reduce their trash when using these areas? How much does trash collection in this area cost your host agency?		
What would happen if we had no designated recreation areas for use by the public?		
A "Micro-investigation" potential exists with any trash item (a can, broken glass, papers, etc.) How could this single item		

Continuation Sheet WORK PROJECT *Recreation Cleanup (Picnic grounds & campgrounds)*

Activity	Materials & Resources Needed	Approximate Time Frame

affect this environment? Multiply this by the amount of trash in the area. Yuck!

Take a few minutes to see what's growing in the area and tie that in with the climate . . . can do this in the various recreation areas you're cleaning up, then compare the similarities and differences.

If it's feasible, your crew might decide to recycle . . . for a party?

Words to remember: *pollution* *trampling*
littering *biodegradeable*
carrying capacity

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Design & Construct an Exhibit on Habitat of Squirrel in a City*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1.1
2.1
2.3 (man & squirrel)
2.4
6.2
6.3

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Explain Management's reasons for exhibit and how it fits into overall management plan.*	*Park Chief of Interpretation*	*30 minutes*
2. *Study squirrel habitats in woodland and urban areas.*		
a. *Have enrollees simulate squirrels, in groups of 2 in a woodland setting. Try to discover: What would I eat? Where might I live? Who will eat me? Where can I hide? Where might I get my water? Who else lives in my neighborhood? Whom am I afraid of? Who might eat the same things I would?*	*Field trip to woodland Peterson series Field guide on mammals*	
b. *Share the above information in a group.*		
c. *Crew Leader will introduce the terms niche, habitat, food chain, carrying capacity.*	*Resource Guide, pages 32, 36, & 38*	
d. *After investigating the woodland area, have enrollee do questions a & b above, in a city park setting.*		
e. *Have enrollees discuss similarities and differences of the habitat.*		

Continuation Sheet WORK PROJECT *Design & Construct an Exhibit on Habitat of Squirrel in a City*

Activity	Materials & Resources Needed	Approximate Time Frame
3. *Analyze relationship between man and the squirrel in the urban environment.* *Sample questions:* *a. How do man and the squirrel interact in the city?* *b. How do man's activities affect the squirrel population, i.e., pollution, increased population, feeding the squirrel, destruction of urban green space.* *c. Can the trends be reversed?* *d. How do you feel about wildlife in the city?*	*Park Naturalist or Crew Leader*	*1 1/2 hours*
Working in small groups:		
4. *The enrollees will design the content of the exhibit considering the following:* *a. types of visitors* *b. expectations* *c. aesthetics* *d. park management needs*	*Agency Personnel*	*8 hours*
The enrollee will construct the exhibit. Considerations for design and construction, considering the following factors: *a. sources and types of materials available, i.e., renewable and nonrenewable resources, type of environment exhibit will be placed in, expected life span of exhibit materials, maintenance, ease of alteration, vandalism, energy conservation* *b. economics*		*8 hours*
5. *See game, "Food Chain."*	*Resource Guide, page 373*	*1/2 hour*
6. *Communicating Feelings through Sketching and Writing*	*Forest Investigation Part V, page 181*	*45 min. each*

Continuation Sheet WORK PROJECT *Design & Construct an Exhibit on Habitat of Squirrel in a City*

Activity	Materials & Resources Needed	Approximate Time Frame
7. *Have enrollee expand discussion on following topics:* *a. location of park, i.e., reasons of location, why have city parks, benefits* *b. competing needs for land encompassed by park*		*1/2-1 hour*
8. *Conduct survey of community surrounding park.*		*2 hours*
9. *Conduct visitor survey to solicit visitor comments on exhibit.*		*4 hours*

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Restoration Activities of Kitchen in an 1800 Home*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1.5 (specifically, process of time)
2
3.2
4.1
4.5
6

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Have Agency personnel discuss reasons for project.*	*Chief of Interpretation*	*1/2 hour*
2. *Have small group research the following topics, via library, interviews,* *a. history of the structure of the house* *b. occupants of the house* *c. The process used by Park Management to prepare project before assigning it to YCC, i.e., regulations on historic sites, 101 statements* *d. living conditions of period of restoration* *e. political, economic, social climate of the local area as it related to Nation.* *f. environmental considerations of the period, as compared to present* *g. operation of kitchen, i.e., food sources, preparation, utensils, furniture, manner of cooking, fireplace operations*	*Park library* *Park interpretative* *Local Historical Society & library*	*4-8 hours to be divided in segments of 1 or more hours.*

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Continuation Sheet WORK PROJECT *Restoration Activities of Kitchen in an 1800 Home*

Activity	Materials & Resources Needed	Approximate Time Frame
3. *Have each group prepare and deliver presentation (skits, newspaper article, etc. to entire YCC group, park, staff and/or community group.*	*Materials as needed by each group*	*2 hours*
4. *Have enrollees research or discuss proper types of materials and tools to be used in historic restoration with consideration of historical factors.*	*Park Architects Park Maintenance*	*1 hour*
5. *Have Resource People demonstrate the proper methods to be used in kitchen restoration activities so as to preserve the historical accuracy (which may include repair of logs, cleaning and repair of fireplace, painting or whitewashing, floor construction, furniture cleaning and/or repair).*	*Historical Architect Maintenance Personnel*	*2-8 hours*
6. *Have a few enrollees role play family members of the period, answering questions pertaining to the life style of the period.*	*Period clothing*	*1 hour*
7. *Have a demonstration of kitchen activities, i.e., splitting and chopping wood, food preparation, fire building, period safety practices, carrying out period activities. (No modern conveniences such as watches should be used.)*		*2 hours*
8. *Have enrollees discuss differences between basic needs of 1800 and those of the present. See "Lifestyle Analysis" and second part of "Bringing It Home."*	*Resource Guide, pages 404-407 and 411*	
9. *Have enrollees discuss how the following factors will influence the longevity of the restoration project: visitation, vandalism, climate, pollution.*		*1 hour*

Continuation Sheet WORK PROJECT *Restoration Activities of Kitchen in an 1800 Home*

Activity	Materials & Resources Needed	Approximate Time Frame
10. See ideas for developing simulation games	*Resource Guide, pages 247-258*	*2+ hours*
11. Adapt Interpreting past events to 200 years ago and 200 years in the future.	*Forest Investigation Task D, page 187*	

RANGE MANAGEMENT

CAMP NAME & NO. _____
DEVELOPED BY *Sally Wisely*

WORK PROJECT *Inspection and Maintenance of Fences (Range Management)*

Environmental Relationships that could be taught (EA Goals and Objectives)

Plant Identification
Principles of Range Management
Inferring food value for animals
Determining range condition
Use of map and compass
Cultural/historical perspective on area and fencing

Activity	Materials & Resources Needed	Approximate Time Frame
- *This project of walking the fenceline provides endless opportunities for exploration. Make it active!*		
- *Refer to the Range Investigation for the following:*	*Resource Guide, pages 275-294*	
Plant Inventory - Task Cards B and C	*Pg. 286*	*1 hour*
Transect Survey - Task Card D	*Pg. 287-289*	*1 hour*
Predicting Range Condition - Task Cards E and F	*Pg. 290 and 291*	*1 1/2 hours*
Range Utilization - Task Card I	*Pg. 293*	*2 hours*

- *NOTE: When determining the forage value of the area, take it a step further than the investigation. Estimate the # and type of animals the area could maintain. Approximate figures:*

24-26 lbs. of dry forage a day	*Supports 1 cow (eats mostly grasses)*
5 lbs. of dry forage a day	*Supports 1 deer (eats mostly browse)*
5 lbs. of dry forage a day	*Supports 1 sheep (eats mostly browse)*
5 lbs. of dry forage a day	*Supports 1 antelope (eats mostly grasses)*

Continuation Sheet WORK PROJECT *Inspection and Maintenance of Fences (Range Management)*

Activity	Materials & Resources Needed	Approximate Time Frame
- *As enrollees walk the fenceline, have them note their observations in a journal. Depending upon the area, the wildlife observed could be the beginning of a more detailed study.*		
- *Aside from the fence, are there any other human signs? Roads? Water tanks? Archaeological sites? Windmills? etc. Discuss the purpose and impact of whatever you find.*		
- *As you come to arroyos, discuss the water gap: (Fencing device to allow water and debris to flow while restricting animal movement.) Talk about its purpose, and discover how it works. Take a short side trip exploring the arroyo. What's it like? Vegetation? Animal signs? Can you tell anything about erosion from your explorations?*		
- *Have a Range Conservationist speak to the group. Have him/her explain range management, multiple use problems, etc.*		
- *Simulation Game. Example: Set up a game around the issue of whether or not to chain a 500 acre parcel to reduce pinon, juniper and sage. Determine interest groups involved and pros and cons. Examples: Ranchers whose cattle graze the area, wildlife organizations who are concerned about habitat disturbance, Native Americans who use the area to gather pinon nuts, etc. Make the issue real and pertinent to the area.*	*Game Guidelines: 1. Some preparation needed before the game. 2. Refer to pg. 247. for information on setting up a simulation game.*	*1 1/2 hours*

Continuation Sheet WORK PROJECT *Inspection and Maintenance of Fences (Range Management)*

Activity	Materials & Resources Needed	Approximate Time Frame
- *Much of the work in this project will be in small groups of twos or threes. This can provide valuable "quiet time" in the open spaces.*		
- *Don't forget to examine the fence itself. What fencing material was used? What's the history of fencing in the area? Does the fence have any effect on wildlife? Bring in a resource person from the local community, there's usually someone around whose hobby is fence materials.*	*Perhaps a resource person, with barbed wire collection*	
- *A map and compass should be used on this work project. This is a good time to learn or a good opportunity to sharpen skills.*	*Map, compass refer to Map & Compass Investigation*	

CAMP NAME & NO. _____
DEVELOPED BY *Sally Wisely*

WORK PROJECT *Range Management (Weed Control)*

Environmental Relationships that could be taught: (EA Goals and Objectives)

Range plant identification
Map weed location on topo maps and aerial photos
How plant spreads

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
- *Visit the worksite* *Explain the problem/project:* *To control henbane, a plant poisonous to livestock and humans.*		*15 minutes*
- *Have enrollees identify the plants in the area. (Good plant identification guides are necessary. It would be best if you had mounted specimens examples).*	*Plant Identification Guides, Plant specimens (Consult host agency)*	*1 hour*
- *Map the location of henbane*	*Topographical maps aerial photos compasses*	*1 1/2 hours*
- *Discussion* *Henbane is an 'exotic' plant. (Not Native to the area). How do you think it got here? Does its location give you any ideas? (It is located along a road). How does henbane spread? Compare the initial henbane location to the present. If growth is unchecked, predict the impact of the weed spreading. Discuss all possible methods of controlling*		*30 hours*

Continuation Sheet WORK PROJECT *Range Management (Weed Control)*

Activity	Materials & Resources Needed	Approximate Time Frame
henbane. Determine the most effective and environmentally sound course of action. Is it the same method the host agency has chosen? If not, further exploration is necessary. (You might want to consult with agency specialists).		
- *Note:* *Be sure to chronical your research and actions with pictures and writing. This is a perfect project for the local news media, it is a good public service project.*		

FISH & WILDLIFE

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Gabion Construction on a Trout Creek*

Environmental Relationships that could be taught: (EA Goals and Objectives)
Enrollees should understand the needs of fish for shelter, food and water temperature.
Enrollees should understand how gabion construction affects the needs of fish and their population levels.
Enrollees should understand the role of the State Fish & Game Department and the Forest Service in fish management.
Enrollees should understand the effects of improved fish habitat on the locality in terms of human impact.
Enrollees should understand how and why man changes a stream.

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Introduction: Have fisheries biologist with you at the work project to discuss the purpose of gabion construction, the needs of trout, salmon and steelhead, the factors that affect life in a stream, and how to select gabion locations.	*Fisheries biologist or hydrologist*	*First day-- about 1 hr.*
Activities: Where should we put the gabion? Why? Why do we want more fish habitats anyway? Could the gabions have other effects on the stream? What? How about erosion? How will it change the flow? What products shall we use to construct the gabion? Why?		
Water Investigation: Sample the aquatic insect population (Water Investigation, pages 191-206). Determine the probable oxygen level, water temperature and pH level using the Insect Indicator Chart, page 199. Divide into small groups to do this, then compare results. You may want to give each enrollee the form on page 199.	*Water Investigation, pages 191-206 Task B, page 197 Jelly cups, pond & stream books, pans, seine or screen. Small sieves, if possible. Hand lenses.*	*About 2 hrs.*

Continuation Sheet WORK PROJECT *Gabion Construction on a Trout Creek*

Activity	Materials & Resources Needed	Approximate Time Frame
On another day, see how close you were. Use a thermometer, Hach test kit to determine the temperature, oxygen level and pH. Do Task D.	*Hach test kit Task D, page 201*	*1/2 hour*
Discuss the pro.'s and con's of improving the habitat: *1. What will be the impact on local businesses? campgrounds? the streambanks? the trails to the stream?* *2. What impact have we made?* *3. Who pays for this?* *4. Does this project have positive environmental effects other than for the fisherman?* *5. Should we spend taxpayers' money on projects like this which may be used by only certain fishermen?*		*Last day.*
Related Activities: Fish population census, field trip to hatchery, fisherman creel survey		

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CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Fish and Wildlife (Building Wildlife Structures)*

Environmental Relationships that could be taught: (EA Goals and Objectives)

Impact of altered environment on wildlife involved;
Food chain;
Food web;
trophic levels;
population analysis;
predator-prey relations;
observation techniques;
energy pyramid;
hunting as a management tool;
behavior of wildlife;

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Monday:		
Ask enrollees to fill out the "Animal Pairs Sheet."	*Resource Guide, page 330*	*45 minutes*
With enrollees, fill out mini-environmental impact statement.	*Resource Guide, page 361*	*30 minutes*
Tuesday:		
Play the Food Chain game.	*Resource Guide, page 373*	*1 hour*
Have enrollees do Tasks D and E from Animal Investigations.	*Tasks D and E, pages 201-203*	*1 hour*
Wednesday:		
With your help, have enrollees fill out the form entitled, "Wildlife Habitat."	*Resource Guide, page 333* *magic marker* *large paper pad*	*45 minutes*

Continuation Sheet WORK PROJECT *Fish and Wildlife (Building Wildlife Structures)*

Activity	Materials & Resources Needed	Approximate Time Frame
Thursday:		
Do "Predator-Prey," a simulation from the Resource Guide.	*Resource Guide, page 331* *Topography map of your area*	*45 minutes*
Discuss the impact of hunting on wildlife populations. Have enrollees list the pro's and con's of hunting. Ask the following questions: *a. Is hunting good or bad for wildlife? Why?* *b. Do hunters contribute to wildlife conservation? How?* *c. Do you hunt? Why? Why not?* *d. Will hunting last very long in the U.S. as a form of recreation?*		
You might try some role-playing with enrollees. Suggested roles: *a. hunter* *b. humane society member against hunting* *c. gunshop owner* *d. wildlife protection officer* *e. mayor of your city* *f. enrollee*		

Continuation Sheet WORK PROJECT *Fish and Wildlife (Building Wildlife Structures)*

Activity	Materials & Resources Needed	Approximate Time Frame
Friday:		
Try to take enrollees on field trip to the best wildlife habitat you can find, i.e., refuge, research project, etc.		

CAMP NAME & NO. *Bombay Hook #2711*
DEVELOPED BY *Jah Kirk - EAC*

WORK PROJECT *Bayshore Boundary Posting - Replace and Repost Refuge Signs on the Bayshore and up the Guts*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Explain value and purpose of boundary posting as a management tool.*
2. *Identify bayshore flora, fauna, and food web.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Why is it necessary to repair and replace boundary signs? (identify refuge land, allows law to prosecute offenders, etc.)*		
2. *What is the best way to do this to conserve time and energy? (having a drop off point and walking the boundary or having a boat attempt to get to each sign point.)*		*15 minutes*
3. *What would be the best material to use as boundary markers? (wood vs. galvanized metal.)*		
4. *Place a wooden and a metal sign in a marsh tidal area close to YCC headquarters. Return several times during the program and observe erosion, readability, effect of tides and storms.*		*8 weeks*
5. *Locate nests in the area and identify their builders. Discuss their relevance to the ecosystem and the food web.*	*Peterson Guides*	*1 hour*
6. *Identify greater yellow legs, lesser yellow legs, several terns, several gulls, kingfisher, egrets (American and snowy), great blue heron, etc.*	*Peterson Guides*	*1 hour*
7. *Identify marsh grasses: spartina, phragmites, cord grass, 3-square, salt grass, etc. Discuss their importance to the ecosystem and the food web.*	*Peterson Guides*	*1 hour*

Continuation Sheet WORK PROJECT *Bayshore Boundary Posting - Replace and Repost Refuge Signs on the Bayshore and up the Guts*

Activity	Materials & Resources Needed	Approximate Time Frame
8. *Take a sample of water back to camp and look at it under the microscope. Identify plankton, larvae, etc. Discuss the value of each in the food web.*	*Coastal Awareness Studies (COAST) See address on back*	*Unlimited*
9. *Collect some mud, water and fiddler crabs. Set up an aquarium and study their life cycle. Discuss their value in the food web.*	*Coastal Awareness Studies*	*Unlimited*
10. *Identify the tracks found in the posting area in the sand or in the mud. Discuss the value of each to the food web and to the ecosystem.*	*Peterson Guide*	*1 hour*
11. *Find a few horseshoe crabs. Examine their anatomy (they are anthropods). Discuss their value to the ecosystem and to the food web. Discuss former uses (fertilizer, food)*	*Coastal Awareness Studies*	*1 hour*
12. *Identify the following adult biting insects: greenhead fly, deer fly, mosquito (salt marsh). Discuss their importance in the food chain.*	*Coastal Awareness Studies*	*1/2 hour*

* -Source-
COASTAL/OCEANIC AWARENESS STUDIES (COAST)
Office of Coastal Zone Management
Delaware Sea Grant College Program
College of Education
University of Delaware
Newark, Delaware 19971

CAMP NAME & NO. *Bombay Hook #2711*
DEVELOPED BY *Jan Kirk - EAC*

WORK PROJECT *Marsh Channel Improvement - Digging out Guts to Various Hunting Blinds*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Recognize importance of marsh as an ecosystem.*
2. *Recognize marsh management problems.*
3. *Identify marsh flora, fauna, and food web.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *What is a marsh? (wetlands dominated by grasses)*		
2. *Why do you think it is necessary to clear these channels? (allow access to hunting areas)*		
3. *Besides benefiting the hunting management program, how can this benefit the ecosystem? (tides, food chain, more habitat)*		
4. *Why is it necessary to have a hunting program? (conservation, pressure from hunter organizations that pump money into the refuge system, etc.)*		
5. *Take a sample of water back to camp and look at it under the microscope and identify plankton, larvae, etc. Discuss the value of each in the food web.*	*Coastal Oceanic Studies* (COAST) See address below*	*Unlimited*
6. *Collect some mud, water and fiddler crabs. Take them back to camp and set up an equarium to study the life of fiddler crabs. Discuss their value in the food web.*	*COAST*	*Unlimited*
7. *Find and identify as many nests as possible in the area adjacent to the channel. Make a collection of abandoned ones. Discuss the importance of the nest builders in the food web.*	*COAST*	*1 hour*

Continuation Sheet - WORK PROJECT *Marsh Channel Improvement - Digging out Guts to Various Hunting Blinds*

Activity	Materials & Resources Needed	Approximate Time Frame
8. *Find a few horseshoe crabs. Examine their anatomy. Discuss their value or lack of value to the food web. Discuss former uses (fertilizer, food, etc.).*	*COAST*	*1 hour*
9. *Locate a muskrat home and discuss how it is constructed, the value of the muskrat to the food web and its commercial value.*	*COAST*	*1 hour*
10. *Show slides of some otters and discuss their value in the food web and commercially.*	*COAST*	*1 hour*
11. *Capture some killifish, minnows, etc. and set up an aquarium to study them. Discuss their importance in the food web.*	*COAST*	*1 hour*
12. *Identify the following adult biting insects: greenhead fly, deer fly, mosquito (salt marsh). Discuss their importance in the food chain.*	*COAST*	*1 hour*
13. *Construct a fly trap to be used some distance from the site to reduce the insect problem. Get involved with design. Discuss placement for maximum effectiveness, and why it works.*	*COAST*	*2 hours*

* -Source-
COASTAL/OCEANIC AWARENESS STUDIES
Office of Coastal Zone Management
Delaware Sea Grant College Program
College of Education
University of Delaware
Newark, Delaware 19971

CAMP NAME & NO. *Bombay Hook #2711*
DEVELOPED BY *Jan Kirk*

WORK PROJECT *Lotus Control - Manually Removing Lotus Plants from Fresh Water Impoundments*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Understand management and use of fresh water impoundments in a refuge system.*
2. *Be able to compare environmental effects of chemical control.*
3. *Identify flora, fauna, and food web in that area.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Point out the lotus plant and discuss its anatomy.*		
2. *Why are we doing this? (Presently there are no approved chemicals the government can use to control it and it is not a food for water fowl. It takes over other vegetation.)*		*15 minutes*
3. *Identify 3-square, salt marsh bulrush, dwarf spike rush, pondweed, duckweed, widgeon grass, spartina, phragmites, cattails, wild rice. Discuss their importance as food sources.*	*Peterson Guides*	*1 hour*
4. *Attampt to locate some of the insects associated with the lotus (dragonflies, etc.). Will these insects be able to utilize other plants?*	*Peterson Guides*	*1 hour*
5. *This is a nontidal area, brackish water. What would happen if you used chemicals here to control this lotus? Discuss whether or not the chemical could be selective against lotus, how it could effect the animal life, how it could build up because of no natural outlets.*	*YOU AND YOUR ENVIRONMENT*	*1/2 hour*
6. *Take a water sample back and with a microscope identify various organisms and discuss their value to the food web.*	*Resource Guide, page 198*	*1/2 hour*

Continuation Sheet WORK PROJECT *Lotus Control - Manually Removing Lotus Plants from Fresh Water Impoundments*

Activity	Materials & Resources Needed	Approximate Time Frame
7. *Do a vegetational transect through the work site area. This could be used in following years as a comparison.*	*Range Investigation, pages 275-284 Task D, pages 287-289*	*2 hours*

CAMP NAME & NO. *Bombay Hook #2711*
DEVELOPED BY *Jan Kirk - EAC*

WORK PROJECT *Dune Errosion Control on Beach - Planting Grass to, Prevent Movement of Dune Away from Beach, Conserve Beach*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Understand dune formation and life.*
2. *Identify types of dune flora and fauna and food web.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *What is a dune? (mass of sand)* 2. *Why are we planting grass here? (to prevent the dune from moving away from the beach, preserving beach)* 3. *What causes dunes to form? (wind)* 4. *Are dunes stationary? (no, wind moves them)* 5. *How can you tell if a dune is young or old? (Old dunes have round, small grains whereas new dunes have irregular, large grains.)*		*20 minutes*
6. *What special characteristics does the vegetation here have to have? (long roots to get water and keep from being covered, protection from evaporation)* 7. *Locate and identify marram grass, Japanese black pine, prickley pear cacti, poverty grass, primrose, cranberries, blueberries, "Dusty Miller," bayberry, sensitive plant, goldenrod, seawort, trumpet creeper. Discuss the roots, leaf construction, position to the sun.*	*Peterson Guide*	*1 hour*

Continuation Sheet WORK PROJECT *Dune Errosion Control on Beach - Planting Grass to Prevent Movement of Dune Away from Beach, Conserve Beach*

Activity	Materials & Resources Needed	Approximate Time Frame
8. *Find or locate evidence for rabbits, mice, velvet ants, dune spiders, snakes, different wasps. Discuss protective devices as burrowing, nocturnal activities, coloration.*	*See address below.	
9. *Do a vegetation transect. Use Range Task D and identify plants at particular points along the profile.*	*COAST* Range Investigation, 275-284 Task D, pages 287-289	*1 hour* 1 hour
10. *If this is done early in the program, sink a stake and come back and observe it several times during the summer. Make sure it is measured in the same way.*	*COAST*	*Unlimited*

* -Source-
COAST
Office of Coastal Zone Management
Delaware Sea Grant Program
College of Education, University of Delaware
Newark, Delaware 19971

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ENGINEERING, CONSTRUCTION & MAINTENANCE

CAMP NAME & NO. _____
DEVELOPED BY *EA Task Force*

WORK PROJECT *Fence Building*

Environmental Relationships that could be taught: (EA Goals and Objectives)

Determine how the fence relates to land use management. (Why are we here and what are we doing?)
Recognize different types of fences and the purpose for their use.
Learn about the relationship between wildlife movement (ingress and egress) and fences.

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame

1. Explain the project.

Ask the work coordinator or resource person assigned to the project to explain it. Make sure he:

a. Gives a general description of the fence - length, direction, etc.

b. Explains why the fence is being built.

If you don't use the resource person, explain a and b yourself.

Discuss the following:

a. Why are we building this fence?

If no one can give an answer - ask:

Continuation Sheet WORK PROJECT *Fence Building*

Activity	Materials & Resources Needed	Approximate Time Frame
What clues can we find to help us figure out why we are building it? *Presence of livestock and recreation facilities are clues.* b. *What effect will our work have on the environment?* - *Immediate - cutting trees, damaging flowers, erosion potential* - *Long Range - increased vegetation for wildlife habitat, increased forage along the fence row*		
2. *As you are travelling to the projects one day, observe the varieties of fence that you see (or talk about the different types of fences you are familiar with). Why aren't we using one of those fences here?* *If your crew wants to pursue this, contact your host agency or go to the library. An interesting supplementary lesson is a study of the different types of barbed wire. A local person may have a barbed wire collection.* **** ATTENTION: While you are talking about barbed wire, take advantage of the opportunity for a safety message.*		*2nd or 3rd day* *20 minutes*
3. *To learn about the relationship between wildlife and your fence, conduct the following investigations chronologically in one or several days.*		

Continuation Sheet WORK PROJECT *Fence Building*

Activity	Materials & Resources Needed	Approximate Time Frame
a: *Identify the animals in the fence area. Complete Task A of Animal Investigation.*	*Clipboards for enrollees* *Task A, page 237*	*30 minutes*
b. *As a group, make a list of animals you would expect to find in this area (Brainstorm).*		*5 minutes*
c. *Working alone or in pairs; select one of the animals from the list that you would like to be. When you returned home from a hunting expedition, you discovered this fence!*	*Sheets with questions* *Pencils*	*30 minutes*
Play the role of your animal (Be the animal, don't just be a person "playing the animal") and spend the next 30 minutes answering the following questions:		
1. *Is this fence in your yard or in the neighborhood? Or is it right through the middle of your house?*		
2. *How are you going to cross this fence--as prey? as predator? (Actually try it and see for yourself.)*		
3. *How is this fence going to be an advantage to you? A disadvantage?*		
4. *Will the advantages/disadvantages change with the seasons? If so, how?*		
5. *How will this affect your family?*		

Continuation Sheet WORK PROJECT *Fence Building*

Activity	Materials & Resources Needed	Approximate Time Frame
d. *As the group reassembles, share the results of the investigation.*		*30 minutes*

Based upon what we learned as animals, how do we feel about the fence?

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CAMP NAME & NO. _____
DEVELOPED BY _____

WORK PROJECT *Bridge Building*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *The enrollees should understand the purpose for constructing the bridge. This includes why and for whom it will be constructed.*
2. *The enrollees should understand the agency contribution, and management responsibilities to the project.*
3. *The enrollees should understand both the long and short-term impacts to the environment.*
4. *Develop an attitude towards facility developments with a minimum of impact to a natural environment.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Working in small groups have enrollees complete the mini impact statement. Then bring the groups together and summarize the groups findings by listing the information on a flip chart.*	*Agency environmental impact forms Resource Guide, page 361*	*45 minutes - 1 1/2 hours*
2. *Have each crew on the project keep a wildlife list on animals they see while on breaks and lunch hours.*	*Field guides and binoculars*	*15 minutes - 1 hour*
3. *Have the group conduct soil horizon investigations at various distances from the stream. Task C*	*Shovel and Resource Guide, page 218*	*30 minutes - 1 hour*
4. *Have each individual sketch what the area looked like twenty-five years ago.*	*Sketch pads and pencils*	*45 minutes - 1 1/2 hours*
5. *Construct and monitor an ongoing visitor sign-in sheet at the trail head in order to list the amount and types of usage.*	*Construction materials for sign-in box, and forms for monitoring traffic.*	*Ongoing*

Continuation Sheet WORK PROJECT *Bridge Building*

Activity	Materials & Resources Needed	Approximate Time Frame
6. *Identify a watershed. Either on a map or on the ground trace the origin of the stream. Do Task F, Water Investigation.*	*Maps Task F, page 205*	*25-45 minutes*
7. *Conduct stream flow investigations. Do Task E, Water Investigation.*	*Task E, page 203*	
8. *Have each individual sketch and submit a bridge design with a materials list and an estimate of costs and enrollee work hours. Then bring the enrollees together and list their findings on a flip chart, and compare the findings with the actual form 4 for the project.*	*Sketch pads, pencils, flip-charts, Interior Form 4 (FS, 1300-4)*	*2-4 hours*
9. *Head a discussion with a series of questions of why people would want to gain access to the other side of the stream.* *a. What is the importance of the bridge?* *b. Who will use the bridge?* *c. If this were a toll-bridge, what would you charge for different users to cross this bridge?* *d. Assuming fifty people use the bridge per day at _____ toll fee, multiplied by 365 equals one year usage fee. How long will it take for the bridge to pay for itself?* *e. Is the bridge construction really worth it?*		*30 minutes - 1 hour*
10. *Have each enrollee make a sketch of how they perceive the bridge and area twenty-five years from now.*		*45 minutes - 1 hour*

WATER, MINERAL, & SOIL MANAGEMENT

CAMP NAME & NO. _____
DEVELOPED BY *J. Stanley Alexander*

WORK PROJECT *Cave Clean-up or Construction within a Cave*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Investigate the hydrology of the cave area region and analyze the factors that are necessary for cave formation.*
2. *Observe a stream above ground surface and where it sinks into the ground to create an underground watershed.*
3. *Analyze the water for hardness in order to determine the type of rocks and minerals that it has been in contact with while underground.*
4. *Familiarize each enrollee with the various types of cave formations and the circumstances leading up to their development.*
5. *Observe that water entering a sinkhole can pollute an area miles away by traveling through a long network of underground streams.*
6. *Calculate how many people could live off of a small stream.*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
1. *Visit an area of a small stream which is the beginning of a series of streams that make up a large underground watershed.* *Note the size of the stream.* *Calculate the streamflow as in the YCC Resource Guide. How many people could this stream support?* *Questions and Discussion:* *a. Are there any visible pollutants in this stream?* *b. What can be said about the quality of water in this stream?*	*Stopwatch* *Water Investigations, pages 191-203* *Task Card E, page 203*	*30 minutes*

Continuation Sheet WORK PROJECT *Cave Clean-up or Construction within a Cave*

Activity	Materials & Resources Needed	Approximate Time Frame
c. What other information, knowledge, or tests would we need to know to decide whether or not to drink this water? *d. Under what conditions might we expect to get different results here than we did today?*		
2. Visit an area where several of these smaller surface streams have come together to form a large stream. *Note the difference in the size of the stream.* *Calculate the streamflow here. How many people can this stream support?* *Questions and Discussion:* *a. Are there any visible pollutants here?* *b. What is the importance of a watershed?*		*30 minutes*
3. Visit a sinkhole where the water from this stream is disappearing into the ground. *Questions and Discussion:* *a. Where is this water going?* *b. Discuss a watershed that is below the earth's surface. What is the importance of a watershed?* *c. What are some of the factors that you think can affect this watershed?*		

Activity	Materials & Resources Needed	Approximate Time Frame
d. *Observe the rocks in this area. What factors might lead one to think there might be a cave in this area?* d. *Discuss how a pollutant in this stream might affect an area miles away from here without knowing where the pollutant came from.*		
4. *Visit a karst window.*		*40 minutes*
Explain what a karst window is. *Questions and Discussion:* a. *What might have caused this karst window? or What factors have caused this karst window?* b. *What types of rocks are common in this area?* *Would you expect the water here to be hard water or soft water? Why?* *Take water hardness kit and test for hardness.* *Results:* _____ *What habitat are the plants and trees in this area common to?*		
5. *Visit a cave in this area. A guided tour through the cave should show cave formations and discuss the process and factors in cave formation.* *Questions and Discussion:* a. *What factors are essential in cave development? (Allow about two minutes for enrollees to write down some of these factors.)*		*1-2 hours*

Continuation Sheet WORK PROJECT *Cave Clean-up or Construction within a Cave*

Activity	Materials & Resources Needed	Approximate Time Frame

b. Discuss what the enrollees write down.
c. Observe the different types of cave formations.

Summary:

Discuss as a group:

1. *What factors are essential in cave development?*
2. *What is the result of rapid water movement beneath the earth's surface?*
3. *What can result of very slow water movement within a cave?*

Additional Activities:
A related film or films concerning cave formations, hydrology, and karst topography.

CAMP NAME & NO.
DEVELOPED BY *EA Task Force*

WORK PROJECT *Rip Rapping for Erosion Control in Holding Ponds*

Environmental Relationships that could be taught: (EA Goals and Objectives)

1. *Wind and water action cause erosion. 1.4*
2. *Develop understanding of current management practices. 1.5 (Why is the holding pond here?)*
3. *The objectives of the FWS in the migratory waterfowl program. 6.4*
4. *Determine past, present, future use of the area. 2.3*
5. *Man's manipulation of the environment--reasons? 2.5*
6. *Relationship between source of water and supply. 1.4 & 1.5*

Description of Activities - BE SPECIFIC!

Activity	Materials & Resources Needed	Approximate Time Frame
Introduction: Discuss the purpose(s) of rip rapping and the signs and evidences of various types of erosion at work project.	*Refuge biologist*	*15 minutes*
1. Discuss the materials to be used in erosion control. *a. What is available?* *b. Consider costs.* *c. What works best in this situation?* *d. What disturbs the environment the least?*	*Form 4's (costs)*	*10-15 minutes*
2. a. Construct a plane table.	*Refuge biologist* *Cardboard cartons (3/grp)* *Unlined paper-8 1/2" x 11"* *Wooden ruler-12"(1/grp)* *4 map tacks (1/grp)* *Masking tape* *Pencil & eraser* *Plastic flagging--2 colors* *Heavy twine* *Stakes (2/grp)*	*10-15 minutes*

Continuation Sheet WORK PROJECT *Rip Rapping for Erosion Control in Holding Ponds*

Activity	Materials & Resources Needed	Approximate Time Frame
	Plane Table Construction, page 314	
b. Determine length of step.	*Measuring tape*	*10 minutes*
c. Make a map of holding pond.	*Plane Table*	*1 hour (depends on size)*
Break into small groups (3-4). Walk around holding pond. Determine which areas are in greatest need of erosion control. Plot these areas on your map. Decide what contributes to erosion in each area. Are the reasons for erosion the same in each area? Number the sites from 1 to 5, giving the #1 to the site in greatest need of repair. Do sites seem to be located on only one side of the pond? Why?	*Map of holding pond Pencil*	*30 minutes*
e. Each group shares their map with the others. Discuss causes of erosion in each area.		
a. Determine Watershed Boundaries. What is the source of water for the holding pond? (rain, snow) At what time of year will the water table be the highest? How does the water depth determine amount of erosion? Are other factors more important?	*Pencils U.S. Geodetic Survey Topo map of watershed of holding pond*	*15 minutes*
b. Determination of What is the maximum volume?	*50 ft. sound cord, marked at intervals*	*1 hour (depends on size)*

Continuation Sheet WORK PROJECT *Rip Rapping for Erosion Control in Holding Ponds*

Activity	Materials & Resources Needed	Approximate Time Frame
4. *Identify the species of migratory birds on & around the pond.*	*Interior--Duck Identification Golden Book of Birds*	*1/2-1 hour (more if wanted)*
a. *Select 5 species. Determine the type of food each species eats. Is it available in the area?*	*Field Guide Robbins binoculars spotting scope*	*15-30 minutes*
b. *Determine the habitat types. Are there suitable nesting areas for the 5 species?*	*Refuge bird list (contains nesting information & seasons when birds are on refuge)*	*15 minutes*
c. *What are other needs that must be met for the birds to make a home here?*		*5 minutes*
d. *If all of the needs are not met, what are the birds doing here?*		*5 minutes*
5. *Present slides on refuge management with emphasis on migratory waterfowl program of FWS.*	*Slides*	*1/2-1 hour*
6. *Predictions, Past & Future*		
a. *Individual enrollees should situate themselves around the holding pond as far apart as possible (may pre-mark sites, if you wish)*	*Pencil Paper Clipboard*	*25-30 minutes*
b. *At a signal, each enrollee should record all their observations about the area for 5 minutes.*		

Continuation Sheet WORK PROJECT *Rip Rapping for Erosion Control in Holding Ponds*

Activity	Materials & Resources Needed	Approximate Time Frame
c. *Repeat with eyes closed for 5 minutes.* *Observations will be recorded upon opening eyes at end of time period.* d. *Get the group together. Fill in this matrix:* *Eyes open: See Hear Touch Smell Feel* *Eyes closed:* e. *Discuss: What was this spot like 50, 100 years ago? What will it be like 50, 100 years from now? or*	*Pencil* *Paper*	*45 minutes*

NON-RESIDENTIAL CAMPS

Non-residential programs provide an opportunity for greater numbers of young people to share in a YCC experience. They allow teenagers to do work projects which benefit their own community and where they can be admired and the enrollees praised by their own friends, families and neighbors. They are identical to residential camps in the most important program element--an integrated work/E.A. program. However, the non-residential staff members must work and meet YCC E.A. goals and objectives within an 8-hour day. They do not have the luxury of evenings and weekends for supplementary E.A. time and staff meetings. The challenge of operating within an 8-hour day can be met by:

1. Scheduling group E.A. activities at the beginning or the end of the day. While the E.A.C. has the enrollees, the rest of the staff can meet.

2. Having the camp director or work coordinator take over a crew while the E.A.C. meets with the crew leader to plan the E.A. program for that crew.

3. Scheduling spike camps. Use evening time for E.A. as well as the work day.

4. Selecting staff members carefully. Staff skills necessary for a good YCC program must be developed in a smaller staff than that of the residential camps.

5. Making use of some of the excellent materials in the New Games book (see bibliography) to develop cohesiveness among the staff and enrollees. The book provides short-term activities and non-competitive games which can be useful in developing esprit de corps.

6. Effectively inserting E.A. activities and discussions into travel time, lunch and rest breaks.

7. Negotiating carefully with the agency to increase the numbers of work projects with high E.A. potential. Because there is no leisure time for E.A., it is very important that work projects have high E.A. potential.

Both residential and non-residential camps must operate an integrated work/E.A. program. E.A. development and implementation, as presented in Section I, is, therefore, the same for both types of camps. The non-residential camps have an advantage in this area--the environment the enrollees are learning about is their own. Cultivate this advantage by actively involving the enrollees in learning to understand their environment.

URBAN CAMPS

Urban camps form a vital and productive component of YCC. They provide the opportunity for youth from a variety of ethnic backgrounds to jointly explore the resources within their environment and do work projects which benefit their own urban community. Special challenges exist for staff members in urban camps. The most difficult is to apply natural environmental concepts to an urban E.A. program. Greater creativity is required to illustrate ecological concepts and more patience is needed in dealing with young people whose background differs from that of the staff. Work projects are sometimes hard to find and paperwork and permits can be time-consuming and frustrating. However, meeting these challenges effectively within the YCC program leads to rewards for the enrollees, staff and community.

Urban camp staff members must understand that the YCC E.A. goals and objectives apply to all YCC camps; however, they may be made more applicable by:

1. Expanding the enrollees' awareness and appreciation of the wide range of urban, social, recreational, educational and historical resources.

2. Expanding the enrollees' awareness of and ability to use their education and skills to be productive, motivated and responsible citizens.

3. Demonstrating an understanding of the interrelationships between the physical, cultural, political, social and historical aspects within and surrounding the urban environment.

4. Demonstrating the relationship between the natural world and the urban environment.

5. Relating this knowledge to the enrollees' daily activities so that their lifestyle shows an understanding of the environment's effects on them and on their ability, in return, to affect their environment.

The environmental concepts and principles in Section II also must be understood by enrollees in urban camps. Staff members will need to be creative in providing examples relevant to the urban situation.

Planning and Implementing an Integrated Work/E.A. Program

Planning for the environmental awareness program is the same in both urban and non-urban camps (See Section I). Establish a series of learning goals for each project and be sure they include environmental advocacy goals. To assist you in meeting the challenge of a work/E.A. program in an urban setting, we have developed two common work projects: Urban Parks and River Clean-up and Development.

I. Urban Parks

A. In addition to finding work projects in existing parks, the following areas may have potential for park development as a YCC work project.

1. Vacant lots
2. Cemeteries
3. Rooftops
4. Green Belts
5. Old dumps and landfills
6. Municipal buildings
7. Riverbanks
8. Railroad rights-of-way
9. Industrial waste areas
10. Other areas which can be developed into urban "green spots"

B. Types of work which YCC can accomplish in urban parks.

1. Designing and planning park facilities
2. Grading and landscaping, including planting trees, shrubs, and grass
3. Conducting surveys on use, soils, wildlife, etc.
4. Developing wildlife habitat through selective planting, building nest boxes, etc.
5. Repair and maintenance of existing facilities and buildings
6. Construction of new facilities and building
7. Development, construction and repair of park recreation equipment, including picnic tables, benches, plan equipment
8. Construction of bike paths and interpretative nature trails
9. Stream and waterway improvement
10. Erosion control

11. Park barrier construction

12. Park cleanup and litter patrol

C. An urban park E.A. plan may include:

1. Preliminary investigations and tour of potential park area

a. What could be developed?

b. Who should benefit from the park?

c. What are the problems?

d. What facilities should be provided?

e. Who is in charge of the parks in your city?

f. What suggestions does the park maintenance staff have?

g. Who uses or will use the park?

h. What permits do we need to develop the park?

i. Where do we get the permits?

2. Community survey

a. What do the neighborhood children and adults want in the park?

b. How many people will be served by the park?

c. Where are nearby parks located?

d. Who is served by the other parks?

3. Potential advisors--your community resource directory is a good source book for this information

a. Parks and Recreation Commissioner

b. Landscape architect

c. Soil conservationist

d. Park maintenance personnel and police who patrol parks

e. City forester

4. Benefits of parks to the environment

a. Trees give off oxygen in their photosynthetic processes which increases the oxygen supply in cities.

b. Trees in parks muffle noise.

c. Parks enhance neighborhoods and stimulate property values.

d. Trees in parks filter pollutants out of the air.

e. Parks act as flood control areas by providing more open grounds for water to soak into and decreasing runoff.

f. Trees in parks decrease soil erosion by catching raindrops on leaves and holding soil in their root systems.

g. Parks provide shady areas in hot cities.

h. They provide psychological benefits.

i. They can be used to isolate dangerous environments....

j. They offer educational opportunities and contribute to wildlife preservation.

5. Historical background of the park or potential park site

6. Urban vegetation investigation

a. What trees grow nearby?

b. What are the effects of pollutants on trees?

c. What trees are resistant to city conditions?

d. What survival problems exist for trees in urban settings?

1) Paving cuts the water and oxygen supplies

2) All decaying matter (leaves, dead trees, etc.) are removed which prohibits the normal nutrient recycling necessary for plant growth.

3) Road salt causes chemical damage to certain trees.

4) Gaseous pollutants cause deterioration.

e. Benefits of vegetation

1) Cuts city heat

2) Removes gaseous and particulate pollutants from the air

3) Deadens noises

4) Provided wildlife habitat

5) Aesthetically pleasing

f. Oxygen-carbon dioxide cycle between plants and animals

g. Wildlife interrelationships with plants

1) Which plants do the squirrels use for homes?

2) What plants should we plant to attract specific animals?

h. Tree and plant identification

i. Plant succession

1) How is it prevented in the city?

2) Where is it evident?

7. Wildlife investigation

a. Life cycles of animals (include insects) in the park

b. Effects of wildlife on vegetation

c. Competition between animals and man

d. Investigations of carrying capacity of park

e. Pest control

f. Wildlife protection

1) Responsible agencies

2) Methods of citizen action for wildlife preservation

g. Identification of insects and other animals

h. Relationships of wildlife to man

i. Adaptations of wildlife to urban areas

8. Waterway investigations

a. Freshwater life in park streams and ponds

b. Nutrient recycling in waterways

c. Succession in ponds

d. Water management policies and agencies

e. Erosion control on stream and pond banks

f. Water quality testing

9. Problem solving in parks

a. How do park personnel deal with vandalism?

b. What problems are caused by intensive park use?

c. How are intensive use problems solved?

d. How can we develop a maintenance-free park?

10. The park as an ecosystem

a. Interrelationships of plants and animals

b. Mineral recycling in parks

c. Identification and mapping of park food chains

d. Plant competition in the park

e. Identification of limiting factors to plant growth

f. Discussions of species diversity and its relationship to stability for park vegetation considerations

g. Discussions of different ecosystems and their similarities

1) Forest

2) Farm

3) Marine

4) Inland waters

11. Community gardens--could develop a small area for community gardens in the park

a. Principles of cultivation

b. Methods of soil preparation and planting

c. Methods of soil erosion control on cultivated lands

d. Pesticide use and misuse

e. Compatibility among plants

12. Methods of erosion and drainage control

13. Landscaping techniques

II. River Clean-up and Development

A. Possible YCC work projects can often be located along urban streams and rivers, particularly those which have potential for development as greenbelts or recreation areas.

B. Types of work which YCC can accomplish

1. Clear debris from banks and streambed

2. Grade and plant banks for erosion control

3. Conduct water quality survey

4. Identify river pollutants and their sources

5. Develop walkways, bike paths, nature trails along banks

6. Develop picnic areas or mini-parks

7. Conduct community surveys

8. Assist government agencies in environmental advocacy work to prosecute polluters

C. A riverbank E.A. plan may include:

1. Tour of worksite and preliminary investigation

a. Purpose of project

b. What could be developed?

c. What is best procedure?

d. What facilities should be provided?

e. What benefits will be provided for the community?

f. What problems might occur?

2. Potential advisors

a. Water conservationist

b. Limnologist (running water biologist)

c. Fresh water biologist

d. Environmental Protection Agency

e. Parks and Recreation Commissioner

f. Landscape architect

g. Water pollution analyst

h. City planner

3. Historical background of stream

4. Fresh water ecology

a. Insect studies

b. Relationship of oxygen content and temperature

c. Eutrophication processes

d. Factors that affect stream life

e. Nutrient recycling in ponds

5. Limnology

a. Study of the physical factors that affect stream life

b. Studies of plant and animal life in running water

6. Water resource management

7. Water pollution standards

8. Effects of specific pollutants on stream plants and animals

9. Methods used for identification of polluting industries and other facilities

10. Identification of advocacy groups interested in water pollution

11. Field trips

a. Sewage treatment plants

b. Water treatment plants

c. City reservoir

12. Identification of city water source

a. Cleaning processes used for city water

b. Logistics of city water systems

13. Methods of picnic area development

14. Soil testing to determine suitable vegetation for banks

15. Methods of bike path development

16. Methods of erosion control

17. Methods of bank stabilization

    a. Gabions

    b. Cradles

The following list should help you see other ways to integrate work and E.A. in an urban setting.

Work Project	Potential Environmental Awareness
1. Revegetation Projects (tree, grass, shrubbery planting and nursery work for revegetation)	1. What kinds of tree grow well in cities? Why? -How do city people react to green spaces? -Why are green spaces necessary? -What caused the death of the trees? -See the Urban Park Development outline for other areas
2. Plant Maintenance (removal pruning, disease and insect control)	2. Discussions of the diseases and insects which harm the trees and how to control them -Who is responsible for park and/or street tree maintenance?
3. Surveys and Inventories (lead paint, water, air noise pollution)	3. Why are they necessary? -How are they used? -How do we do or conduct them? -A great deal of basic information is necessary as background for this project, such as basic information on pollution.
4. Zoo, botanical gardens projects (animal & plant care, visitor services, building maintenance)	4. What special needs do the plants and animals have? -Who visits the zoo? Garden? -Why do we have zoos? Gardens? -What problems exist in the zoo or garden? -How are these problems solved?

Work Project	Potential Environmental Awareness
5. Litter Pick-up	5. See the Work/E.A. Activity Sheet on Litter Pick-up
6. Building Maintenance	6. What affect does air pollution have on buildings? -What materials are used in construction? -Why are they used? -What affect does the building have on weather? (i.e. wind breaks, raises or lowers temperatures, etc.) -What is the building like as an environment inside
7. Wildlife Survey	7. What animals are found in the city? -Where? -What do they eat? -How do we make the city habitable for them?

These projects are only suggestions. Use your own ideas and those of your group. Some of your projects will be long-term. Make sure uninteresting, mundane projects such as litter pick-up are not. Enthusiasm for the projects as well as the educational possibilities within them decrease as the time on them increases. Remember: the enrollees are to receive a varied work experience which provides them with learning experiences in a variety of areas. Careful planning and attention to YCC philosophy will provide this for them and will also provide the city with a dedicated enthusiastic work force. In other areas of YCC E.A. planning there are certain cautions and suggestions which should be noted:

1. Surveys and Inventories: Make sure that any surveys or inventories they conduct for the city will be used. An air pollution survey will seem fruitless to the enrollees if they think the city council is not actively interested in improving the city air quality.

2. Camping Trips: As stated earlier, E.A. should be extended to recreational activities. Many urban enrollees, however, have never been camping and find a camping trip frightening. If this is true of your enrollees, make sure your first camping trip is not to an area so alien and removed that the enrollees do not enjoy the experience. Staff members who really enjoy wilderness camping and backpacking must be cautioned about over zealousness in their contact with enrollees about it. Overnight trips do, however, allow the enrollees to live with

and get to know each other in conditions outside of their work relationship. Involve the enrollees in the planning of this experience as much as possible and make it their trip.

3. Permits: Because so many city agencies are usually involved in some way in identifying and certifying YCC work projects, it is very important that the necessary permits and clearances are acquired before the program begins--getting them can often take months. To give your enrollees an understanding of the steps you went through to get clearance, the last step in the process, i.e. picking up the permit at the necessary office, could be left for the first few days of camp so the enrollees could do it.

4. Field Trips: Don't overdo them! It might be beneficial to take urban enrollees to a rural nature-environmental education center toward the end of their summer, after they understand the importance of ecological understandings in their own environment. They will experience a new environment and see how the ecological principles they have discussed apply to all environments. Some suggested field trips are:

Work Project	Field Trip
Water Quality Survey	Visit water and sewage treatment plant
Park Development	Visit other YCC parks of other parks to get ideas. Visit the Department of Parks and Recreation and its maintenance facilities.
River Cleanup	Visit water treatment plants. Visit upstream communities to see whether they treat water and how. Visit water quality control center.
Nature Trail Development	Visit nature center and other nature trails for ideas.

The City and Environmental Awareness

Urban E.A. should include understandings of the social, political and cultural environment. For example:

1. What are the various local neighborhoods or communities?
2. Where are the business, industrial and residential sections?
3. How do they contribute to or alleviate pollution problems?

4. Who founded the city?

5. What was its early importance?

6. How has the geography changed during growth and development?

7. Has the urban environment altered the local climate?

8. Has there been a change in air temperatures and precipitation levels over the years?

9. Is there a smog problem? What causes it?

10. What are the environmental and social implications of expanding metropolitan areas creating a megalopolis?

11. What city agency should be contacted about rodent problems?

12. Which one has jurisdiction over city sewers or water quality?

13. Which one would help an apartment dweller get compensation for sub-standard housing?

14. Who monitors the water, air and noise pollution levels?

15. What is being done about urban decay?

These are just a few of the questions which could be part of city E.A. programs. If the enrollees can understand the processes that allow a city to function and the services available to its residents, they will be more active as involved citizens in achieving environmental quality.

URBAN YOUTH IN URBAN AND NON-URBAN YCC CAMPS

Working with urban young people often poses more problems than working with young people from other environments. They are more "street wise" and exposed to more crime, drugs, and pollution than most rural young people. It is, however, important that they be a part of YCC. The only alternative to increasing population will be urban centers where large numbers of people can live close together in a pleasant environment. To accomplish this, we need to develop a core of motivated people with a positive attitude toward urban living who will work toward a better city environment. They can develop some of this motivation through YCC.

Some urban young people have also not developed a good work ethic or a positive attitude toward learning. As a result, many YCC camps experience difficulty working with their urban young people. Most people working with them in YCC do not share their background and have a difficult time relating to them and dealing with them. YCC can help them develop a healthy self image and a sense of social responsibility. It allows some youth to be successful at something positive for the first time. The following suggestions include many which have been tried successfully and seem to work well for YCC programs. In many programs a hard line was taken at first, but the experience with YCC still seemed to be a positive one for most enrollees.

1. Delineate a clear cut set of rules of conduct and dress.

2. Provide a comprehensive orientation session so they understand the objectives of the YCC.

3. Make sure they know exactly what is expected of them. It is much easier to fulfill someone's expectations if those expectations are clearly defined. It is also easier to back up punishment if expectations are clear-cut!

4. Make sure they understand they will be expected to put in a hard day's work.

5. Make sure they understand the reasons behind all safety regulations. This goes for all aspects of their experience. They must know the reasoning behind their tasks and projects.

6. If they come to work improperly dressed, send them home for the day and dock them that day's pay.

7. Enforce strictly the rules and regulations you have established.

8. Don't be afraid to fire or dock the pay of anyone who isn't doing his share. Usually one such occurrence shows the enrollees that you mean business.

9. Find work projects they can help plan and into which they can have input.

10. Find work projects in areas with a high degree of public visibility. The attention and praise they often receive from people who see them working helps create the pride in a job well done that increases their motivation and enthusiasm.

11. Plan for heterogeneous work crews. YCCer's should have the opportunity to work with and relate to others from different racial, social, and economic backgrounds.

12. Be positive. Young people will rise to your expectations if they are clearly defined. If you have low expectations of them they will also fulfill them. Challenge them and be lavish in praise for a job well done.

13. Listen to them, give them responsibility and show them you care about their ideas.

Peer pressure is very strong in teenagers. It can be used to your advantage in heterogeneous work crews. One of the strengths of the YCC program is that it is not limited to young people from lower-income levels. This allows youth from highly motivated backgrounds to work with youth from welfare or low-income backgrounds. Arrange your work crews so they reflect this span of background. Highly motivated young people have a positive effect on others and, at the same time, they can learn a great deal about urban life styles and the problems which result from many inner city environments.

The YCC has not been created as a therapy program for urban youth. Be sensitive to the special problems of urban young people, but do not expect or use the YCC to solve their problems. It can be a positive work experience for them and it can help them become useful, working citizens with a positive attitude toward their city, but any real change can only come with time. One summer with YCC is only a beginning.

Both urban and non-urban staff members have some of the same problems in dealing with young people whose backgrounds may be very different from their own. However, the non-urban staff has the additional responsibility of meeting the needs of urban youth in an alien environment. For many urban young people the rural or isolated camp setting is a strange and disturbing environment. In order for urban enrollees to feel comfortable enough to cooperate and work in a non-urban setting the camp staff must:

1. demonstrate an awareness of the enrollee's environment and perspective.

2. help transfer the strengths, skills and knowledge the enrollees bring with them so they can be used in the new environment.

3. help the enrollees transfer and use the new skills and increased knowledge in their home environment.

The following guidelines have been developed to meet the needs of urban enrollees in a non-urban setting.

I. Staffing

A. Try to have at least one staff member who has lived in or knows the city. Specifically, individuals that come from the community (Chinese, Hispanic, Black, etc.) of the enrollees. These people can serve as ongoing resource personnel for the overall staff.

B. Develop the staff as a team. Don't let the urban staff members assume sole responsibility for direction of the urban youth. Their value is as a resource and sounding board for the total staff which has collective responsibility for overall programming. Make sure all staff members interact and work with the urban youth as well as the other enrollees.

C. Training Topics

1. The effective use of staff modeling in attitude and behavior.

2. Urban community resources

3. Traditions/habits and lifestyles in urban communities presented by staff members from specific communities of enrollees. This is also useful information to help staff members tie-in E.A. activities and concepts to the enrollees' urban setting.

4. Consciousness raising exercises on staff attitudes and values toward city life and city youth. You must be honest with yourself if you are sincere about honesty in dealing with youth.

II. Work Projects

A. If possible, have some projects in the urban communities of the enrollees. Try to give all enrollees a chance to do something on their own "turf."

B. Try to develop skills and concepts which have application in the urban setting.

C. Work and E.A. Integration

1. Give examples of major concepts in terms of the city. What are examples of adaptation in the city? What do habitats look like in the city? How does energy flow in the city? (See Chapter 2)

2. Tailgate sessions--Can you compare and contrast the project's objectives and concepts to the home environment

of the enrollees without negative value judgements? Can the dialogue bring out urban applications of skills concepts from the enrollees?

3. Make sure your bulletin boards and illustrations show examples of E.A. concepts in many environments; wilderness, rural, suburban and urban.

III. Social and Recreational Camp Life

A. Stress recreational activities that have universal appeal: sports, pinball, fishing, movies, amusement parks. Try not to alienate or isolate the enrollees with the activities. Be careful that music at dances doesn't have a segregating effect. Repressing musical taste differences will immediately create hostility. "Disco" does have greater overall appeal, compared with "Soul" or "Rock and Roll."

B. If possible, go to the enrollees' different communities for recreational activities. Get their ideas of what a good time is.

C. The interaction process that goes on in recreation can shed some light on how the enrollees view each other and allow staff members to spot problem areas before they become problems.

D. Conduct recreational and E.A. activities which help enrollees acclimate themselves to a rural setting. For example, some enrollees are very uncomfortable with the "quiet" of the country. Some of Steve Van Matre's acclimatizing exercises (see bibliography) such as "the blindfold walk" have been very successful in helping enrollees sharpen their hearing to country sounds.

IV. Evaluation

A. Ongoing informal observation and dialogue can provide daily evidence of the degree of interaction and cooperation among the enrollees.

B. Formal assessment in the design of a simple questionnaire can be developed by each camp and given at specific intervals. This provides feedback <u>during</u> the summer.

These guidelines are meant as that, to be reviewed and modified to fit the camp setting, agency objectives, and the personalities of the staff. Incorporated into your own ideas, they can be the basis for a productive and enjoyable summer for all.

YCC SPIKE CAMPS

Spike camps are defined as any camp conducted away from the normal base camp facility. They vary widely in distance from base camp, period of time in operation and facilities provided. They must be planned and conducted with the prior approval of the project manager and the understanding that staff members are responsible for YCC enrollees 24-hours a day. A spike camp can be a vital part of the camp program if proper planning is done in advance. They offer the opportunity to increase work production through elimination of excessive travel time. A spike camp may provide an opportunity for enrollees in a non-residential program to experience residential living for a limited period of time.

Environmental Awareness in Spike Camps

Unique E.A. experiences are often provided by spike camps. However, resources and equipment for E.A. are often limited. Develop your spike camp E.A. program around the work projects and environmental conditions present in your spike camp location. Provide your enrollees with the opportunity to develop and demonstrate a personal environmental ethic while they are in spike camp. Arrange for them to evaluate their impact on the spike camp location. "Before" and "after" surveys may show the change which has taken place over the spike camp period.

Turn any lack of facilities in a spike camp into the basis for an environmental discussion. This may be the first experience your enrollees have had in a "pioneer" setting. Take advantage of this to involve them in planning for food, transportation, shelter, clothing, materials and supplies. "Needs" are often simpler in a spike camp situation and comparisons can be made with "Wants." Lack of refrigerated food storage may provide enrollees with an opportunity to understand how food was handled in the past without refrigeration, including the amount of time involved in drying, salting and pickling, and the lack of variety and nutrition available during the winter.

Disposal of wastes and sanitation is often dealt with on a more primitive level in spike camps. This is a good opportunity for enrollees to understand what happens when a toilet doesn't flush and the garbage truck doesn't come. Help them understand how primitive spike camp conditions relate to conditions and problems in much of the world.

Spike Camp Planning

Successful spike camps take into consideration:

Weather--usual and "unusual"

Terrain

Elevation

Hazards (including wildlife and poisonous plants)

Physical condition of enrollees and staff

They involve advance planning for:

Safety and health

Food

Shelter

Clothing

Transportation

Materials and supplies

Each camp has to determine their own requirements for a safe and effective spike camp operation; however, the following check list is provided as a guide:

Spike Camp Checklist

Safety and Health

1. Spike camp safety plan, including emergency procedures and communications.
2. Trained first aid personnel.
3. First aid supplies and equipment.
4. Sanitation arrangements, including toilet, bathing, dishwashing, waste water disposal.
5. Proper food storage to meet required standards.
6. Culinary water from an approved source with adequate storage containers and cups.

Food

1. Food supplies appropriate to storage conditions, preparation time, and skill of enrollees and staff.
2. Equipment and supplies needed to prepare and cook food.

Shelter

1. Access and approval to use existing facilities.

OR

2. Temporary shelter in form of trailers or tents, etc., including specific instructions and tools needed. If tents are used, include information on how to choose a suitable site, erect them, and provide drainage.

3. Adequate bedding or sleeping bags.

Clothing

1. Personal equipment, clothing, and toiletries.

2. Adequate foul-weather gear for "unusual" situations.

Materials and Supplies

1. Work tools and equipment for planned projects.

2. Recreation equipment needed for planned after-hours activities; i.e., swimming, softball, etc.

3. Equipment needed for planned E.A. activities.

This checklist is only a start towards developing a specific list to meet the needs of your spike camp, whether backpacking on a trail or using fully equipped facilities. For further information, resource materials are listed in the bibliography.

RESIDENTIAL YCC CAMPS

Residential camps offer the most time available to meet objectives of the YCC program. In addition to one-fourth of the available work time, there are also opportunities to integrate environmental awareness into after-hours and weekend activities. However, there are a few cautions to observe in planning E.A. activities for residential YCC camps.

1. Because it looks like so much time is available, there is a tendency to schedule E.A. "tomorrow." This inefficient planning and delayed scheduling can eliminate the time advantage of the residential camp and not provide for integration of environmental awareness into the work program.

2. Enrollee E.A. "overkill" is also possible. The saturation point can lead to closed minds by the end of a camp. Relevance, variety and timing can prevent "overkill."

3. Enrollees in residential camps are isolated from their home environment. An effort needs to be made to tie what they are learning in E.A. at camp to the real world at home.

ENVIRONMENTAL INVESTIGATIONS

The following material is a revision of the YCC Pocketbook for Environmental Awareness. It contains lesson plans from the revised U.S. Forest Service "Investigating Your Environment" Series. Each investigation series contains the following components:

1. Introduction
2. Statement of Anticipated Behavioral Outcomes
3. Materials list
4. Activities list
5. Instructions to the E.A.C. and the Crew leader
6. Enrollee Task cards

The investigations are designed for environmental awareness in the field situation, so the E.A. can be integrated with the work projects. The crew leader is changed from a dispenser of facts and information to that of a facilitator, motivator, and learner along with the enrollees. The activities provide for a maximum of enrollee response and summary because of the discussion and question sections. They use the processes of collecting observable data; making inferences, setting up investigations to check out inferences, and communicating feelings and awareness.

The task cards in the activities section are designed to be Xeroxed and given to the enrollees to complete. Sets (50 per package) of the task cards printed on heavy paper are also available from your Regional Office. Instructions for ordering are provided on page 172.

AN INTRODUCTION TO INVESTIGATING YOUR ENVIRONMENT SERIES

Making decisions about the management of our environment becomes a little easier if we understand what makes up that environment and how our actions affect it. The processes and techniques contained in these investigations enable people to examine different components of the environment and help them to understand the relationships among these components.

The investigations encourage participants to observe their surroundings and to collect, record, and interpret data. Facts and figures are collected as a means toward gaining a deeper understanding, not as an end in themselves. The questions and discussions are designed to elicit maximum response and involvement from the participants and to eliminate lecturing and show-and-tell activities. Each lesson plan provides a framework within which succeeding activities and discussions build on what has been learned before, leading the participants to an understanding of environmental relationships. A knowledge of these relationships provides the basis for better understanding of environmental problems and their possible solutions.

One of the goals is to help individuals develop the skills and motivation to interact with their environment at many different levels. The materials (lessons and tasks) in this series are designed to contribute to that goal because they allow participants to investigate the environment by:

- -Collecting, recording, and interpreting information about different parts of the environment
- -Applying these interpretations by analyzing physical, social, and economic impacts on the environment in a variety of situations.

The main framework of the lessons is the Interpretation of Data Process. This process has been adapted by permission from the course, "Development of Higher Level Thinking Abilities," 1968, Northwest Regional Education Laboratory, Portland, Oreg. The course deals with thinking tasks concept formation, interpretation of data, and the application of these data, as defined in the parent material.

This Interpretation of Data Process, used throughout the lesson plans, allows people to make their own interpretations about the environment using the observations and information that they collected. It involves four basic types of "tasks."

TASK	RESULT
-Open	Produces a large body of data Allows everyone to participate
-Focus	Zeros in on the topic or topics to be investigated

TASK	RESULT
-Interpretive	Looks for contrasts and similarities, causes and effects, and other relationships between the focus topics.
-Summary	Allows group to summarize its findings.

Task cards are an integral part of each investigation and are important because they:

-Promote small group interaction and data collection

-Allow for individualized study

-Allow for people with different levels of ability to participate at the same time

-Are success oriented

-Place responsibility for learning on the participant rather than the teacher.

Some of the interpretive tasks use charts, tables, and other factual material as a basis for making more accurate interpretations of the data collected. This can further place the responsibility for learning on the participant and allows the teacher or leader to facilitate the activities and learning experiences even if he or she is unfamiliar with the material.

The summary questions and discussions at the end of each "task" and each Investigation are among the most important activities. They are designed to:

-Allow each person to contribute to the group's understanding

-Allow each person to summarize into generalizations or conceptual ideas the data they have collected and interpreted

-Allow each person to analyze the processes and methods used by the group to collect, interpret, and summarize data.

This process can become a valuable tool by:

-Developing environmental investigation that allows groups to pool their skills and knowledge in collecting and interpreting their own information

-Giving a group leader a way to identify where the group is in their level of understanding of a topic

-Allowing everyone an opportunity to participate at their level of interest and motivation

-Allowing a group to work together in problem-solving situation

-Allowing the group to summarize its own findings, values, and feelings before comparing them with other groups, specialists, or professional opinions.

Conducting an Investigation

The lesson plans are self-explanatory, although there are some aspects of the overall process that need to be emphasized.

Preparation

1. Select the site and dry run the investigation on the site.
2. Plan to pace the session so that each activity can be done well.
3. Use the lesson plan as a guide, especially for the questions and the discussion periods. Once the plan has become familiar, do not hesitate to revise it as necessary.
4. If there will not be enough time to do an entire investigation, decide in advance which activities should be omitted. Do not become trapped into moving so quickly that the participants are provided data rather than being allowed to collect it. Always allow ample time for the summary questions.
5. Make sure that there is enough equipment and that it is in working order.

Beginning

1. Set the stage for what will happen during the session. Refer to the introductory paragraphs in each lesson.
2. Before leaving for the study area, have the participants discuss what effects the investigation itself may have on the environment and possible hazards that may be encountered.
3. Arrange for checking out and returning the equipment. Usually it is best to have one or more participants do this.

Implementation

Feel free to make changes and revisions to meet the needs of your YCC camp.

1. Be sure to give clear directions. Do not be reluctant to read or write directions. Experience has shown that ad libbing instructions often changes and confuses the meaning.

2. Listen to what the participants say and accept all their contributions.

3. Refocus on the original question if the discussion digresses.

4. Go over quickly with the YCCer's what will take place ~~during~~ the field investigation so they will know what to expect.

5. Use the field investigation as a guide involving questioning strategies and self-directed investigations. Revise as necessary to fit your situation.

6. Minimize leader talk and/or lecture (refer to and use question and discussion sections of outline--these work in eliciting responses).

7. Plan and pace your session so that what you do is done thoroughly and well. For example, it is okay to give them data to solve a problem, instead of letting the crew gather it, if time is a problem. Don't have your lesson so rushed that you have to give out data all the time. If you have a time restriction, make sure you decide ahead of time which TASK's you are going to eliminate.

8. The summarizing question and discussion area of how this relates to man and the management of the environment is so important that you should plan to start the summarizing and discussion area of the session at least 1/2 hour before completion.

9. Conclude the session with the summarizing questions or equivalent at the end of the lesson plan. (This is one of the most important parts of the activity.) This will give you an evaluation tool to see what generalizations or concepts students can generate.

10. Have crew discuss and list in small groups ways in which the study activities can help change attitudes. Groups may share ideas.

11. Assign one or two YCCer's to be accountable for equipment at the beginning of each session. (Have the same people be responsible for cleaning up the equipment at the end of each session.)

12. When your session is finished, jot down strengths and weaknesses so you can revise your lesson so it will be better next time.

Conclusion

1. Constantly be alert for opportunities to expand, adapt, and improve subsequent investigations.

2. The ideas and activities presented in these teaching materials will come to life only as you try them, modify them, and improve them to fit your own needs, style, and situation.

 They were developed by many people from many different groups who shared the objectives of better environmental education through involvement. They have been successfully used at environmental education workshops throughout the country.

Specific materials and ideas in this packet are used with the permission of:

-Oregon and Washington Environmental Education Group

-Northwest Regional Education Laboratory, Portland, Oreg.

-Michael Giammatteo, Ph.D., Sylvan Institute of Mental Health, Vancouver, Wash.

-Journal of Geography.

INSTRUCTIONS FOR ORDERING TASK CARDS

Forest Service Camps

Your Regional Office has supplies of the task cards. Your Project Manager can supply you with the address. Use the form on the next page to order them..

Interior, State, Military and TVA Camps

Use the order form on the next page and send it to the appropriate Regional Office on the list below.

Camp Location	Regional Office
Region I: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island	Office of Youth Programs Custom House, Room 804A Boston, MA 02109
Region II: New York, New Jersey, and Delaware	Office of Youth Programs 252 Seventh Ave., 5th Floor New York, NY 10001
Region III: Maryland, Pennsylvania, Virginia and West Virginia	Office of Youth Programs 2nd and Chestnut Streets Suite 600 Philadelphia, PA 19106
Region IV: Kentucky, Tennessee, North Carolina, South Carolina, Florida, Georgia, Mississippi, Alabama, and Puerto Rico	Office of Youth Programs 1720 Peachtree Road, NW Suite 333 Atlanta, GA 30309
Region V: Michigan, Ohio, Wisconsin, Indiana, Minnesota, and Illinois	Office of Youth Programs P.O. Box 5088 Chicago, IL 60607
Region VI: Texas, Arkansas, Louisiana, Oklahoma, and New Mexico	Office of Youth Programs 1100 Commerce Building Room 8B37 Dallas, TX 75242
Region VII: Iowa, Kansas, Missouri, and Nebraska	Office of Youth Programs 911 Walnut Street Room 1702 Kansas City, MO 64106

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Camp Location	Regional Office
Region VIII: Montana, North Dakota, South Dakota, Utah, Wyoming and Colorado	Office of Youth Programs Lake Plaza South, Room 617 44 Union Boulevard Lakewood, CO 80228
Region IX: Arizona, Nevada, California, Hawaii, and the Trust Territories	Office of Youth Programs Federal Office Building 450 Golden Gate, Room 14470 San Francisco, CA 94102
Region X: Washington, Oregon, Idaho, and Alaska	Office of Youth Programs 4th and Pike Building Room 307 Seattle, WA 98101

ORDER FORM
Environmental Investigations
Task and Data Cards

The Task Cards are packaged in lots of 50. One (1) complete set of Task and Data Cards includes 50 copies of each card for the particular investigation you order.

Send the complete form to the appropriate address as listed on pages 172 and 173.

Complete Forest Investigation ..... _____ sets

Complete Water Investigation ..... _____ sets

Complete Soil Investigation ..... _____ sets

Complete Animal Investigation ..... _____ sets

Complete Land Use Investigation ..... _____ sets

Complete Community Investigation ..... _____ sets

Complete Range Investigation ..... _____ sets

Complete Maps and Compasses ..... _____ sets

Total Sets _____

E.A. Coordinator: _____

Camp Name: _____

Mailing Address: _____

_____

_____

_____

_____

253

FOREST INVESTIGATION

MATERIALS LIST (FOR A GROUP OF 10 ENROLLEES)

10 CROSS SECTIONS OF TREES

6 INCREMENT CORES (PREFERABLY IN PLASTIC) FROM NUMBERED TREES

10 HAND LENSES

1 INCREMENT BORER

10 PIECES OF SKETCHING PAPER

10 SETS OF TASK CARDS

TAGGING TO MARK TREES

MEASURING TAPE

10 PENCILS AND CLIPBOARDS

FORESTS

Investigating a particular forest environment can provide information concerning the past, present and future natural and man-made relationships of that area which, in turn, become valuable tools in land use management.

Some Objectives

Behavioral Outcomes in Knowledge: As a result of these activities, each participant should be able to:

a. List at least three observations about the cross-sections provided, and infer possible reasons for each observation.

b. Describe ways to set up an investigation to find out more about the above observations and inferences.

c. Set up an investigation (collect and record data) to find out reasons for growth rate differences in a given stand of trees.

d. Describe activities appropriate to other environments for interpreting the landscape.

e. Identify and list at least three evidences of change in the environment, and infer the cause-and-effect relationships of those changes.

f. Construct a diagram of a cycle in a rotten stump.

Behavioral Outcomes in Feelings, Awareness, Values, and Action: As a result of these activities each participant should be able to:

a. Describe how he or she feels about one change in this environment.

b. Communicate feelings of awareness by constructing a sketch of a given object in the environment, using natural materials.

c. Communicate feelings, awareness, and values by describing in writing the effect of a given object on the environment.

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.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Observing and Inferring with Cross Sections	Cross Sections Hand Lenses (optional) Task Cards A & B Flip Chart or Blackboard Felt Tip Pens	10 min.	179
II.	Collecting and Interpreting Data about Tree Growth Rates and Competition	Tree Cores Cardboard, Scotch Tape Increment Borer Tagging for Trees Task Card C Pencils Clipboards Diameter Tape	40 min.	179
*III.	Observing Evidence of Change	Task Card D Clip Boards Flip Chart or Blackboard Pencils Felt Tip Pen or Chalk	35 min.	180
*IV.	Observing and Recording Things About a Rotten Stump or Log	Task Card E Hand Lenses Clip Boards Pencils	25 min.	181
*V.	Communicating Interpretations Through Sketching and Writing	Sketching Materials Sketch Paper Clip Boards Pencils	30 min.	181
VI.	Transferring the Process to Other Environments	Task Card F Clip Boards Pencils	15 min.	182
VII.	Summary	Task Card F	30 min.	182

*These activities are not restricted to a forest environment and can be conducted in any plant community.

Set the stage for this investigation by reviewing quickly what will take place in the allotted time. For example, "In this session we will develop some skills in collecting, recording, and interpreting data about the forest, and then communicate these interpretations using different methods and processes."

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. OBSERVING AND INFERRING WITH CROSS SECTIONS

Distribute cross sections of trees 4"-6" (10-15 cm.) in diameter that show a variety of growth patterns and influences (fire, insects, etc.).

Have people spend a few minutes looking at the cross sections (5 minutes).

Questions and Discussions

1. "What are some of the things you noticed about the cross section?" List on board.

2. Point to two or three items from the list that deal with growth characteristics and rings (varying widths of growth rings, center not in the middle, etc.).
"What are some possible reasons for _____?"
Select some observations.

3. "In general, what could growth rings tell us about a group of trees?" (competition, climate, temperature)

4. Pass out Tasks A and B, page 185. "This is what we just did and here is the task card for your reference later." Refer to the information on Task A about tree growth rings.

II. COLLECTING AND INTERPRETING DATA ABOUT TREE GROWTH RATES AND COMPETITION

Task C (with tree cores) requires preparation by the facilitator before the session. Task C is on page 186.

A tree stand should be selected for study, four to five trees tagged, numbered and bored, and their diameters taken. Trees to be selected should show effects of environmental conditions--injury, overcrowding, lack of sunlight, etc. The tagged and numbered trees should be bored with an increment borer by the facilitator ahead of time. Cores should be numbered corresponding to numbers on trees. Taping tree cores to cardboard with see-

through scotch tape or in plastic straws will help keep them longer if liquid resin is not available. In any event, keep the numbered cores and trees to use again. This eliminates the necessity of reboring the trees.

You may be able to find and use stumps of trees that grow under a variety of competition influences, instead of using tree cores.

Steps 1--3 in Task C are all planning steps in setting up an investigation and should be done away from the study trees.

Questions and Discussion

1. "Observe the tree core that your group has been given and record the information in step 1 of Task C." Pass out hand lenses, pencils, the numbered tree cores taped to cardboard, and Task C. (10 minutes)

2. Have each group tell you the information for the number of dark rings from center to bark and remarks about the ring pattern while you record on the large chart (see Task C, step 2). "What does this tell us about the trees these cores came from?"

3. Now put the diameters on the large chart and have everyone record them on Task C, step 2. Ask, "Now what does this added information tell us?"

4. "Go on to Task C, step 3. Pick out two or three trees from the chart that show differences in growth and set up an investigation to find out why there are differences."

5. Have the groups take Task C to the area where the trees are tagged and numbered. Have them spend 10--15 minutes doing the investigation and completing Task C, step 4.

6. (Outdoors) When all groups are finished, ask for a 2--3 minute summary from each group. "What did you find out?"

7. "What are some of the major factors that you think are affecting the growth of this forest?"

8. "What does the information tell us about the past events of this environment?"

III. OBSERVING EVIDENCE OF CHANGE

Pass out Task D, page 187.

Questions and Discussion

1. "What evidence of change (natural and manmade) might there be in this environment?"

2. "Spend the next 20 minutes looking for evidences of change and recording them on Task D."

After 20 minutes, ask:

1. "What evidences did you find?" Have group develop a total list. Record on chart in front of total group, if possible.

2. "What could we do with this list?" This is a key question.

3. "Get into groups and put the whole list into a sequence." (Optional)

IV. OBSERVING AND RECORDING THINGS ABOUT A ROTTEN LOG OR STUMP

Move the group to a rotten stump or log.

1. "Let"s focus in on one evidence of change in this rotten log (stump)."

2. Pass out hand lenses and demonstrate how to use them (many people have never used one before).

3. Go on to Task E, page 187. "Notice that on Task E it says, 'Do not tear the stump apart!' Why do you think this note is there? Spend 10 minutes observing the log and recording your observations on and interpretations of Task E."

Questions and Discussion

1. Ask for volunteers to share what their diagram or cycle looks like. If appropriate, comment how people defined and illustrated the word *cycle* differently.

V. COMMUNICATING INTERPRETATIONS THROUGH SKETCHING AND WRITING

Distribute sketching paper and pieces of charcoal from a campfire or fireplace.

Questions and Discussion

1. "Sketch the log or stump you just studied, using charcoal from a campfire or fireplace. Other sketching materials will be given to you as you work." Subject of sketch depends on the environment. It can be anything that is significant about the area: a rotten log, stump, snag, old homestead, fence, barn, city building, transmission tower, or freeway.

2. While people are sketching, go around and given them rotten wood, brown dandelion leaves, green dandelion flowers, and other goodies in season.

3. If you're not in the woods, improvise.

Begin this part when about half the people finish their sketch.

Questions and Discussion

1. "Use your pencil or pen. Find a place on your sketch (across the bottom, or down the side) to write some things as I give you the directions."

2. Give these directions to the group:

   a. "Write two descriptive words about the stump (words that tell what it looks like)." Repeat instructions.

   b. "Write three action words about the stump (words that describe processes or changes taking place, or things happening to it)." Repeat instructions.

   c. "Now write a short phrase that tells how the stump affects the rest of the environment (a phrase describing its value or usefulness or a phrase describing any thought you have about the stump)." Repeat instructions.

   d. "Write one word that sums up everything about the stump (a word that suggests a comparison, an analogy, or synonym)." Repeat instructions.

   e. (Optional) "Now, if you wish, go back and give a title to what you have written."

   f. "Congratulations. You have just written a poem about the stump or whatever you sketched."

3. Have people read their writings if they wish.

VI. TRANSFERRING THE PROCESS TO OTHER ENVIRONMENTS

This could be done inside, depending on outside conditions. The same processes could be used to investigate other environments. Hand out Task F, page 188. 15 minutes.

VII. SUMMARY

1. Discuss Task F.

2. "What did we find out about the environment in our session today?" (List on chart, if there is time.)

3. "How are these things important to the way we manage the environment?"

4.. "How can we summarize our investigations and discussions today?"

5. You may want the group to describe in writing how they felt about this session.

TASK A (work in small groups)

Write down some things you notice about the cross sections.

TASK B (work in small groups)

Select three observations about the cross sections from the group list.
List possible reasons for these observations.
List ways you could set up an investigation to find out more about your observations and inferences.

Observation (What you noticed)	Inferences (Possible reasons for this)	Investigations (How we could find out)
1.		
2.		
3.		

Tree Rings Information.

The current year's growth is the ring next to the cambium layer just inside the bark. The rapid spring growth is a lighter color than the growth made in the summer, so one light and one dark ring makes one year's growth. It is easier to see and count the summer wood or dark rings to determine the age of a stump or log of a tree when it was cut.

These rings are easily counted on the stumps of cut trees.

How old was this tree when it was cut? _____ The dark rings are summer wood and the light rings are spring wood. One light and one dark ring makes one year's growth.

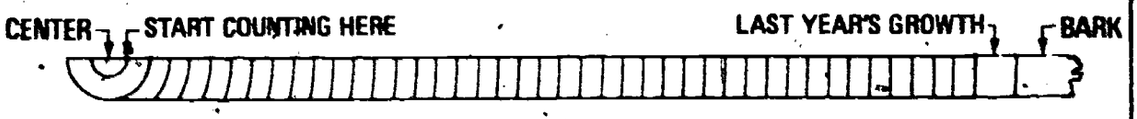
FOREST INVESTIGATION Task Card
Forest Service
Revised 1977

TASK C (groups of 4-5)

1. Observe the tree core your group has been given and record the information.
   See drawing of tree core to help interpret the tree core you have been given.

Tree #	Number of dark rings from center to bark (approx. age)	Remarks about the ring patterns

DRAWING OF TYPICAL TREE CORE



2. When your group has recorded the information, one person from the group should put this information on the blackboard or easel board. Chart should be like Task C, step 2.

   Record the following information about tree cores from the master chart. Instructor will provide the diameter information.

Tree #	Number of dark rings from center to bark (approx. age)	Diameter of tree trunk (cir. ÷ 3)	Remarks about the ring pattern
1			
2			
3			
4			
5			
6			

3. Set up an investigation to find out reasons for some of the differences in the data.
   a. Select two or three trees from the list that show differences in growth rates.
   b. Which trees did you select? (indicate by number) _____
   c. Why did you select these trees?

4. Go with your group to the site of the trees you selected for investigation.

   a. *Collecting and recording data:* Record your observations.

   b. *Interpreting data:* Record possible interpretations of the above data

   c. *Summarizing your investigation:* Write your group's summary below, including:

      What you were trying to find out
      What data you collected about it
      What interpretations you made
      What other data would you collect about your investigation.

TASK D

Look for evidence of change (natural and manmade) in the environment.
Record and fill out other columns.

Evidence of changes in the environment	What might have caused them?	Effect on the environment

TASK E (individuals or groups)

Do Not Tear The Stump Apart!

1. Record your observations and ideas below.

*Living things	Effect on stump
*Nonliving things	Effect on stump

2. In the space below, construct a diagram of one of the *cycles taking place in the rotten log or stump.

*You define the word *cycle* any way you want to.

FOREST INVESTIGATION Task Card
Forest Service
Revised 1977

TASK F

List some other things in this environment that could help us further interpret the forest.

Things in the forest	*What it can tell us about the forest*

Identify and list some of the methods and processes we used today in our investigation.

Describe how we could use these methods and processes in another environment to find out more about it (city, schoolyard, etc.).

WATER INVESTIGATION

MATERIALS LIST(FOR A GROUP OF 10 ENROLLEES)

1 WATER TESTING KIT

2 THERMOMETERS

2 WHITE DISHPANS

10 SETS OF TASK-CARDS

1 SECCHI DISK

10 JELLY CUPS, BABY FOOD JARS, ETC.

CHART PAPER

10 HAND LENSES

6 POND LIFE BOOKS(GOLDEN NATURE GUIDES)

10 MAPS OF THE AREAS

1 50-FOOT OR 100-FOOT TAPE

2 SCREENS

FELT MARKERS

WATER

Water is another of the basic components of the "natural environment." It is essential for the survival of all living things and is a key factor in shaping land forms. This investigation can be used with a variety of different types of work projects and can be easily interrelated with soil, plant and animal investigations.

Some Objectives

Behavioral Outcomes in Knowledge: As a result of these activities, each participant should be able to:

a. Identify the boundaries of the stream (pond or lake) watershed on the map provided.

b. Predict the pH, temperature, and dissolved oxygen count of the stream or pond, using the list of aquatic animals found.

c. Demonstrate the ability to test out the above predictions using the water testing kit.

d. Measure the cubic feet of water per second flowing in the stream, or in the pond, and determine what size community could live off the water measured.

e. Describe three ways this stream or pond is important to the surrounding environment.

Behavioral Outcomes in Feelings, Awareness, Values, and Action: As a result of these activities, each participant should be able to:

a. Describe in writing how he or she feels about man's effect on the aquatic environment at this site.

b. Describe at least one action he or she can take in everyday life to help improve the way water is managed in the--
   - Home
   - Community
   - Consumer habits

c. Describe the benefits of each of the above actions.

d. Describe the implications of water use and management in our society.

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.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Observing the Water Environment	Task Card A Pencil, Something to Write on	10 min.	193
II.	Observing and Collecting Aquatic Life	Task Card B Screens Jelly Cups Pans	30-40 min.	193
III.	Identifying and Recording Aquatic Animals	Task Card B "Golden Nature Guide Pond Life" Books or Similar Guides Hand Lenses Chart Paper	20 min.	193
IV.	Predicting Water Characteristics	Task Card C	10 min.	194
V.	Measuring and Recording Water Characteristics	Task Card D Hach Water O_2-pH Test Kit or equivalent Thermometer	20 min.	194
VI.	Measuring Water Volumes	Task Card E Part 1 for streams, Part 2 for Lakes or Ponds 60 or 100 ft. Tape Watch w/second hand Secchi Disc if available for ponds.	40-50 min.	195
VII.	Determining Watershed Boundaries	Task Card F Map of Area	10 min.	196
VIII.	Communicating Feelings, Awareness and Values.	Task Card G	10 min.	196

Set the stage for this investigation by reviewing quickly what will take place in the allotted time. For example, "In this investigation, we will develop some skills in collecting and interpreting data about the water environment. We will then apply these data in discussing the role of water in the environment and our society."

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. OBSERVING THE WATER ENVIRONMENT

Distribute Task A, page 197.

"As you approach the water, record your observations on Task A." (10 minutes)

Questions and Discussion after completing Task A

1. "What are some things you noticed as you approached the water?"

II. OBSERVING AND COLLECTING AQUATIC LIFE

Questions and Discussion

1. "What do you notice about the water environment?"

2. "What are some factors that affect the lives of animals in water?"

3. "Where would you expect to find animals in a water environment?"

4. "What are some guidelines that we need to consider in collecting aquatic life so our investigation will cause the least impact on the environment?"

Pass out collecting equipment. Go on to Task B, page 197. (30 to 40 minutes)

III. IDENTIFYING AND RECORDING AQUATIC ANIMALS

Have groups identify as many of the aquatic insects they found as possible, using the aquatic life drawings on back of Task B and in pond life books provided. (20 minutes)

Questions and Discussion

1. "What animals did you find?" (You might compile a group list, preferably on a chart. Each person could record his own list.)

2. "Where did you find most of the specimens?"

3. "What other life would you expect to find in this stream?"

4. "What are some things we could do with this list of animals?"

IV. PREDICTING WATER CHARACTERISTICS FROM AQUATIC ANIMALS FOUND

Distribute Task C Cards, page 199.. On the basis of the aquatic animals you found, and the tables in Task C, predict the temperature, pH, and O_2 count. (10 minutes)

V. MEASURING AND RECORDING WATER CHARACTERISTICS TO TEST OUT PREDICTIONS

"One way to test the predictions is to use this (Hach Water O_2pH Testing Kit, or equivalent). Open the kit. The instructions are inside the lid. There are lots of jobs to be done in testing (clipping, squirting, swirling, dipping, counting, reading, etc.), so make sure everyone in the group has a job to do."

Pass out Task D (and Data Card on the reverse side). Have group transfer their predictions from Task C to Task D and record the test measurements beside the predictions for comparison.

Each group of three to five people takes a kit, and spreads out along the edge of the water.

Do not demonstrate the use of the kit. Let the participants read the instructions and learn to use the kit as they collect the data. You should check among the groups as they work to make sure they use the right bottles, chemicals, etc. (20 minutes)

Questions and Discussion

1. "How did the test results compare to the predictions?"

2. "Under what conditions might we expect to get different results than we did today?"

3. "What can we say about the quality of the water in this stream so far?"

4. "What else would we need to know to decide whether or not to drink this water?" (Coliform bacteria count)
this water?" (Coliform bacteria count)

VI. MEASURING WATER VOLUMES FOR STREAM, POND, OR LAKE

(For a stream, use Part 1; for a pond or lake, use Part 2.)

Part 1. Stream Measurements

Questions and Discussion

1. "How many people do you think could live off the water in this stream (domestic water use only)?
2. "What measurements do we need to know in order to determine the amount of water in this stream?" Discuss how to make different measurements. Work Task E, Part 1.

Questions and Discussion

1. "How many people could live for 1 day (domestic use only) off the water in this stream?"
2. "How did your prediction compare with your measurement?"
3. "What would happen to this environment if we piped all the water at this point to a community?"
4. "If we were going to use some of this water, how much should be left to flow downstream? Why?"
5. "What might affect the amount of water in this stream?"
6. "How important is this stream to a community? To the environment here?"

Part 2. Pond or Lake Measurements

Questions and Discussion

1. "How many people do you think could live off the water in this pond or lake?" (domestic water use only)
2. "What measurements do we need to know in order to determine the volume?" Work Task E, Part 2.

Questions and Discussion

1. "How many people could live for one day (domestic use only) off the water in this pond?"
2. "How did your prediction compare with your computations?"

3. "What might affect the amount of water in this pond?"

4. "What would happen to this aquatic environment if we drained it?"

5. "If we were going to use some of this water, how much should be left to minimize damage to the pond environment?"

6. "How important is this pond to the environment?"

VII. DETERMINING WATERSHED BOUNDARIES

Distribute Task F and a map of the area in which you have been working.

Have participants get into small groups and write a description of what they think a watershed is. Have groups share their definitions with the other groups.

Finish Task F. (10 minutes)

Questions and Discussion

1. "What activities did you list and how did you think they would change the water characteristics?"

2. "Are any of these evident here?"

3. "How would we find out more about this watershed?"

VIII. COMMUNICATING FEELINGS, AWARENESS, AND VALUES

Have participants complete Task G. (10 minutes)

Ask for responses from Task G and discuss.

IX. SUMMARY

1. "What did we find out about water from our investigations today?"

2. "How can we summarize our discussions and investigations?"

3. "What are some methods and processes we used in our investigations in this session?" (May be useful for first field sessions to identify processes used in the investigation)

4. You may want the participants to evaluate the session by writing how they felt about the session.

TASK A (individuals or small groups)

As you approach the water, observe and record your observations.

Plants _____

Animals _____

Air _____

Rocks _____

Water _____

Other _____

TASK B (individuals or groups)

Part 1

Using the collecting equipment (screens, jelly cups, etc.), collect as many types of aquatic animals as possible. Put them in the white dishpans for observation by the group. (Keep the pans in a cool place.) When you have finished, move on to Part 2 of the task. Try to identify the aquatic life found.

Part 2

Using the "Golden Nature Guide Pond Life" books, or similar field manuals, and picture keys on the other side of this card, generally identify the specimens you found.

List or sketch the animals you found. Return animals to water as soon as you have finished.

Description of where found	Type (name or sketch)	How many	Common name

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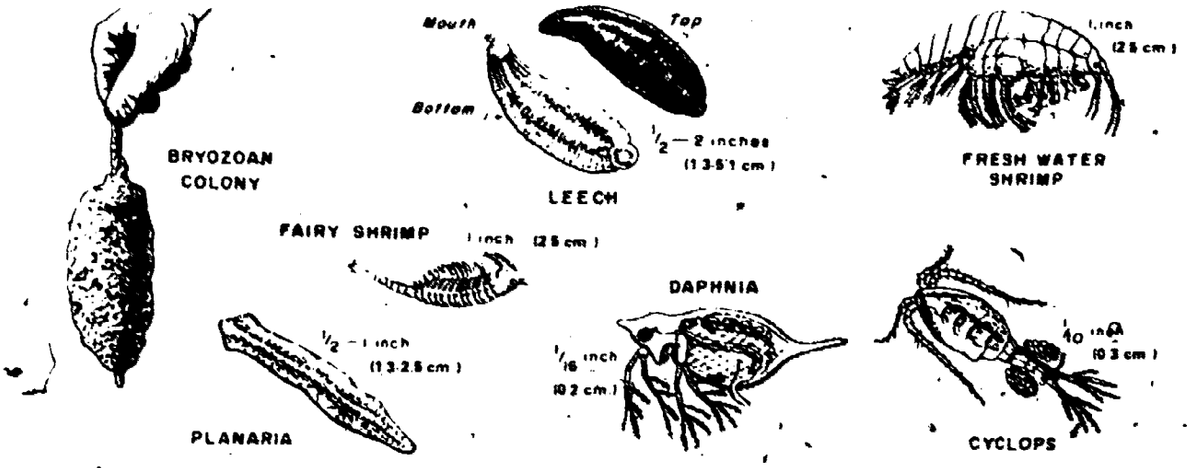
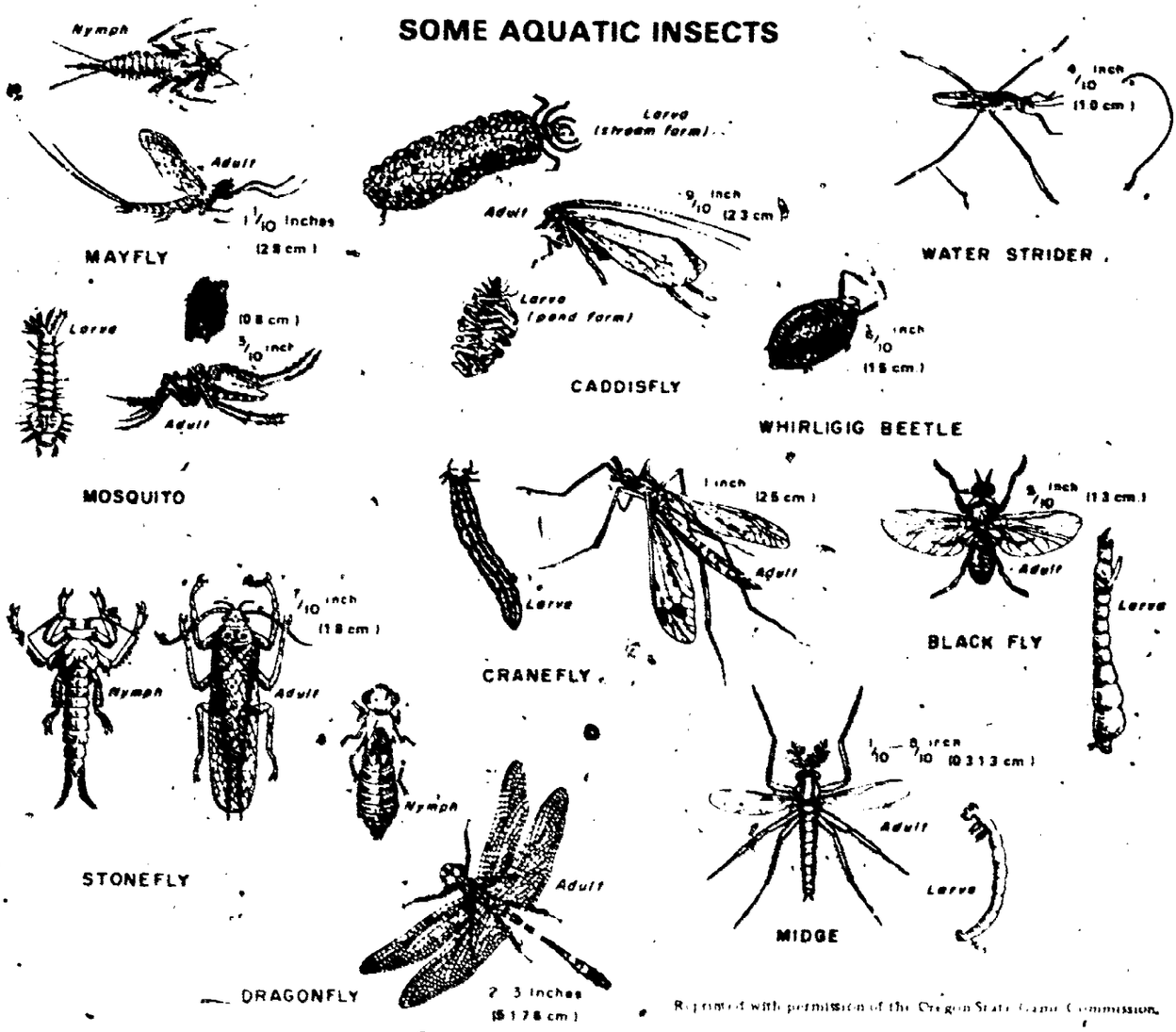
SOME SUB-SURFACE FRESH WATER ORGANISMS



SOME AQUATIC INSECTS



TASK C (individuals)

On the basis of the aquatic animals you found, the tables in the Aquatic Data section below, and your observations, predict the following characteristics of this stream.

I predict that the:

Water temperature will be _____ because _____

Air temperature will be _____ because _____

pH will be _____ because _____

Dissolved O_2 count will be _____ because _____

I can see about _____ ft. into the water.

The color of the water is _____.

Keep these predictions for future use

AQUATIC DATA

Table I. pH Ranges That Support Aquatic Life

	MOST ACID					NEUTRAL						MOST ALKALINE	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bacteria	1.0												13.0	
Plants (algae, rooted, etc.)						6.5							12.0	
Carp, suckers, catfish some insects						6.0						9.0		
Bass, crappie						6.5					8.5			
Snails, clams, mussels							7.0				9.0			
Largest variety of animals (trout, mayfly, stonefly, caddisfly)						6.5		7.5						

Table II. Dissolved Oxygen Requirements for Native Fish and Other Aquatic Life

Examples of Life	D. O. in parts per million or/milligrams per liter
Coldwater organisms, including salmon and trout (below 68° F.)	
Spawning, growth and well being (caddisfly, stonefly, mayfly)	6 ppm and above
Warmwater organisms (including game fish such as bass, crappie, catfish and carp) (above 68° F.)	
Growth and well being (some caddis fly)	5 ppm and above

Table III. Temperature Ranges (Approximate) Required for Certain Organisms

Temperature (Fahrenheit)	Examples of life
Greater than 68° F. (20 °C) warm water	Much plant life, many fish diseases Most bass, crappie, bluegill, carp, catfish, caddisfly
Middle range 55 - 68° F (12.8 - 20 °C)	Some plant life, some fish diseases Salmon, trout, stonefly, mayfly, caddisfly, water beetles
Low range. Less than 55° F. (12.8 °C) cold	Trout, caddisfly, stonefly, mayfly

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TASK D (groups of 3-5)

Make Sure Everyone in Your Group Gets Involved in the Testing.

1. Using the water test kit, determine the water and air temperature, dissolved oxygen count, and pH of the stream or pond.
   Record the data below, using predictions from Task C.

Name of Stream, Pond or Lake:

Location of water sample (edge or middle of stream bank of pond, etc.)	Time Taken	Temperature (°F or °C)				pH		Usable Oxygen (ppm) (mg/liter)	
		Water		Air					
		My pred.	Actual test	My pred.	Actual test	My pred.	Actual test	My pred.	Actual test

2. Water Productivity and Color
   On the basis of the color you recorded in Task C and Table I (See Data Card reverse side), what can you say about this water?

3. Light Pentration (pond or lake)
   My estimate of how far I could see into water (from Task C) is _____ ft. (or meters).
   Transparency of lake and pond waters can be roughly determined by the use of a white and black plate (called a secchi disk), which is lowered on a line until it can no longer be seen. It is approximately 8 inches in diameter, painted white and black in alternative quadrants. Very little sunlight pentrates below the point at which the disk disappears.

   Lower the Secchi disk into the water until it can no longer be seen. Measure depth from surface of the water to the disk and record _____ ft. (or meters).
   On the basis of the depth of the Secchi disk and Table II, what can you say about the water?

4. Temperature Layering (pond or lake)
   On the basis of the temperatures you recorded for your pond, the season of year, and the information in Table III, describe what you think is happening in the water now.

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Table I Relationships of water color to productivity

The quantity of life that may be present in any given body of water at any given time is often referred to as the "productivity." A water of low productivity is a poor water, biologically speaking, but is a clean water and desirable as a water supply or for recreational use. A productive water may be either a nuisance to man or it may be highly desirable. Foul odors and weed-choked waterways are usually branded a nuisance, however, bumper crops of bass, catfish or sunfish may be the result and are highly desirable.

Color of Water	Probable Cause	Fish Food Productivity
Clear	Absence of algae and microorganisms	Low
Greenish Hue	Blue green algae	Moderate
Yellow to Yellow Brown	Diatoms (microscopic, one-celled algae)	Moderately High
Red	Micro crustaceans	High
Dark Brown	Peat, Humus	Low
GEOLOGICAL FACTORS HAVING BEARING ON COLOR		
In limestone geology Green	Abundant Calcium	Moderate
In volcanic geology Yellow-Green Red	Abundant Sulfur Abundant Iron	Low Moderate

Table II Relationship of Water Clarity to Fish Food Production and Watershed Condition

Interpretations of Depth Readings			
Depth you can see into water (secchi disk reading)	Fish Food Production (If reasons for degree of clarity are biological (algae, etc.))	Condition of Watershed above Water Readings (If reasons for degree of clarity are physical (soil siltation, etc.))	Possibility of Dissolved Minerals
0-6 (0-15.2 cm)	Most productive waters for fish food Maximum oxygen from photosynthesis (greatest diurnal variation) Maximum algae growth	Poor condition due to soil runoff, silts, etc.	Most
+ 24" (+ 61.0 cm)	Least productive for fish food Minimum oxygen from photosynthesis (least diurnal variation) Minimum algae growth	May indicate better condition because of vegetation cover, more stable soil, etc.	Least

Table III Temperature Layering in Ponds, Lakes

In summer, the surface water absorbs the sun's heat and warms faster than the water below. The warmed water is lighter than the cold water, so it floats on the cool layers. By midsummer there are three distinct layers.

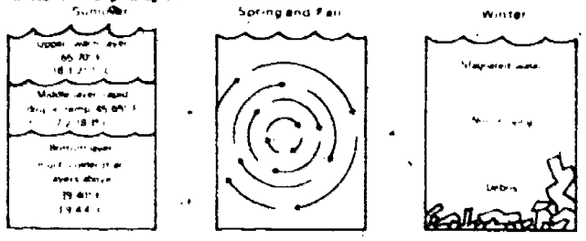
During the summer, mixing or circulation is prevented by these stratified layers of water which act as a barrier.

The upper layer of water cools in autumn until it approaches the temperature of the water in the middle and lower layers. Aided by winds, the surface water sinks causing circulation from top to bottom.

In winter, the cold surface water continues to sink and the water becomes stagnated, photosynthesis slows, and oxygen levels drop.

In the spring, aided by winds, another circulation and mixing occurs, called the "Spring Overturn."

I Seasonal Change Diagram

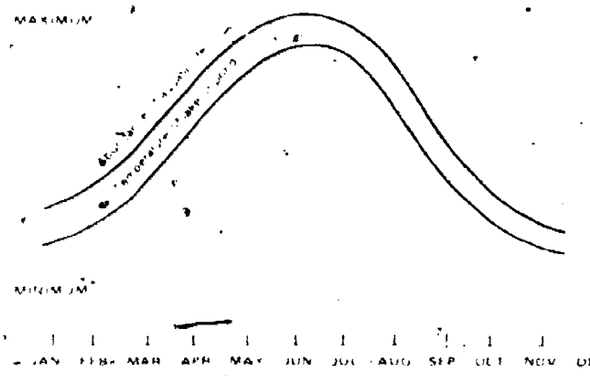


During the summer, fish and aquatic life are most active.

During spring and fall overturns, the temperature of the water is equalized throughout the lake. Fishes and other animals are more active than in winter, but less active than in summer.

Activity is greatly reduced during the winter. Many animals hibernate in the mud or debris at the bottom.

V Seasonal Change Chart



TASK E (in groups)

Part 1 For Stream

Instructions for collecting and recording streamflow measurements

(For metric application, substitute meters for feet and liters for gallons.)

1 Measure and mark a 100 foot distance along a straight section of your stream. If you can't find a 100' section, use 25' or 50'. Throw a stick (5 or 6 inches long, or 12.7 or 15.2 cm long) in the water above the upstream marker. Record the number of seconds it takes to float downstream between the markers. Record below. Now divide the 100-foot distance by the total seconds it took the stick to float between the stakes. Do this three times and use the average time.

1st measurement 100 ft ÷ _____ = _____ ft. per second.
(distance) (total seconds to float 100 ft.) (number of feet stick floated each second)

2nd measurement 100 ft ÷ _____ = _____ ft. per second
3rd measurement 100 ft ÷ _____ = _____ ft. per second
Total _____ ÷ 3 = _____
(ft. per second) (ft. per second average)

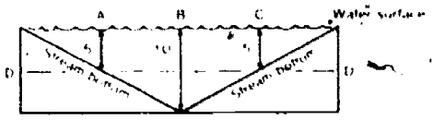
2 Find the average width of your section of the stream. Measure the width of the stream at three places within the 100-foot area, then divide the total by three to get the average width of the stream.

First measurement _____ ft
Second measurement _____ ft
Third measurement _____ ft
Total _____ ft 3 = _____ ft (average width)

3 Find the average depth of your section of the stream. Measure the depth of the stream in three places across the stream in a straight line; then divide the total by four to get the average depth of the stream.

First measurement _____ ft
Second measurement _____ ft
Third measurement _____ ft
Total _____ ft 4 = _____ ft (average depth)

NOTE The reason you take three depth measurements then divide by four is to take into account the shallow areas of the stream. It can be explained by the following example of a drawing of a stream cross section. If depth in three places in A(3'), B(10') and C(5'), (total 20'), find an average by dividing by three. 20' ÷ 3 = 6 2/3'. Now look at the area or average depth (D), which is 5'. Take total of depths and divide by four. 20' ÷ 4 = 5', the correct average depth.



4 Find the cubic feet of water per second. Multiply the average width, average depth, and the number of feet the stick floated each second. (A cubic foot is water in a container 1 foot wide, 1 foot high, and 1 foot long, or 7.48 gallons. A cubic meter of water is the amount in a container 1 meter wide, 1 meter high, and 1 meter long, or 1,000 liters.)

_____ ft X _____ ft X _____ = _____
Average width | Average depth | Number of feet per second | Cubic feet of water flowing per second

5 The average person uses about 200 gallons (757 liters) of water a day for home use. (This does not reflect each person's share of water used for public services and industrial and commercial uses.)* In order to find out how many people could get their water needs for 1 day from this stream, complete the following calculations.

_____ X _____ = _____
Stream flow in cu. ft per second | Gallons in 1 cu. ft. of water | Gallons of water per second

_____ X _____ = _____
Gallons per second | Seconds in minute | Gallons of water per minute

_____ X _____ = _____ _____ _____
Gallons of water per minute | Number of minutes in a day | Total gallons water per day | *200 Gals (Amount of water one person uses per day) | Total number of people who could get daily waters needs from this stream

*U.S. Office of Education

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TASK E (in groups)

Part 2. For Pond or Lake

Instructions for collecting and recording volumes of water in a pond or lake.

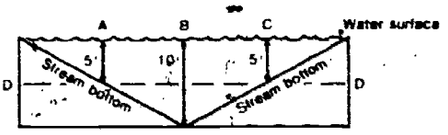
(For metric application, substitute meters for feet and liters for gallons.)

1. Find the average diameter (distance across) of the pond. Measure the length and width of the pond. You may have to take several length and width measurements and get average of them.

   Pond width _____ ft.
   Pond length _____ ft.
   Total _____ ft ÷ 2 = ____ ft. (average diameter)
   Average diameter _____ ft. x 3.14 ( ) ÷ 4 = ____ sq. ft. surface.
   (area of pond)

2. Find the average depth of the pond or lake. Measure the depth in three places along a line (transect) across the pond, as near the middle as possible. Add these depths and divide by four (see explanation below) to get the average depth. (If additional accuracy is desired, repeat this process along additional transects and average results.)
   First measurement _____ ft.
   Second measurement _____ ft.
   Third measurement _____ ft.
   Total _____ ft. ÷ 4 = _____ ft (average depth)

   NOTE: The reason you take three depth measurements then divide by four is to take into account the shallow areas of the stream. It can be explained by the following example of a drawing of a stream cross-section. If depth in three places is A(5'), B(10') and C(5'), (total 20'), find an average by dividing by three: 20' ÷ 3 = 6 2/3'. Now look at the area or average depth (D) which is 5'. Take total of depths and divide by four: 20' ÷ 4 = 5', the correct average depth.



3. Formula for computing number of gallons of water in pond.
   a. _____ X _____ = _____ cu. ft.
   Area of pond | Average depth | Volume in cu. ft.
   b. _____ cu. ft. X 7.48 = _____
   Volume in cu. ft | Number of gals. water in pond

   (A cubic foot of water is the water in a container 1 foot wide, 1 foot high, and 1 foot long, 7.48 gallons. A cubic meter of water is the amount in a container 1 meter wide, 1 meter high and 1 meter long, or 1,000 liters.)

4. Formula for computing the volume using acre feet of water. (No meter equivalent included)
   a. (Surface) _____ X _____ = _____
   Area of pond in feet | Average depth in feet | Volume cu. ft
   b. _____ ÷ 43,560 = _____ acre feet of water.
   Volume cu. ft. | (sq. ft. in an acre
   c. _____ X 395,900 = _____
   Acre feet | Gal./acre foot | Number of gallons in pond

5. The average person uses about 200 gallons (757 liters) of water a day for home use. (This does not reflect each person's share of water used for public services and industrial and commercial uses.)* In order to find out how many people could get their water needs for 1 day from this pond, complete the following calculations.

   _____ | _____ | _____
   Gallons of water in the pond | Amount of water one person uses per day | Total number of people who could get daily water needs from this pond

*U.S. Office of Education

TASK F (small groups)

Describe what you think a watershed is. _____

Find your location on this stream (pond, lake) on the map.
Where does the water come from? _____
Where does it go? _____
Draw lines around the boundaries of our watershed. We are in the _____ watershed.

What activities in this watershed might change the characteristics of this water?

Activity	Ways the activity might change the characteristics of the water

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TASK G (individuals or small groups)

In addition to the factors we have collected information about today, list others that influence the way water is used.

Factor	Who Is Involved	Influence on Water

Select one or two of the above factors and describe what you might do to become involved in determining how the water will be used in your home, community, county, etc.

SOIL INVESTIGATION

MATERIALS LIST (FOR A GROUP OF 10 ENROLLEES)

- 2 LA MOTTE SOIL PH KITS
- 10 MICROMONOLITH CARDS*
- 2 TAPE MEASURES
- 10 SETS OF LAB SHEETS
- 1 STICK (50"/CM OR 100"/CM LONG)
- 1 STAPLER
- 10 SETS OF TASK CARDS AND DATA CARDS
- 1 BOX OF STAPLERS
- 2 SHOVELS
- 10 JELLY CUPS AND LIDS**
- 3 SOIL THERMOMETERS
- 2 #10 CANS OF WATER
- 10 HAND LENSES
- 3 BABY FOOD JARS, HALF FULL OF WATER

* A MICROMONOLITH IS A 5" BY 7" CARD WITH JELLY CUP LIDS STAPLED ALONG ONE SIDE CORRESPONDING TO THE NUMBER OF HORIZON LAYERS. HORIZON SAMPLES ARE COLLECTED IN JELLY CUPS AND ATTACHED TO THE LID ON THE CARD. THE CARD MARGIN IS USED TO RECORD SOIL DATA.

** BAGGIES, PLASTIC WRAP, PILL BOTTLES, ETC. HAVE BEEN USED ALSO.

SOIL

Since soil is a basic component of the "natural environment" and an important component of land-use whether in the "natural environment" or "man-influenced environment" these activities can be used effectively with a wide range of work projects.

Collecting and analyzing soil data is important before undertaking projects that deal specifically with land-use such as building campgrounds, and trails, or use of land in nearby communities.

Some Objectives

Behavioral Outcome in Knowledge: As a result of this session each participant should be able to:

a. Describe three ways in which the living organisms in the top part of the soil affect the soil.

b. Construct a soil micromonolith of an assigned soil profile; and determine and record texture, structure, pH, temperature, and color of each layer.

c. Write a description of a soil studied, using the words recorded about that soil on the micromonolith.

d. Demonstrate the ability to determine the best uses of the land in this area, using the data from the soil micromonolith and the land capability charts.

e. Describe three things that might determine the proper management of soil resources.

Behavioral Outcomes in Feelings, Awareness, Values, and Action: As a result of this session, each participant should be able to:

a. Describe how he or she feels about man's effect on this soil environment.

b. Describe how he or she feels about man's effect on the soil environment where they live.

c. Describe what he or she can do to improve the use of the soil in rural areas and in communities.

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.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Describing Soil	Task Card A Pencil	5 min.	211
II.	Observing, Recording Things in the Soil	Task Card B Pencil	20 min.	211
III.	Developing the Skills to Collect Soil Data	Task Card C Pencil	30 min.	211
IV.	Constructing a Soil Micromonolith	Soil pH Kits Soil Thermometers Tape Measures Jelly Cups and Lids Micromonolith Cards Hand Lenses Task Card C	45-60 min.	212
V.	Analyzing the Soil Data	Task Card D Pencil (Optional: Plant Identification Books, Picture Keys, etc.)	20-30 min.	213
VI.	Measuring the Slope of the Land	Task Card E 100" Stick or 100 cm Stick Tape Measure Baby Food Jar 1/2 Full of Water	10 min.	214
VII.	Determining Possible Land Uses	Task Cards D, E & F Land Use Data Tables	20 min.	214
VIII.	Communicating Feelings Awareness and Values	Task Card G	30-40 min.	215
IX.	Summary			215

Soil Investigation

Set the stage for this investigation by reviewing quickly what will take place in the allotted time. For example, say: "In this session we will develop some skills in collecting, recording, and interpreting data about soil environments. We will then apply these data in making some decisions about how to use this land."

Note to crew leader: 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. DESCRIBING SOIL

Distribute Task A, page 216, and have the group complete it before going to the study sites. (5 minutes)

II. OBSERVING AND RECORDING THINGS IN THE SOIL

Go on to Task B, page 217.

1. Have participants do Task B, step 1, before going to study site. (5 minutes)

2. Travel to study site. Have participants do Task B, steps 2 and 3. (15 minutes)

Questions and Discussion

Discuss the terms litter, duff, and humus. Have participants pick up samples of litter, duff, and humus from the area they're standing on.

1. "What did you find?"

2. "How do you think the organisms you found affect the soil?"

3. "What might be some reasons for the odors in the soil?"

4. "Under what conditions would you expect to find more or different organisms?"

III. DEVELOPING THE SKILLS TO COLLECT SOIL DATA

Questions and Discussion

Move the group to a soil profile or soil pit.

1. "What do you see as you look at this cross section or profile of soil?"

2. "What are some things we might want to find out about this soil?"

Comment to the group, "The various conditions and characteristics of soil that you have mentioned, such as color, texture, structure, temperature, and acidity and alkalinity (pH), affect the way land can be used. Knowledge of these conditions is essential to land use planning, whether in a forest or in your backyard. We are going to collect, record, and analyze some information about those soil characteristics." Distribute Task C and refer to instructions on the back side.

Discuss and demonstrate how to collect data about the following soil characteristics using the instructions on the back side of Task C. This instructional session is extremely important. The participants need the skills they develop in this session when they collect data for the micromonolith. Demonstrate and discuss what you are doing as you proceed; and draw on the participants for most of the observations. For example, in demonstrating texture you may want to have samples of sand, loam, and clay in cans. Have participants feel these samples before determining the texture of the soil layers in the profile. You may want to demonstrate the use of the pH kit in front of the whole group. Use some foreign material such as cigar ashes, a rotten log, or coffee.

IV. CONSTRUCTING A SOIL MICROMONOLITH

Refer to Task C, page 217. Explain that there is a place to check or record the data collected and a place to sketch how the soil looks.

Display the materials available (jars, jelly cups, baggies, etc.) and demonstrate how they are used to construct a micromonolith. (45-60 minutes)

COLLECTING INFORMATION ABOUT SOIL CHARACTERISTICS

1. *Soil layers* (horizons). Mark where the soil changes color and general appearance. Many soils have three major layers or horizons: top soil, subsoil, and parent material. Because soil formation has many variables, you may find more or fewer layers.

2. *Color.* Describe the color of each major layer, using your own descriptive terms. Moisten soil to get a more accurate color description.

3. *Texture* (how the soil feels). Determine the texture of each major layer. Texture is determined by the feel. Rub a

moistened sample of soil between thumb and forefinger. Spit on sample to moisten, if water is not available.

If it feels very gritty and not plastic--sandy
If it feels smooth and slick; or somewhat gritty and sticky--loamy
If it feels smooth, plastic, very sticky--clayey

4. *Structure* (how the soil is put together in geometric shapes). Determine the structure of each major layer. Carefully break apart a shovelful of soil from each layer and match its characteristics with one of these structure words:

   Blocky

   Columnar

   Granular

   Platey

5. *Temperature.* Determine the temperature of each layer. Use the soil thermometer.

6. *pH* (acidity or alkalinity). Determine the pH of each major layer. Soil pH is an indication of how well certain plants can grow in the soil. Put a small sample of the soil to be tested in a porcelain dish. Do not touch the sample. Use just enough pH reagent to saturate the soil sample. Match the color of the pH reagent at the edge of the soil sample with pH color chart.

Each person should *construct a soil micromonolith* (Task C). A micromonolith is a small model of a soil profile in which samples of each soil layer are attached to a card.

V. ANALYZING THE SOIL DATA

After the group finishes Task C, distribute Task D, page 219. Discuss this task by reading the instructions with the whole group and going over the first task on soil depth. The following soil data tables are also located on the back of Task D. They will be needed for Task D. It may be important to have local plant identification books, picture keys, etc., for use by participants in interpreting the soil data tables. (20-30 minutes)

Questions and Discussion

1. "Using the observed color of the top layer, and Table II, A and B, what did you say about the erosion factor of your soil?"

2. "Using the structure of your soil and Table IV, what did you say about the drainage of water?"

3. "How well did the plants in the study area conform to the soil pH plant chart?"

4. Have groups read how they would set up their own soil pH/plant chart. Point out that soil scientists determine soil pH and record the plants growing in the area to construct a table or chart for use in interpreting soil pH/plant relationships elsewhere.

5. If there is a Soil Conservation Service soil survey report describing local soils available, read its description of the soil just studied. Point out that these reports are prepared from the same information we used. Compare the Soil Conservation Service's description with the participants' descriptions. Usually the descriptions are very similar.

6. "How does this soil description differ from the one you wrote in Task A?"

VI. MEASURING THE SLOPE OF THE LAND

"In addition to the other data we have collected, measurements of the slope of the land are needed in order to discuss possible uses of the study area. If the slope is varied, measurements from several locations may be needed to obtain a more accurate average." Pass out Task E, page 221. (10 minutes)

VII. DETERMINING POSSIBLE LAND USES

"Using the soil data you have collected, the slope measurements, and the land use data tables, determine a land classification and possible use(s) for your study site." Distribute Task F, page 222. (20 minutes)

Questions and Discussion

1. "What recommendations did you make on Task F?"

2. "How do you feel about the present use of this land?"

3. "How could man improve the use of this land?"

4. "What are some uses which could damage the land? What environmental precautions should be taken to minimize the damage?"

5. "How do the things we have done so far relate to making land use decisions?"

6. "How do social, economic and political factors affect the development and use of the land?"

7. "What are some long-range effects of land use decisions on our society?"

VIII. COMMUNICATING FEELINGS, AWARENESS, AND VALUES

After the group has completed Task F or whenever you have time, have them do Task G, page 222. (30-40 min.)

Ask for responses from Task G and discuss.

IX. SUMMARY

1. "What did we find out about the environment in our study today?"

2. "How can we summarize our discussions and investigations?"

3. "How are soil characteristics important in environmental management?"

4. You may want the participants to evaluate the session by writing how they felt about it.

TASK A

Write your own description of soil. Keep this description for reference later.

TASK B (small groups)

1. Predict what you will find in the top few inches (centimeters) of the area to be studied. List your predictions.

2. Select an area about 2 feet (61 cm) square on the ground and sift through the top 3 inches (7.6 cm), recording the evidence of plants and animals you observe. Replace the ground in as near original condition as possible.

Name or description of item in the soil	Quantity	Possible effect on soil

3. The terms litter, duff, and humus are used to describe organic matter at the top of the soil. From your study above, complete the following chart

Term and definition	Describe the feel	List the identifiable parts of plants and animals you found
Litter (identifiable dead things on surface)		
Duff (partially decomposed organic matter - compacted		
Humus (almost completely decomposed nonidentifiable organic matter)		

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TASK C

Using the information on the back of this task, and the available equipment, record your observations below. Make a micromonolith using the materials provided.

Sketch your soil profile, label the layers or horizons, and record the data.

PROFILE SKETCH

DATA

Air temperatures:
3 ft. (91.4 cm) above surface _____
Just along surface _____
Contents of layers above top soil (if existing):
Litter _____
Duff _____
Humus _____
Total depth of layer above top soil _____

Topsoil (a horizon):
Depth _____ in. (cm) to _____ in. (cm)
Color _____
Texture: Sandy _____ Loamy _____ Clayey _____
Structure: Columnar ___ Blocky ___ Platey ___ Granular ___
pH _____
Temperature _____ °F (°C)
Plant roots visible _____

Record below the same information for the other layers.

Describe type of rock in the bedrock (if present).

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COLLECTING INFORMATION ABOUT SOIL CHARACTERISTICS

1. *Soil layers* (horizons). Mark where the soil changes color and general appearance. Many soils have three major layers or horizons: top soil, subsoil, and parent material. Because soil formation has many variables, you may find more or fewer layers.

2. *Color*. Describe the color of each major layer, using your own descriptive terms. Moisten soil to get a more accurate color description.

3. *Texture* (how the soil feels). Determine the texture of each major layer. Texture is determined by the feel. Rub a moistened sample of soil between thumb and forefinger. Spit on sample to moisten, if water is not available.
   - If it feels very gritty and not plastic— sandy
   - If it feels smooth and slick, or somewhat gritty and sticky— loamy
   - If it feels smooth, plastic, very sticky— clayey

4. *Structure* (how the soil is put together in geometric shapes). Determine the structure of each major layer. Carefully break apart a shovelful of soil from each layer and match its characteristics with one of these structure words: Blocky 

   Columnar 

   Granular 

   Platey 

5. *Temperature*. Determine the temperature of each layer. Use the soil thermometer.

6. *pH* (acidity or alkalinity). Determine the pH of each major layer. Soil pH is an indication of how well certain plants can grow in the soil. Put a small sample of the soil to be tested in a porcelain dish. Do not touch the sample. Use just enough pH reagent to saturate the soil sample. Match the color of the pH reagent at the edge of the soil sample with pH color chart.

Each person should *construct a soil micromonolith* (Task C). A micromonolith is a small model of a soil profile in which samples of each soil layer are attached to a card.

TASK D (individuals or small groups)

ANALYZING SOIL DATA

Using the soil data you collected and the information provided in the soil data tables on the other side of this Task, complete the following.

1. On the basis of soil depth, complete the following (refer to Table I).
   The potential of my soil for water storage is _____
   Why? _____

2. On the basis of color, complete the following (refer to Table II).

   a. The top soil, or A horizon:

      Amount of organic material _____
      Erosion factor _____
      Fertility _____

   b. The drainage in the subsurface soil, or B horizon, is: _____
      _____

3. On the basis of texture, complete the following (refer to Table III).

Layer or horizon	Water holding capacity	Looseness of soil
Topsoil A		
Subsoil B		

4. On the basis of structure, complete the following (refer to Table IV).

Layer or horizon	Penetration of Water	Drainage	Aeration
Topsoil A			
Subsoil B			

5. On the basis of pH ranges, complete the following (refer to Table V).

Some plants that could grow here according to the soil pH plant chart	Some plants actually observed growing here

   How well did the plants in the study area check out with the pH you measured?

   Describe in a short paragraph how you would set up an experiment to collect data and construct your own soil pH plant chart.

6. On the basis of the soil temperatures, complete the statement below (refer to Table VI). The plants on my soil have _____ growth taking place now. I predict that in 3 months the growth conditions of the soil, on the basis of soil temperature, will be _____.

7. Write a soil description about this soil using the words from the data you collected and recorded on the soil micromonolith card. Compare this description with the one you wrote at the beginning of the session.

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SOIL DATA TABLES

TABLE I. RELATIONSHIPS OF SOIL DEPTH TO PLANT GROWTH AND WATER STORAGE

Soil Depth	Water Storage
Deep Soil (over 42" or 1.1 m.)	Excellent water storage and plant growth
Mod. Deep Soil (20"-40" or 0.5-1.1 m.)	Good water storage and plant growth
Shallow Soil (20" or less and under)	Poor water storage and plant growth

TABLE II. SOME RELATIONSHIPS OF COLOR TO SOIL CONDITIONS

A. TOPSOIL (A HORIZON)

Condition	Color		
	Dark (dark grey brown to black)	Moderately dark (brown to yellow brown)	Light (pale brown to yellow)
Amount of organic material	High	Medium	Low
Erosion factor	Low	Medium	High
Aeration	High	Medium	Low
Available Nitrogen	High	Medium	Low
Fertility	High	Medium	Low

B. SUBSURFACE SOIL (B HORIZON)

Subsurface soil color	Condition
Dull grey (if in low rainfall soils 0-20")	Water-logged soils, poor aeration
Yellow, red-brown, black (if in forest soils)	Well-drained soils
Mottled grey (if in humid soils)	Somewhat poorly to poorly drained soils

TABLE III. SOME EFFECTS OF TEXTURE ON SOIL CONDITIONS

Texture	Water holding capacity	Looseness of soil
Sandy	Poor	Good
Loamy	Good to excellent	Good
Clayey	High (water held too tightly for plant use)	Poor

TABLE IV. SOME EFFECTS OF STRUCTURE ON SOIL CONDITIONS

Structure	Penetration of water	Drainage	Aeration
Columnar	Good	Good	Good
Blocky	Good	Moderate	Moderate
Granular	Good	Best	Best
Platy	Moderate	Moderate	Moderate

TABLE V. RELATIONSHIPS OF SOIL pH TO PLANT SPECIES

3.5	4.5	6.5	7	8.5	14
(3.5 to 4.5 is too acid for many plants)		(Most plants do best here)		(8.5 to 14 is too alkaline for most plants)	

Some examples of soil pH plant indicators:

pH 4.0-5.0: Rhododendrons, camellias, azaleas, blueberries, some ferns, hemlocks, some pines and spruces.

pH 5.0-6.0: Some pines, firs, holly, [illegible], some spruce, oaks, birch, yellow, rhododendron.

pH 6.0-7.0: Maple, mountain ash, peney, asters, beaches, carrots, lettuce, pines, firs, ash, basswood elm, yellow poplar.

pH 7.0-8.0: Mock orange, asparagus, sagebrush, red-cedar.

Note: These relationships may vary slightly in different environments.

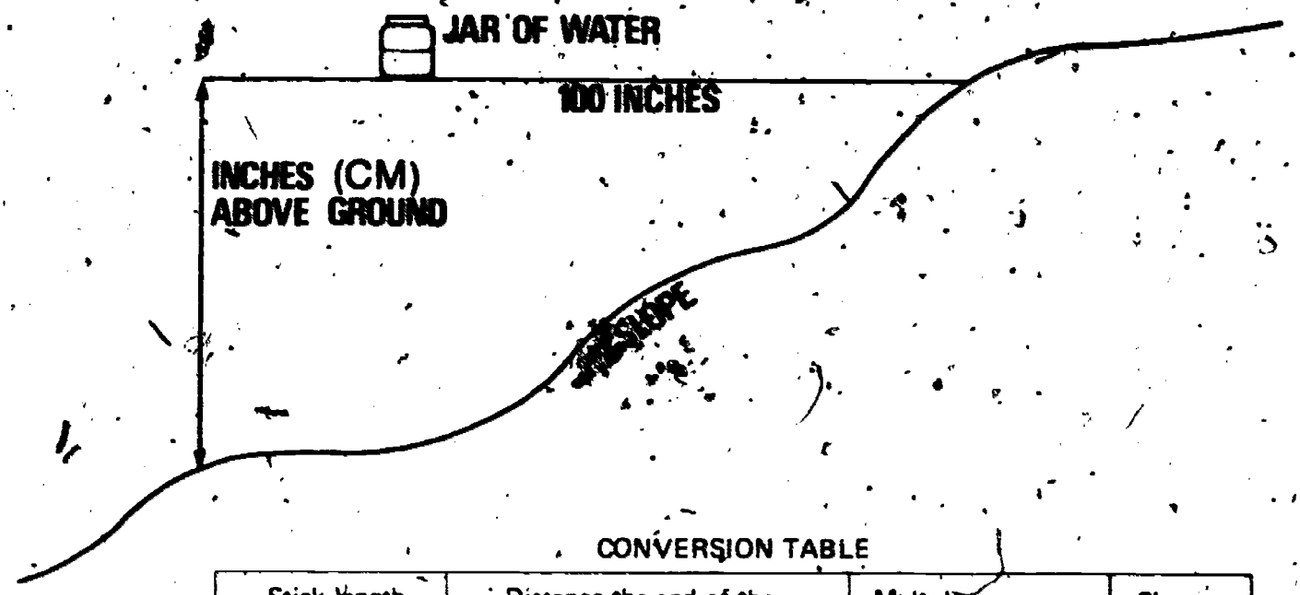
TABLE VI. SOME RELATIONSHIPS OF SOIL TEMPERATURE TO PLANT GROWTH

Soil temperature	Plant growth during growing season
Less than 40°F (4.4°C)	No growth, soil bacteria and fungi not very active
40°F – 65°F (4.4°C – 18.3°C)	Some growth
65°F – 70°F (18.3°C – 21.1°C)	Fastest growth
70°F – 85°F (21.1°C – 29.4°C)	Some growth
Above 85°F (29.4°C)	No growth

TASK E

MEASURING THE SLOPE OF THE LAND

1. Select a place that represents the average slope of the land being studied or take several measurements and average them.
2. Place one end of a 100-inch (100 cm) stick on the slope you want to measure. Hold stick so it is about level. If you use a different length stick, then correct by using the conversion table.
3. Place a jar with some liquid in it on the outright stick. Raise or lower the stick until level.
4. Measure the number of inches (centimeters) the free end of the stick is off the ground.
5. The number of inches (centimeters) is the slope of the land in percent.
6. Repeat the above steps in several different areas to get an average slope of the land being investigated.



CONVERSION TABLE

Stick length (inches)	Distance the end of the stick is above the ground	Mult. by conversion factor	Slope %
100 in. (cm)	_____ in. (cm)	x 1 =	_____
50 in. (cm)	_____ in. (cm)	x 2 =	_____

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TASK F (small groups)

DETERMINING POSSIBLE LAND USES

Man's great diversity of land uses requires different sets of criteria that analyze a variety of soil and land factors in different ways. These factors must be considered in determining the most appropriate land use for a given area. The most limiting soil factor will be the major influence in determining the best use of the land. See the Land Use Data Tables for definition of limiting soil factor.

Using the data from Tasks D and E and from the Land Use Data Tables, answer the following questions.

According to the Land Use Data Tables, this land could be used for:

1. Agriculture (list and explain why):

2. Occupancy land uses
   - Roads and streets
   - Building sites
   - Septic tank filter fields
   - Picnic and camp areas

I feel the best uses of this land would be: _____

_____

Why? _____

TASK G (individuals or small groups)

In addition to the factors we have collected information about today, list others that influence the way land is used.

Factor	Who Is Involved	Influence On Land

Select one or two of the above factors and describe what you might do to become involved in determining how the land will be used in your backyard, community, county, etc.

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LAND USE DATA TABLES

AGRICULTURAL USES

Directions: Circle the item in each of the five columns below that best describes each of the five soil factors in the soil you studied. The most limiting soil factor will determine the best agricultural use of the land. A limiting soil factor can be defined as something that will restrict the use of land for desired activities. The most limiting factor indicates the most appropriate agricultural use.

SOIL FACTORS					Agricultural Uses
Slope (%)	*Erosion Hazard*	*Soil Depth*	*Drainage*	*Texture*	
0-3	None	Deep	Good	Loam or silt loam*	Farm crops—cultivation good soil mngmt. practices
3-20	Slight to moderate	Mod. deep	Somewhat poor	Sandy loam or silty clay	Farm crops—few to several special cultivation practices
20-30	Severe	Shallow	Poor	Sand or clay	Occasional cultivation, many special practices
0-2	None to slight	Deep	Good to poor	Stony	Pasture-woodland cultivation; no machinery can be used
30-90	Very severe	Deep to shallow	Good to poor	Sandy, loamy, clayey or rocky	Pasture, timber growing, woodland, wildlife, no cultivation machinery
all	None to extreme	Deep to shallow	Excessive to poor	Rockland, river wash, sand dunes	Wildlife, recreation

*Loam is a combination of sand, silt, and clay particles.

Occupancy land uses

Select the most limiting factor for each land use and record the overall limitation (slight, moderate or severe) on Task F.

Land Uses and Factors Affecting That Use	*Slight Limitation*	*Moderate Limitation*	*Severe Limitation*
Roads and Streets			
Slopes	0-12%	12-30%	Over 30%
Depth	Over 40 in.	20-40 in. (50.8-101.6 cm)	Less than 20 in.
Watertable	Over 20 in.	10-20 in. (25.4-50.8 cm)	Less than 10 in.
Building Sites			
Slopes	0-12%	12-20%	Over 20%
Depth	Over 40 in.	20-40 in. (50.8-101.6 cm)	Less than 20 in.
Watertable	Over 30 in.	20-30 in (50.8-76.2 cm)	Less than 20 in.
Septic Tank Filter Fields			
Slope	0-7%	7-12%	Over 12%
Depth	Over 6 ft.	4-6 ft. (121.9-182.9 cm)	Less than 4 in.
Watertable depth below trench	Over 4 ft.	2-4 ft. (61.0-121.9 cm)	Less than 2 ft.
Picnic and Camp Areas			
Slope	0-7%	7-15%	Over 15%
Stones	0-20%	20-50%	Over 50%
Watertable during season of use	Over 30 in.	20-30 in. (50.8-76.2 cm)	Less than 20 in.

ANIMAL INVESTIGATION

MATERIALS LIST(FOR A GROUP OF 10 ENROLLEES)

GOLDEN NATURE GUIDES - ZOOLOGY, MAMMALS, FISHES, REPTILES, AND AMPHIBIANS

BINOCULARS

SPOTTING SCOPE(OPTIONAL)

ANIMAL TASK AND DATA CARDS - 10 SETS

4 OR 5 EACH OF ANIMALS SKULLS, SKINS, STUDY MAMMALS, BIRDS, OR PICTURES OF THE DIFFERENT PARTS OF ANIMALS(FOR OPTIONAL ACTIVITIES)

ANIMALS

This investigation will help enrollees collect and interpret information that will help them identify some relationships that exist between animals and their environment in your area. It also provides an opportunity to move into a discussion of the impact of population on the environment since we, too, are animals and react in the same way that other animals react.

The entire investigation could be completed at one time or over a longer period, completing one or more tasks during a daily EA session. Review the purpose and general procedures with enrollees before beginning the tasks. (Note: Animal materials such as skulls and skins can usually be obtained from local fish and game departments, natural history museums, and universities, if your request is made long before the material is needed. If this material cannot be obtained, photos of the various materials can be used effectively.)

Some Objectives

Behavioral Outcomes in Terms of Knowledge: As a result of these activities, you should be able to:

a. Identify and describe three different habitat types.

b. Identify and describe six different animal adaptations.

c. Construct a diagram of a food chain or an energy cycle using the evidences of animal life observed.

d. Describe possible adaptations of certain animals that enable them to live in a particular environment.

Behavioral Outcomes in Terms of Feelings, Awareness, Values and Action: As a result of these activities, each participant should be able to:

a. Evaluate one habitat for a particular species of animal.

b. Describe three things that come down in everyday life that will make the energy cycle and consumer habits more efficient and that will cause the least amount of harm to the ecosystem.

c. Design and sketch an animal well adapted to a particular habitat.

Activities List

Activity	Materials Needed	Approximate Time	Page
I. Observing and Measuring Animal Sightings and Evidence	Task Cards A & B Binoculars Field Guides, etc.	1-1 1/2 hr	229
II. Comparing Habitats	Paper Pad Pencil	45-60 min.	229
III. Observing and Discussing Animal Adaptations	Task Card C	30 min.	230
A. Optional Activities			
1. Animal Adaptation	Skulls Skins, or photos of such Field Guides	20 min.	
2. Classifying Tooth and Mouth Adaptations for Food Use	Skulls or photos	20 min.	
IV. Exploring Relationships Between Animals and Some Environmental Factors	Task Cards D, E & F Field Guides	1 hr	233
V. Discussing Changes in Animal Habitats	Task Card G	1 hr	234
VI. Communicating Feelings, Awareness, and Values	Task Card H	15 min.	234
A. Optional Activity			
1. Designing a Model Animal	Pad Pencil	30 min.	
VII. Summary		30 min.	235

Investigating Some Animals and Their Environment

Set the stage for this investigation by reviewing quickly what will take place. For example, say: "During this session we will collect and interpret information that will help us identify some relationships that exist between animals and their environment in this area."

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. OBSERVING AND MEASURING ANIMAL SIGHTINGS AND EVIDENCE

Questions and Discussion

1. "What animals would we expect to find living in this area? (Vertebrate, invertebrate)
2. "What are the needs of these animals?"
3. "What are some names of the places where animals live?"
4. "Where would you look for animals around here?"
5. "What habitat conditions exist in this area that would be important to the animals?" (Vegetation, soils, moisture relationships, temperature)
6. "What evidence might we find that animals have been here?" (Sightings, sounds, smells, tracks, droppings, nests, burrows, partially eaten food)
7. "What are some guidelines that we need to consider so our investigation will cause the least impact on the environment?" List on task A.

Pass out Task A, page 237 and go over instructions. Allow 30 minutes, then discuss it with the enrollees.

II. COMPARING HABITATS

Pass out Task B, page 239 and go over instructions. (30-45 minutes) Have the group use the area used in Task A as one habitat if they want to.

Questions and Discussion

1. "What habitats did you explore?"

2. Break into three groups and have each group put the data for one habitat from Task B on a large piece of paper. Have each group put their display up and report on it (characteristics, animals there, or evidence). Use three different habitats. Record responses on board.

3. "What could account for the differences and similarities of the habitats?"

4. "What are some other animals that might live in the different habitats?"

5. "After looking at this information and our discussions, what can we say about habitats?"

III. OBSERVING AND DISCUSSING ANIMAL ADAPTATIONS.

"Animals are adapted to their environment in many ways. What characteristics of an animal would we look at in determining why it lives in a particular habitat?"

Pass out Task C, page 239 and go over instructions. Discuss Task C when group has finished. (20-30 minutes)

Optional Activities

If appropriate, during these activities say something such as: "The purpose of these activities is not necessarily to name the animals although many of you know them from past experience. The purpose is to observe the different parts of animals up close and to make some inferences about where they live, what they eat, etc. If you are interested in the names of these animals, there are specific books on animal identification.

1. Animal Adaptation (20 minutes)

This activity can be done with the actual animal parts (skulls, pelts, stuffed mammals, and birds) or by using pictures of different animals cut or copied from encyclopedias, national wildlife magazines, Golden Nature Guides, Peterson field guides, etc.

Put the following parts of animals into separate piles and have about three or four participants around each pile.

5-6 skulls (carnivores, omnivores, herbivores)
5-6 study specimens (weasel, skunk, mole, chipmunk)
5-6 pelts (bobcat, coyote, fox, other raccoon)
5-6 birds (woodpecker, grossbeak, flicker, bluejay, hummingbird)

a. Adaptations of one part of an animal

Tell participants to list any types of adaptations that they can observe that will help infer: What type of habitat the animal might live in, where in the food chain it might be, and where this animal might live in the environment (names of animals are not important). Each group will then report their findings to the other groups.

At the end of each presentation, ask any questions that might draw more information out of the group. For example, if the group didn't infer that the coyote and fox had developed the sense of smell, sight, and hearing because of a long nose, forward eye sockets and large ears, ask the group: "On the basis of observable characteristics, which senses do you think have been highly developed in these two animals?" (If groups ask you questions about animal's names, etc., tell them to wait until we try to put some of the different group's reports together.)

b. Matching pelts and skulls

Put three or four skulls and the matching pelts or study specimens in the center of all four groups. Tell them, "Would somebody please match the skulls with the other parts of the animals?" Let the group solve the task without help from the facilitator.

After they have finished this part, say: "Each group had only part of an animal, so, on the basis of observable characteristics, they could only make certain inferences. Now, by adding another part of the animal and by pooling each group's observations, we know more about the animal."

c. Constructing a food chain using animal parts

"Let's try something else." Put the mole, chipmunk, weasel, and coyote skulls and bobcat skin in a pile. Tell them, "Would somebody build a food chain from these parts of animals." After they have done that, say, "We have now put more data together to further interpret our information about these animals." Perhaps let each person draw or sketch the food chain.

2. Classifying Tooth and Mouth Adaptations for Food Use (20 minutes)

a. Developing a key

Give each group of five to eight a group of four to six skulls to classify. Among the skulls to classify it is desirable to have those from carnivores (fox, bobcat), herbivores (muskrat, chipmunk), and omnivores (bear, racoon).

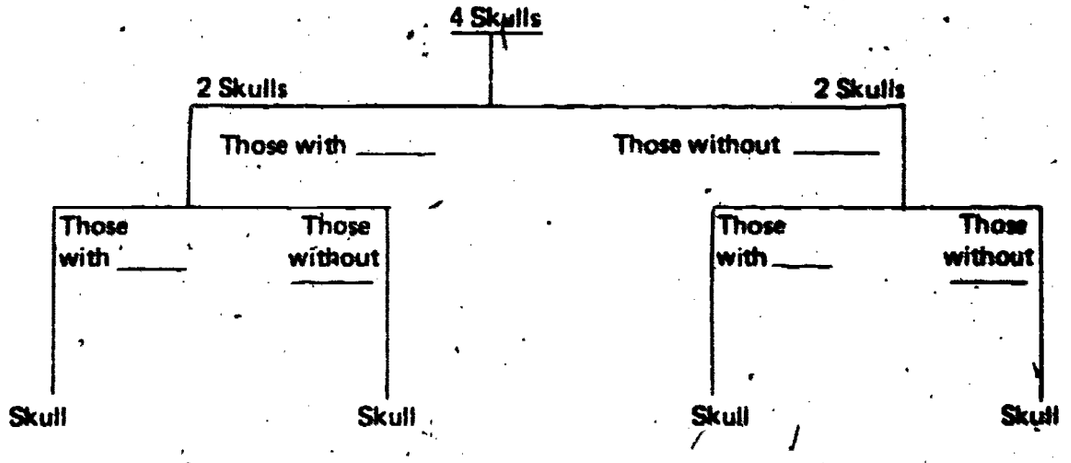
Instructions:

-"Observe the skulls that you have been given. Look at the characteristics of their teeth and/or mouth."

-"Place the skulls into two piles on the basis of similarity and difference of their tooth or mouth characteristics. Try to use observations rather than inferences."

-"Make a large key on flip chart paper, starting with the two piles that you've made. Write the reason for the two piles you've made."

-"Continue to divide the two piles into two more piles and write the reason. Continue dividing the skulls until each has been singled out."



-"Leave your skulls and key and rotate to a key which another group has made. Try to place their animal skulls in the appropriate places on their key."

b. Grouping skulls by tooth structure

"Using the observations you made in developing your key, place the skulls in the three following categories:"

-Mainly shearing back teeth that cut like scissors--carnivore (meat-cutting).

-Mainly grinding back teeth, like human back teeth-herbivore (plant-eating).

-Both grinding and shearing back teeth, or teeth modified to do both cutting and grinding--omnivore (plant- and meat-eating).

IV. EXPLORING RELATIONSHIPS BETWEEN ANIMALS AND SOME ENVIRONMENTAL FACTORS

Food Chains

"One relationship among animals living in a particular environment is a food chain showing what animals eat and who eats them."

1. "What characteristics of an animal would we look at to determine what it eats?"
2. "What characteristics of an animal would we look at to determine what other animals eat it?"
3. "What do we mean when we talk about predator/prey relationships?"

Pass out Task D, page 240 and go over instructions. (10 minutes)

Questions and Discussion

1. Have groups share their food chains.
2. "How can numbers of animals help you determine an animal's position in the food chain?"
3. "How can animal adaptations help you determine an animal's position in the food chain?"

Energy Cycle

1. "Food chains illustrate the movement of energy through a portion of the environment."
2. "What do you think would happen to the food chain if that was the extent of energy flow in the environment?"

Pass out Task E, page 240. (15 minutes)

3. "Think about the diagram in Task E; place the appropriate organisms from your habitat in the appropriate places and draw arrows."

Questions and Discussion

1. "What is the function of each part of the energy cycle?"
2. "What do you think would happen if the group you selected was removed from this ecosystem?"
3. "How does the energy cycle relate to a food chain?"

4. If no one talked about the decomposers, ask what they think would happen if that group were eliminated.

Relationship of Animals to the Environment

1. Pass out Task F, page 241 and animal data cards. Animal data cards are on the back of Task F. "Select one animal of your choice or use one of the animal cards and evaluate the area as to the suitability of the area for that animal." Ask people to take different animals so the area is evaluated for a variety of animals. Have reference guides to get information about different animals.

2. "Many times we use only our own value system in evaluating things for other people or purposes. It may help you, therefore, to do this task for the animal you picked by assuming the role of that animal." (30 minutes)

Questions and Discussion

1. "What do you think are some of the relationships among animals that live in this area?"

2. On the basis of our observations and discussion so far, how can we summarize the relationship between animals and their environment?"

V. DISCUSSING CHANGES IN ANIMAL HABITATS

Questions and Discussion

1. "Are habitats always the same?"

2. "What kinds of influences can cause changes?"

Pass out Task G, page 243. (10 minutes)

Questions and Discussion

1. Have individuals read their descriptions and compare different descriptions.

2. What evidences did you find that show man's influence in this area?

VI. COMMUNICATING FEELINGS, AWARENESS, AND VALUES

Go on to Task H, page 243. (10-15 minutes)

Ask for responses from Task H and discuss.

Optional Activity--Designing a Model Animal

"In our investigations today we have discussed some adaptations that animals have for living successfully in their environment. Let's put these adaptations together and design a model animal to live in one habitat found here."

Instructions: "Working in pairs, design a model animal that you feel would be best adapted to one habit found here. When you have finished, give your animal a name that seems to sum up its characteristics."

"Consider the following ideas in your sketch and identify the parts of the animal that you designed for the items listed below and any other items you consider:"

1. Adaptations for food gathering
2. Adaptations for defense, protection
3. Adaptations for seasonal changes
4. Major foods required (kind and amount)
5. Amount of habitat required for needs
6. Value of animal to environment.

VII. SUMMARY

1. Discuss results of Task H.
2. "What did we find out about animals in our field study session today?"
3. "Why are animals important in the environment?"
4. "How can we summarize our discussion and investigations today?"
5. "What methods and processes did we use in our investigations today?" (This may be useful for the first field session to identify processes used in the investigation.)
6. You may want the participants to evaluate the session by writing how they felt about it.

TASK A (individuals or small groups)

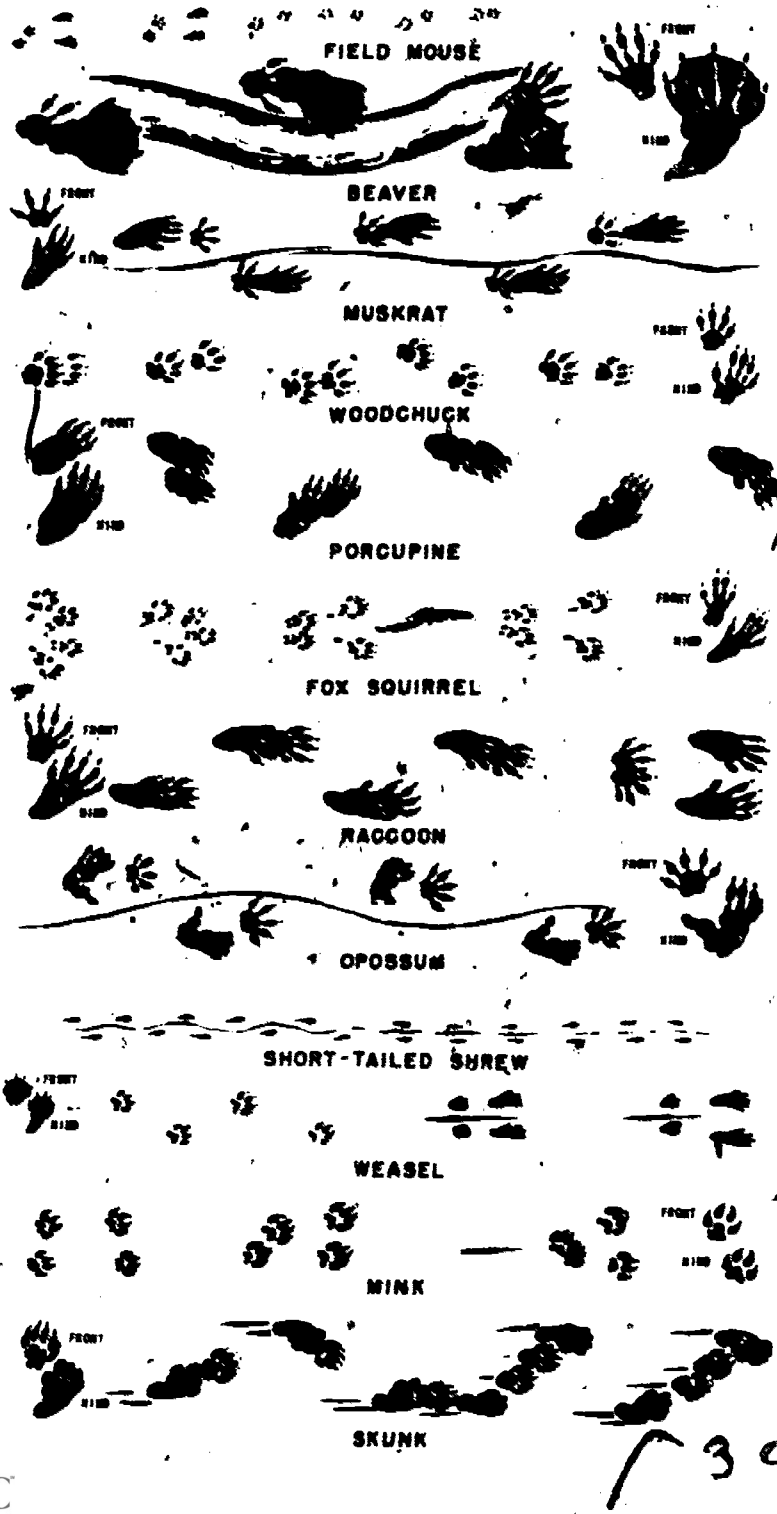
1. List guidelines to use in minimizing the impact you will have on the environment while doing this task.

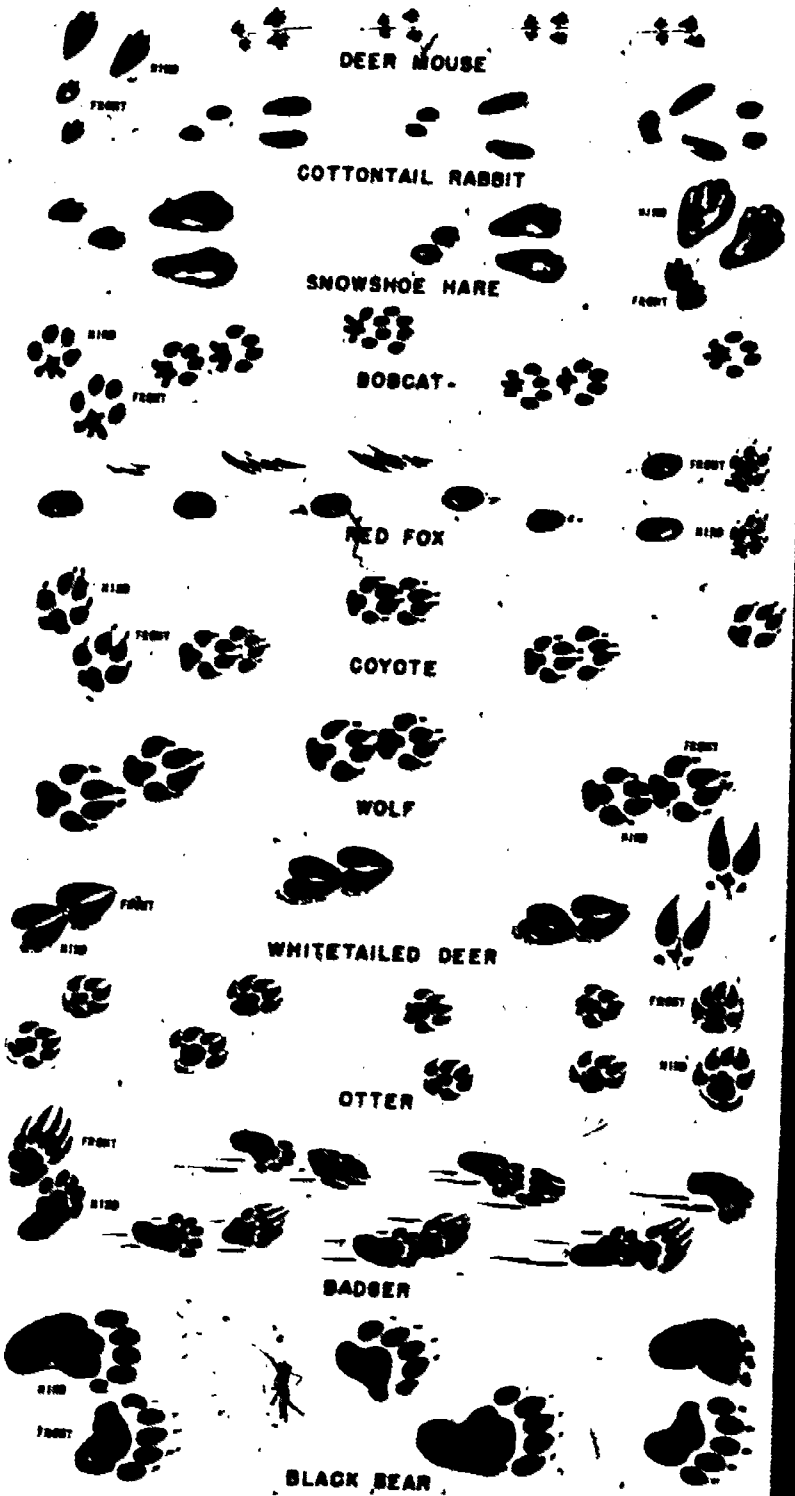
2. Explore as many places as you can from _____ to _____, and record any animals or evidence, or signs of animals (feathers, nests, scat, tracks, partly consumed food, etc.) and the numbers of each.

3. Observe and list different habitats for animals in the area (grass, cultivated fields, hedges, etc.)

4. List animal foods observed in the area.

ANIMAL INVESTIGATION Task Card
Forest Service
Revised 1977


FIELD MOUSE
BEAVER
MUSKRAT
WOODCHUCK
PORCUPINE
FOX SQUIRREL
RACCOON
OPOSSUM
SHORT-TAILED SHREW
WEASEL
MINK
SKUNK


DEER MOUSE
COTTONTAIL RABBIT
SNOWSHOE HARE
BOBCAT
RED FOX
COYOTE
WOLF
WHITETAILED DEER
OTTER
BADGER
BLACK BEAR

TASK B (small groups)

1. Select three different habitats in this area and record the data in the chart. Give each habitat a name based upon the characteristics that you record.

Habitat	I	II	III
Characteristics			
Name of Habitat			
Name and numbers of animals or evidence			

2. What could account for the similarities and difference among habitats?

TASK C

List some things about the animals in this area that would enable them to live here.

Think about the characteristics, traits, and adaptations of the animals you have found in this area or that we would expect to find living here.
Fill in the following chart.

Animal	Things that enable them to live here (characteristics, traits, adaptations)	How it helps them live here
1.		
2.		
3.		
4.		
5.		

ANIMAL INVESTIGATION Task Card
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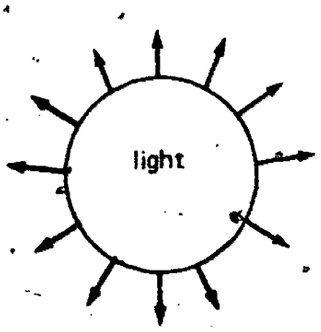
TASK D

Using the information from Tasks A and B, construct at least a five-stage food chain that shows predator/prey relationships.

TASK E

List the animals or their evidences you have seen in the appropriate places in this diagram. ***Put in arrows.*** What other words and ways can you think of to illustrate a similar cycle?



Plants

Herbivores
(plant eaters)

Nutrients

Carnivores
(meat eaters)

Death

Decomposers
(bacteria, fungi)

What would happen if the group were eliminated?

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TASK F

Working with another person, evaluate this area for one animal. Fill out the animal data card below before doing the task, or use the data for one animal on the back of this card.

Animal Data

ANIMAL _____

Where it lives _____

Food needs _____

Predators _____

Other (adaptability to man, life span, reproduction rate, etc.) _____

_____

1. How would you rate the area for the animal's following needs:
   a. General habitat _____
   b. Winter and summer food supply _____
   c. Evidence of predators for your animal _____
   d. Other factors _____
2. How many of your assigned animals or their evidences did you find in the area?

   List some relationships you think exist among the animals of the same species already living there.

   How might the animals react to others of the same species moving in?
3. Which of the habitat types will these animals use?

   Where will they probably locate home, nest, den or burrow? Why?
4. What are some ways that this species of animal affects this environment?
5. Summarize how the animal assigned to you might react to living in this environment.

ANIMAL INVESTIGATION Task Card
Forest Service
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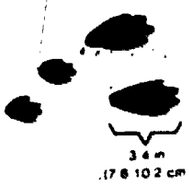
Evidence

COTTONTAIL RABBIT



Droppings small 1/8"-1/4" (.3-.6 cm) diameter, tan to brown, round, glossy.

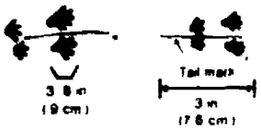
Burrows hidden in brushy places. Small 4"-6" (10.2-12.7 cm) diameter.

Narrow well-worn trails and resting forms under brush clumps.

Small twigs eaten and bark showing teeth marks near to ground level.

Evidence

DEER MOUSE



Droppings small 1/10"-1/8" long, oblong, shaped like rice grains.

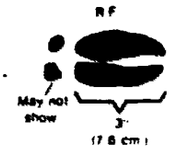
Burrows 3/4"-1" (1.9-2.5 cm) diameter in the ground under fallen logs. Nests may be found in old buildings, in stumps, or even in standing dead trees. Usually grass and down construction.

Empty seed hulls from pine, spruce and fir units, acorns.

Bones found in owl pellets and droppings of predators.

Evidence

MULE DEER



Scat: Roundish pellets about 1/4" (0.6 cm) diameter, from black to tan in color, usually a dozen or more in one place.

Hair on fences, hollow logs, and trees, gray brown.

Hoof scrape tracks on fallen logs

HABITAT Brushy thickets with openings. Woodland areas with open sunlit patches, cover to hide in, and with winter food supply important. Weed cover and brushy fence rows good habitat areas.

FOOD NEEDS: (summer) Many green, succulent plants, weed seeds, grass. (winter) Small twigs and bark. Birch, willow and sumac used.

POPULATION: One rabbit per 4 acres (2 hectares) is considered a good population. Two rabbits per acre is considered high.

PREDATORS:
On adult and young: Most four-footed, winged, and reptilian predators, plus man.

HABITAT Nearly every dry-land habitat is occupied somewhere by this species. Forests, grasslands, deserts, or combinations of the above.

FOOD NEEDS Seeds, nuts, acorns, insects. Stores food for winter.

POPULATIONS 5-10 mice per acre (1/2 hectare) is considered normal. 10-15 mice per acre is considered high.

PREDATORS Owls, hawks, coyotes, bobcats, house cats, fox, skunks, weasel, snakes, almost all meat eaters

HABITAT Conifer forests, desert shrub, chaparral, grassland with shrub, hardwood forest if browse plants present

FOOD NEEDS Shrubs and twigs most of the year, grass in spring. Favored foods include new growth of bitterbrush, mountain mahogany, chokecherry. Will also eat sagebrush, juniper, pine and fir boughs

POPULATION Variable density. May be 10-50 per sq. mile on winter range. 2-4 deer per square mile (0.6 square km) in summer

PREDATORS Man, dog, cougar, coyote, wolf

TERRITORIALITY Gregarious in winter (can live together)
LIFE SPAN 2-10 years.
OFFSPRING One or two fawns per year
COMPATIBLE WITH MAN

Evidence

COYOTE


(outer toes larger)

DOG


(front toes larger)

Dog-like droppings with hair, often light colored.

Partially consumed remains of animals, leg bones broken.

Dens under trees, rocky areas, logs, with openings 1'-1.5' (.3-.5 m) in diameter.

Evidence

RACCOON

Dens in hollow trees, caves, logs, ground burrows. Opening 1' (.3 m) diameter.

Scat loose, often found on logs, and often contain shells of crayfish, fresh water clams, seeds, etc.

Evidence

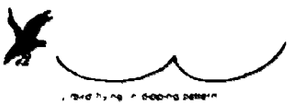
WOODPECKER

The sound of tapping or drumming.

Drill holes in dead trees, logs, fence posts, and telephone poles.

Nests in 1.5"-3" (3.8-7.6 cm) diameter holes in trees, posts, etc.

Sightings of black and white birds that show a "dipping" flight pattern.



HABITAT Prairies, desert, open woodlands, brushy and boulder-strewn areas. Usually not more than 6 miles (9.6 km) from water.

FOOD NEEDS Small rodents, rabbits, mice, almost any weak or old animal, the young of most animals, vegetation, carrion, almost anything

POPULATIONS One per sq. mile where found. Hunting route = about 10 miles (16.9 km)

PREDATORS On young: bobcats eagles; dogs. On adults: man

LIFE SPAN 2-10 years
OFFSPRING One litter of 5-10 pups. year
QUITE TERRITORIAL
COMPATIBLE WITH MAN

HABITAT Wooded areas along streams and lakes, corn fields

FOOD NEEDS Principally fruits, nuts, grains, insects, crayfish, bird eggs, almost anything

POPULATION One animal per 15 acres is considered high. Depends on food supply.

PREDATORS Man, dog, coyote.

TERRITORIALITY Not a strongly territorial animal.

LIFE SPAN 10-14 years
OFFSPRING One litter/year. Average of four/litter
DOES NOT TRULY HIBERNATE
COMPATIBLE WITH MAN
OTHER Meat edible, animal primarily nocturnal, valuable furbearer

HABITAT Forests with some dead trees may use telephone poles, old buildings, etc.

FOOD NEEDS Eats wood-boring insects, grubs, wood ants, insects.

POPULATION About one pair of woodpeckers for every 40 acres (16.2 hectares) of forest land is average.

PREDATORS (Almost no animals bother woodpeckers.) Opossums, snakes, and some kinds of birds may eat their eggs.

TERRITORIALITY Often defend their territory against other woodpeckers.

OFFSPRING Woodpeckers lays 3-8 eggs each year

COMPATIBLE WITH MAN

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TASK G

Describe in writing three influences that you observed that have changed the habitats in this area and the cause and effect relationships that occurred.

Consider:

a. Evidence of change, influence that cause it
b. What the area may have looked like before the change occurred and the animals that lived there then
c. What the area looks like now and what animals live there
d. How the change affected the habitat and the animal species that did and do live there.

TASK H (individuals or small groups)

In addition to the factors we have collected information about today, list others that affect the wildlife and their habitat.

Factor	Who Is Involved	Influence on Animal

ANIMAL INVESTIGATION Task Card
Forest Service
Revised 1977

LAND USE SIMULATION

MATERIALS LIST(FOR A GROUP OF 10 ENROLLEES)

10 SETS OF TASK CARDS

BLACKBOARD AND CHALK OR EASEL AND MARKERS

NEWSPRINT OR BUTCHER PAPER(ENOUGH FOR EACH GROUP TO MAKE VISUAL DISPLAY)

MASKING TAPE

MARKERS(4 COLORS FOR EACH GROUP TO MAKE VISUAL DISPLAY

LAND USE SIMULATION

Simulations are operating models of real life situations usually involving participants in roles that are acted out to correspond to the functioning of some real process or system. These included are based on environmental issues where people are forced to evaluate the consequences of decisions in discussion or on paper before these decisions can be carried out.

This activity will not only develop understandings about problems in the environment and develop awareness and concern about these problems, but help people develop skills they need for citizen action and involvement in environmental management.

Two simulations have been included. Centerplace City is based on a hypothetical situation. The Cispus River Land Management Plan is based on actual resource information. Using the Cispus format a simulation could be developed for your local area by getting appropriate information from the local agency sponsoring your YCC camp.

Some Objectives

Behavioral Outcomes in Terms of Knowledge: 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/her own simulation game based on a current environmental issue.

c. Name and describe at least ten 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 specific problems.

Behavioral Outcomes in Terms of Feelings, Awareness, Values and Action: 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.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Naming, Recording and Classifying Possible Land Use	Task Card A Chalkboard or Easel Felt Markers Masking Tape	20 min.	249
II.	Developing and Giving Presentations	Task Card B Chart Paper Felt Markers Task Card C for Board Members Masking Tape	60-90 min.	250
III.	Analyzing Characteristics of Simulations		30 min.	252
IV.	Developing Your Own Simulation Game	Task Card D Newspaper Article	45 min.	252
	A. Optional Simulation Game		60 min.	

Cispus River Area Land Management Plan, Randle, Washington

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 decision-makers 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, page 255. 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."

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*. Change 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, page 256. 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.

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, page 257 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.

   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, page 258.

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 decision-making skills in environmental management?"
4. "How can we take this process and use it to involve the public in social and political decision-making 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."

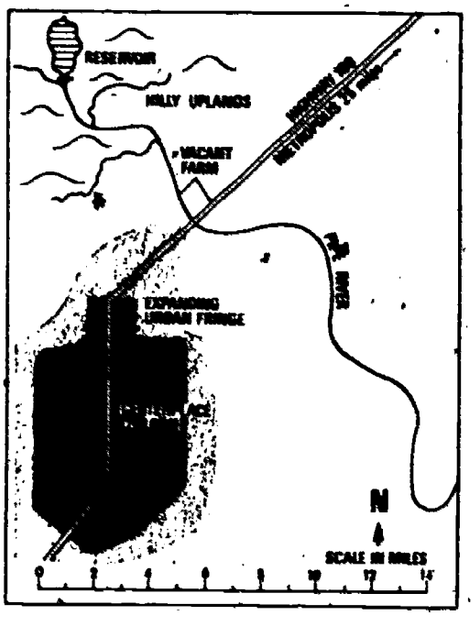
TASK A (Individuals)

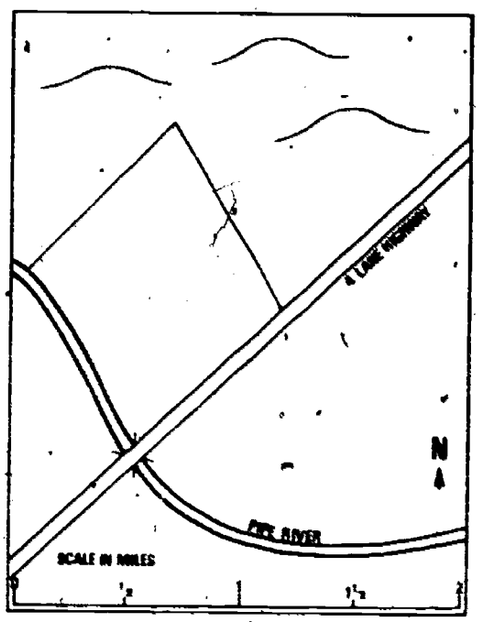
"One square mile (640 acres or 259 hectares) of unused county farmland, 4 miles (6.4 k) northeast of the city, is now available for the city's use."

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.

LAND USE SIMULATION Task Card
Forest Service
Revised 1977

TASK B (in groups)

Group _____ Assigned Category of Land Use _____

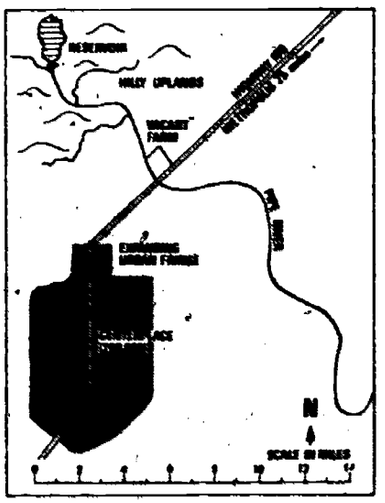
Your only task is to analyze and list possible consequences of different land uses within your assigned land use category. Do not decide which is the best use.

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.



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 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.

LAND USE SIMULATION Task Card
Forest Service
Revised 1977

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.).

HUMAN COMMUNITY (urban) INVESTIGATION

MATERIALS LIST (FOR A GROUP OF 10 ENROLLEES)

10 SETS OF TASK CARDS

MAPS OF THE URBAN AREA TO BE INVESTIGATED

BLACKBOARD OR NEWSPRINT AND EASEL

MARKERS OR CHALK

PAPER AND PENCILS

HUMAN COMMUNITY

"Investigating a Human Community" looks at patterns of land use and constructs a procedure to investigate one part of the local community. Data are collected and analyzed to determine specific issues or concerns of the human community. An action plan is developed to implement solutions and recommendations to solve the identified concerns. This is a lengthy investigation. It is important to do each step in sequence, however this investigation can be accomplished over a period of time.

Some Objectives

Behavioral Outcomes in Knowledge: As a result of these activities, each participant should be able to:

a. Identify at least five different land use categories in an urban environment.

b. Construct a data-collecting and recording tool for some part of an urban environment for data that is observable, collectable, and recordable.

c. Describe a procedure to use in initiating an urban environmental investigation.

d. Identify at least three component parts of an urban environment.

e. Describe four interrelationships that exist among component parts of the environment.

Behavioral Outcomes in Feelings, Awareness, Values, and Action: As a result of these activities, each participant should be able to:

a. Analyze factors and alternative solutions to present condition in an environment.

b. Identify forces and change agents that can be used for or against the improved livability of the area.

c. Describe what he or she can do to become involved in community action programs of identifying and suggesting solutions to local environmental problems.

d. Describe how he or she and the community can become involved in affecting the local political decision-making process through environmental urban investigations.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Becoming Familiar with the Community	Maps of Area to be Investigated Flip Chart Markers	30 min.	263
II.	Identifying and Focusing on Land Use Patterns and Interrelationships	Maps of Area Flip Chart Markers	45 min.	263
III.	Identifying and Analyzing Topic for Investigation	Task Card A Maps of Area Flip Chart Pencils Markers	1 1/2-2 hrs	264
IV.	Conducting the Investigation	Paper Flip Charts Pencils Markers	3 hrs	266
V.	Preparing and Reporting on the Investigation	Flip Charts Markers	1 hr/prep time 10 min. per presentation	266
VI.	Analyzing Factors and Alternatives to Present Conditions	Task Card B Pencils Flip Chart Markers	1 1/2-2 hrs	267
VII.	Developing an Action Plan to Bring About an Improvement or Solution to an Issue or Concern Just Investigated	Task Card C Flip Chart Pencils Markers	1 hr	267
VIII.	Communicating Feelings, Awareness & Values	Task Card D Pencils Flip Chart Markers	30 min.	268
IX.	Summarizing the Investigation	Flip Chart Markers	30 min.	268

Investigating a Human Community

I. BECOMING FAMILIAR WITH THE COMMUNITY

Questions and Discussion

1. "What are some major land use categories found in most communities?" List on board responses; e.g., commercial, residential, recreation, industrial, etc.

2. Pass out map of local community being studied. Have each group locate the major land use categories on the map with marking pens.

II. IDENTIFYING AND FOCUSING ON LAND USE PATTERNS AND INTERRELATIONSHIPS

1. "After looking at your map and locating the land uses on it, what can you say about the pattern of land use in your community?" List on board.

2. "We want to find out more about the different land use categories in this area."

3. "One tool that can help us is to construct a three-stage, data-collecting chart."

4. "As an example, let's do one together." Pick a subject other than a land use category listed on the board to illustrate the use of the chart.

   a. "Let's pick *Transportation* as the topic to be investigated." Write transportation at the top of chart.

   b. "The first column is labeled *What we want to find out* about the topic." Write this at far left on chart and ask for group responses.

   c. "The second column is labeled *How to collect* information about the item listed in column 1." Write this heading next to column 1 and ask for group responses. Ask for ways to collect information on the first four to five items in column 1, one at a time, then ask, "Are there any additional ways you can think of to collect the information in column 1?"

   d. "The third column is labeled *How to record* the information we are going to collect." Write this heading next to column 2 and ask for group responses. Just ask for general ways to record the information for any items.

Here is what a chart might look like after doing it with the total group.

Three-Stage, Data-Collecting Chart
Subject: Transportation

Column 1 What we want to find out	Column 2 How to collect	Column 3 How to record
Location of major arterials	Observation	Graphs
Kinds of transportation	Interview people	Statistics
What is needed	Existing studies	Pictures
How much is available	Count number of cases at certain place	Film
Accessibility of terminals	Count types of vehicles	Tape recorders
Land topography		Questionnaire
Is it working		Map
What is being used now		Tables
Growth pattern		
Traffic flow pattern		
Peak traffic needs		
Attitude of people		

Questions and Discussion

1. "What might be the benefits of analyzing a land use or topic this way before going out to do an investigation about it?" (Sample responses might include, it's easier to see all the parts of the topic; analyzing it breaks it down into manageable parts to study; you realize that problems aren't as simple as they seem.)

III. IDENTIFYING AND ANALYZING THE TOPIC FOR YOUR INVESTIGATION

The following are criteria to be used by the facilitator in identifying an area to investigate:

-Within walking distance in the time segment allotted (3 hours of field investigation)

-A variety of land use categories

-Examples of changing land use

-Interesting to study.

1. Describe the area that the group is doing to investigate and have each person draw that area on his or her map.

2. Split class into appropriate number of study teams, (groups of 4-5) and have them pick a land use category. (Make sure all land uses have been taken.)

3. Hand out Task Card A, page 269. Have study teams identify the land use category they are going to investigate in the designated area and fill out column 1 of the three-stage chart in Task A. (15-20 minutes)

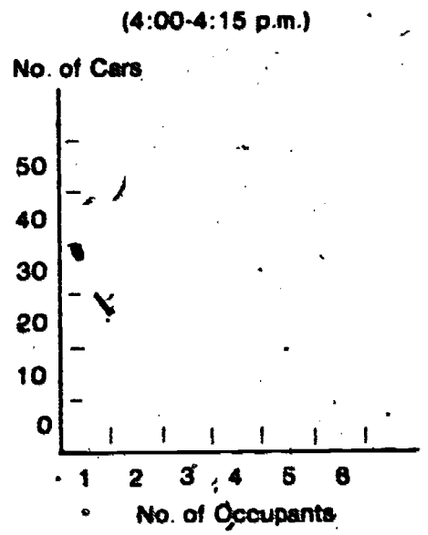
4. "Identify one or two items from column 1 of your chart that you want to find out more about from actual observations in the area to be investigated, and construct a data-collecting and recording device to use in collecting and recording your observations. The items you select must deal with data that are *observable, collectible,* and *recordable* in your area during the actual field investigation and within the time constraints. Filling out columns 2 and 3 may help in your planning." (30-45 minutes)

5. Have sample data-collecting and recording charts to hang up as sample displays.

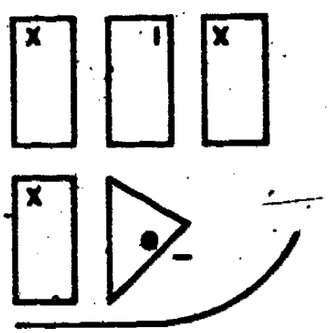
Use of Parks by Age Groups

Age Group	Swim	Walk	Bike	Other
0-6 yrs.				
6-13				
13-21				
21-30				
30-40				
40+				

No. of People in Cars at Intersection



Location of Public Services



Legend:
- X fire hydrant
- I telephone pole
- — restrooms
- ● fire station

6. When the groups have almost finished making the data-collecting charts, tell them to develop a plan of action to investigate their part of the environment using the data-collecting and recording devices in the allotted field time. (Consider dividing responsibilities for collecting and recording information, who goes where, other tools needed, etc.) Data must be observable, collectible, and recordable.

7. After 10 minutes into the planning, put up and read the following sign:

Planning for an Investigation

Usually, the problems that people have are deciding what to do and narrowing down the scope of the topic to something specific enough to actually investigate. Has your group experienced this?

8. Before going out to do the investigation, have each group make a short presentation to describe the procedures and to display the recording devices to be used in the investigation. If you have a large class, have groups pair up and critique each other's plans instead of each small group presenting it to the total group.

IV. CONDUCTING THE INVESTIGATION

Tell group: "You now have 1 hour to do your field work. Be back here at (time). You will then have 1 hour to prepare a 5-10 minute report about your investigation. Instructions for the report will be posted when you return."

V. PREPARING AND REPORTING ON THE INVESTIGATION

Have following instructions posted as groups come back so they have some guidelines for their presentation.

Instructions for the Presentation

1. Describe your task.
2. Report on what you did, how you did it, and what it meant.
3. Describe how you modified your procedure, methods, recording devices, etc.
4. Use more than one person as spokesman.
5. Use visual displays.
6. Limit report to 5-10 minutes.
7. Do not report on all the minute details.

Each group should give its presentation. Stick to time limits and to the process of the investigation.

1. "What problems did you encounter in your investigation?"
2. "What is the next thing to do with all this information?"

VI. ANALYZING FACTORS AND ALTERNATIVES TO THEIR PRESENT CONDITIONS

Questions and Discussion

1. "What are the basic functions of your study area?"

2. "What are some of the needs of the area?"

3. "What impact does your survey area have on the management of your community?"

4. "What examples are there in your area that:

   Illustrate the past
   Typify the present
   Indicate the future."

5. "What interrelationships can we identify in the area investigated, on the basis of your field observations (residential to business, past use to present use, business district to transportation routes, etc.)?"

6. "How do these things above affect the function of the community?"

7. Hand out Task Card B, page 270. "Select one issue, concern, or problem that you identified in your investigation. Using Task B, list and analyze as many factors you can identify." (30 minutes)

8. Have example shown on Task B on flip chart to show how chart should be used.

VII. DEVELOPING AN ACTION PLAN TO BRING ABOUT AN IMPROVEMENT OR SOLUTION TO AN ISSUE OR CONCERN JUST INVESTIGATED

Hand out Task Card C, page 271. "Select one of the alternatives from Task B. Write it in Task C under *Suggested Solution* and complete the task. This can help you to determine if your solution is feasible or not and what course of action you should take for its implementation."

Questions and Discussion

1. Have group give reports on Task C.

2. "What are your recommendations for meeting future needs in this area?"

3. "If you were on the city planning commission, what guidelines would you develop for consideration for future developments in this area?"

VIII. COMMUNICATING FEELINGS, AWARENESS, AND VALUES

Write the following task on the board:

TASK D

Describe your part in implementing the action plan in Task C:
As a member of a community action group.
As a part of the political decision-making process in your community.

Questions and Discussion

1. Distuss individual comments.

2. "What type of community action can we take to identify and motivate people to collect, interpret data, arrive at alternative solutions, and take intelligent action to decide on the best solution consistent with the needs of the environment and society?"

IX. SUMMARIZING THE INVESTIGATION

1. "What procedures did we use in our investigation today?"

2. "What did we find out about the environment in our study?"

3. "How will this process help you when you have students or community groups investigate things?"

4. "How can we summarize our discussion and investigation?"

5. You may want participants to evaluate the session by writing how they felt about this session.

TASK A (small groups)

THREE-STAGE DATA COLLECTING AND ANALYZING CHART

Working in your group, fill out the land use category and column 1 of the chart below.

Land Use Category

Column 1 What we want to find out about our land use category in the area	Column 2 How to collect the information	Column 3 How to record the information

MAN-BUILT COMMUNITY Task Card
Forest Service
Revised 1977

TASK B

ANALYZING FACTORS AND ALTERNATIVES TO PRESENT CONDITIONS

Task B is designed to brainstorm all possible alternatives. List the factors contributing to the issue. Take each factor and ask, "how can this factor be changed, eliminated, modified, or substituted to bring about a change in the issue? Consider all alternatives, no matter how silly they may seem.

Factor	*How it Contributes To The Problem or Issue*	*Alternatives To Its Present Condition* Select one or more alternatives below and describe how the factor might be changed. *Elimination Modification Substitution*	*Describe How The Change Will Affect The Problem Or Issue*

Describe the alternative or combination of alternatives that might bring about an improvement or solution to the quality of the environment investigated. Give reasons for your choices.

After you have analyzed the factors in Task B, go on to Task C

TASK C

DEVELOPING ACTION PLANNING TO BRING ABOUT AN IMPROVEMENT OR SOLUTION TO THE ENVIRONMENT INVESTIGATED

Select one of the solutions suggested by your group in Task B. Write it below under *Suggested Solution*. Complete the rest of the chart.

Action Planning For Problem-Solving

Suggested Solution	*Type Action Necessary To Implement The Solution*	*Identify Change Agents Who Could Help Implement The Solution*	*Implementation Steps To Problem Solution*	*Evaluation Methods. How Will you Follow Up And Evaluate The Effectiveness Of Your Action?*
	Technological What kinds of technological action would be necessary to implement this idea?	Individual What kinds of things could be done through individual action?	What must be done? In what order? When? Steps Target Date 1. 2. 3.	
	Social What kinds of social action would be necessary to implement this idea?	Groups What kinds of things could be done by or through groups? Informal Formal (organizations)		
	Political What kinds of political action would be necessary to implement this idea?	Agencies What kinds of things could be done by or through agencies?		

MAN-BUILT COMMUNITY Task Card
Forest Service
Revised 1977

RANGE INVESTIGATION

MATERIALS LIST(FOR A GROUP OF 10 ENROLLEES)

PREPARED SAMPLES OF PLANT GROUPS

LOOSE SPECIMENS IN LARGE BAGS (COLLECT ON SITE)

100' TAPE AND 2 STAKES

STRING

CHALK LINE, 20'

WIRE HOOP 42" IN DIAMETER

KNIFE

HATCHET

10 HAND LENSES

2 PAIRS OF CLIPPERS

7 STAKES

LATH AND FLAGGING

3 LARGE GROCERY BAGS

10 SMALL SANDWICH BAGS

1 LOCAL PLANT GUIDE

1 LaMOTTE SOIL pH TEST KIT

1 SHOVEL

RANGE

In order for this investigation to be successful certain prior preparation is a must. Because of the great amount of difficulty and time involved with plant identification, the following tasks should be carried out before starting this investigation. Collect and identify most, if not all, of the plants in the area you will investigate. Press and mount your specimens for future reference. Local plant identification guides and your Agency range conservationist can assist with this task.

Some Objectives

Behavioral Outcomes in Knowledge: As a result of these activities, each participant shall be able to:

a. Identify and group key plants on the range site using a key and the plant group chart.

b. Demonstrate the ability to lay out a 100 foot transect and collect and record data pertinent to conducting a transect survey.

c. Identify trends in range health.

Behavioral Outcomes in Feelings, Awareness, Values and Action: As a result of these activities, each participant should be able to:

a. Describe in writing their feelings about the effect of human use on the rangeland environment at this site.

b. Describe at least one change in personal consumer habits to help improve the way range is managed.

Activities List

	Activity	Materials Needed	Approximate Time	Page
I.	Observing the Range Environment	Task Card A Pencil	15 min.	277
II.	Observing the Range Site	Task Cards B & C Plant Group Chart Pencils	30-45 min.	277
III.	Inventory Methods	Task Card D 100 ft Tape	60 min.	278
IV.	Predicting Range Condition	Task Card E Pencil	90 min.	278
V.	Compiling the Range Condition Information	Task Card F Pencil		280
VI.	Production and Utilization	Task Card G & H Pencil 100 ft Tape	30 min.	281
VII.	Judging Range Utilization	Task Card I Pencil String Knife Ruler	30 min.	282
VIII.	Communicating Feelings, Awareness and Values About Rangeland	Task Card J Pencil	10-15 min.	283

Range Investigation

Set the stage for this investigation by reviewing quickly what will take place in the allotted time. For example: In the next four hours we will investigate the range environment and learn techniques for inferring range health, measuring production and utilization of the forage resource. We will discuss some of the implications of managing range lands and the values of range lands to our society.

Range is a land area on which the potential natural vegetation is predominately grasses, grass-like plants, forbs, or shrubs. Natural grazing was an important influence in the evolution of rangeland. Rangeland is more suitable for management by ecological principles than for management by agronomic principles. Rangelands make up more than 40% of the world land area.

I. OBSERVING THE RANGE ENVIRONMENT

Hand out Task A, page 285. Allow 10 minutes before discussion.

Questions and Discussion

1. What did you notice about the plants found here?
2. What animals or evidences of animals did you see?
3. Describe the things you observed on top of the soil.

II. OBSERVING THE RANGE SITE

A range site is a unique combination of soils, plants, and animals produced by climate, geology and use.

Have bags of plant material ready for use in doing Tasks B and C. Hand out Task Card B, page 286.

Range plants are divided into four broad groups which are:

1. Grasses
2. Grass-likes
3. Forbs
4. Shrubs

These groups are further divided into annual and perennial plants.

Definitions:

annual grass--lives for a single year and depends on seeds for reproduction

perennial grass--lasts from year to year from the same root base

forb--wildflowers and "weeds"

shrub--persistent woody plant smaller than a tree

Questions and Discussion

1. What characteristics helped you separate the groups.
2. Which group has the most roots?

Have enrollees complete Task C (on Task Card B, page 286).

Questions and Discussion

1. Which plant group was dominate?
2. Were annuals or perennials more common?
3. Where did you find the different plants growing? Separately, in groups? Mixed?
4. What other observations can you make about the plants growing on the site?

III. INVENTORY METHODS

We need to know more about the plants growing on the site and some of the other factors such as soil cover which influence the site. Several different inventory methods are available to allow systematic measurement of factors.

Hand out Task Card D, page 287.

Questions and Discussion

1. What are some ways we can use the data we collected to infer range conditions?
2. How do the plant % compare between the two systems?
3. Which system would be more sensitive to climatic variations?
4. What additional survey methods might be used in addition to the two systems used in Task D?

IV. PREDICTING RANGE CONDITION

If we apply the color and meaning of traffic signals to range plants we are able to group plants in a way that makes reading the range easier. These groups will be: (1) the "green-group" plants; (2) the "yellow-group" plants; and (3) the "red-group" plants.

Plant groups:

The green group--Plants in this group are the most desirable the ones that livestock like best. When you see the green-group plants in abundance on the range, you know your grazing program is going well. The green-group plants consist of those which are plentiful in excellent condition on native range and are the first to decrease if range condition is forced down to "good," "fair," and finally to "poor" range. Range in the poorest condition has very few green group plants on it.

The yellow group--These are also native plants, but they are less attractive to livestock. They escape grazing because they are short or because they are less tasty to livestock. Yellow group plants are the ones to watch with "caution." They increase in number as grazing becomes heavy. They replace the green-group plants which have become smaller and weaker.

The range manager uses caution when he sees the number of yellow-group plants increasing on his range. He is safe if they are being replaced by green-group plants. That means the range is improving.

If heavy grazing continues, the yellow-group plants begin to weaken and die out. Their place is taken by the red group plants.

The red group--These plants really do not need any explanation. They simply mean "Danger" to the range, so far as production is concerned. These plants are usually annuals or unpalatable species which have come in from other areas and occupy the range as invaders.

Red-group plants seldom if ever, are as effective in controlling soil erosion and conserving water resources as the native plants which are more abundant when the range is in good or excellent condition. Soil and water losses cause nature's plant and soil development process to go in reverse. The range becomes less healthy and less productive.

Hand out Task Card E, page 290.

Questions and Discussion

1. What color group did you put your range in? Why?

2. What condition does your site appear to be?

3. What changes, if any, would you like to see in this site?

V. COMPILING THE RANGE CONDITION INFORMATION

In order to put all information together, do Task F, page 291.

Trend Indicators

Indicators of Upward Vegetation Trend

1. Desirable and intermediate forage plants becoming more abundant.
2. Desirable and intermediate forage plants invading bare ground or stands of undesirable plants. A variety of all age classes of better forage plants must be present.
3. Establishment of perennial plants on erosion pavement.
4. Several years of vigorous growth on browse.
5. Decreaser plants increasing and vigorous. Grasses with long green leaves, and numerous healthy seed stalks.
6. A well dispersed accumulation of litter.

Indicators of Downward Vegetation Trend

1. Desirable and intermediate species decreasing in vigor.
2. Lack of young plants from desirable and intermediate species.
3. Invasion by undesirable species.
4. Hedged and highlined shrubs. Dead branches generally indicating that shrubs are dying back.
5. Litter scarce and poorly dispersed.

Indicators of Upward Soil Trend

1. Gullies approaching the angle of repose and healing.
2. Gullies stabilizing by the growth of perennial vegetation on both sides and bottom.
3. Soil remnants having sloping sides or sides covered with mosses, lichens, or higher plants.
4. Terraces characterized by sloping sides which are being covered with vegetation. Tops of terraces should be occupied by perennial plants.

Indicators of Downward Soil Trend

1. Rill marks. Rill marks are small, active gullies, frequently of the shoestring type.

2. Active gullies. Established gullies are raw and actively cutting. This type of gully may vary from a few inches to several feet in depth.

3. Alluvial deposits. Soil material transported and laid down by running water.

4. Soil remnants. Original topsoil held in place by vegetation or plant roots.

5. Active terraces. Terraces usually caused by hooves of animals. They are "stair step-like" in appearance on slopes.

6. Exposed plant crowns or roots (pedestalled plants).

7. Wind-scoured depressions between plants.

8. Wind deposits.

VI. PRODUCTION AND UTILIZATION

Hand out Task Card G, page 292.

Utilization is the one factor affecting range health and trend which can be readily manipulated. Stocking rates and duration of use can be controlled.

Volume of forage, area to be used and known forage requirements are used to calculate stocking rates. Refinements are usually based on utilization measurements, observation of trend indicators, and assessment of grazing history.

Proper use on most forage plants is 50% by weight of the current years production. At this level of use root growth is not inhibited and sufficient plant material remains to protect the soils.

Questions and Discussion

1. How do you feel about the area sizes?

2. Which unit seems the most practical?

3. In what subject areas could you use the techniques of determining the size of workable land areas?

Have enrollees do Task H (on Task Card G).

VII. JUDGING RANGE UTILIZATION

Utilization is the amount of the current year's growth that is removed by grazing livestock. Utilization is in no way similar to range condition. Close utilization may occur on a range in excellent condition or on a range in poor condition. Heavy utilization over a period of years causes regression and so lowers range condition. Utilization is difficult to determine with great accuracy.

Livestock do not utilize all species of range plants to the same degree. They eat more of the better tasting plants. Each grass, forb, and shrub can be grazed a certain amount without harmful effects to its productiveness. Proper use of a range area can be placed into three categories.

Light use: Only choice plants are grazed. Only a small amount of the less desirable forage plants are consumed, thereby wasting much valuable forage. Ungrazed plants and heavy litter build-up may result in serious fire hazard. Also, excessive amounts of unused plant material may contribute to poor utilization of forage by the grazing livestock because usually they will not eat last year's old stems and leaves.

Moderate use: The most economically important forage plants have been properly grazed on the most popular parts of the management unit. Factors to be considered when determining proper use are: (1) species of grasses being grazed; (2) season of year the grass is grazed; (3) amount of growth made in the present year; and (4) amount of soil moisture this year.

Heavy use: The range has a "clipped" or mowed appearance. Over half of the green and the yellow forage plants are grazed. This leads eventually to a decrease in forage production and range condition. Heavy use is directly harmful to plants and soil and indirectly to animals. Grasses are grazed short. As a result, the leaf "food factories" are inefficient, roots are decreased in size and length, and plants die during the dry summer season or a severe drought. Heavy use results in unprofitable returns and reduces the value of the land for sale. The land may be ruined for many years by speeded-up water and wind erosion and by trampling. Grasses that are grazed short require three to five weeks of top growth before root growth begins.

Have enrollees complete Task I, page 293.

Questions and Discussion

1. What do you think the range utilization is on your site? Why?
2. A considerable amount of stubble and plant litter will remain on a properly utilized range. Plant material which is left on the range after being properly used is not wasted. In what ways does this stubble and little help improve range conditions?

Some ideas:

increase intake and storage of water
protects soil from wind and water erosion
adds humus to the soil
assures plants necessary "food factory" for food storage
increases plant vigor
provides some protection for seedling establishment
prevents evaporation of water from the soil
helps hold snow in place

3. How would you use clipping to determine utilization?

4. How would you determine available forage if residue or stubble height were critical?

5. In what ways could you estimate production without the use of instruments?

Questions and Discussion

1. What can we say about the health, trend and utilization of the range site we have just investigated?

VIII. COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT RANGELAND

Questions and Discussion

How important is this land to us?

Have enrollees do Task J, page 294.

IX. SUMMARY

1. What do you think has happened on the land to account for the way it looks?

2. If left completely alone for the next 100 years, what might happen?

3. What would you do to manage this land for livestock? Wildlife? Both?

4. What other information do you think you would need in order to make a better plan?

5. What did you find out about rangeland from our investigations today?

6. Why is range important to the eco-system?

7. How can we summarize our discussions and investigations?

8. What methods and processes did we use in our investigations today?

TASK A (10 minutes)

Observing the Range Environment

As you approach the study area, observe and record your observations.

Plants

Soil

Rocks

Air

Animals

TASK B (10 minutes)

PLANT GROUPS

You have just been given definitions of the different groups of range plants. Select an annual and perennial grass, a grasslike, a forb, and a shrub from the loose plant materials contained in the sacks.

TASK C (15 minutes)

PLANT GROUP INVENTORY

Utilizing the skills acquired in Task B examine the area within a 50 yard radius. Describe below the plants found and list in the appropriate columns. Separate the annuals and perennials.

Grasses	Grasslike	Forbs	Shrubs

TASK D (1 hour)

SURVEY METHODS

Working in groups of four we will use two different survey methods to inventory the plants in the site. The data collected will be compared and used in the next Task of inferring range health.

Stretch and anchor a 100 foot tape along the ground where you wish to inventory the plants. This is called a transect.

Group A — Start at foot 0 — Record what you find at every foot mark along the tape on the form on the following page. Record by placing a check in the appropriate column behind the foot mark being read. Use of the 3/4" loop is desirable. Only one column is to be checked for each reading. For example forb or bare soil but not both. Vegetation takes first choice.

Group B — Start at foot 100 — Utilize the 10 foot string to establish the amount of the line which crosses plants. Simply start down the tape and pull the string through your hands a distance equal to each root crown. Total number of feet is your percent density.

When the two groups meet at the 50' mark, switch survey methods and record forms. Explain the survey method you have been using to the other group. Then continue the transect for the remaining 50 feet using your new survey method.

Survey Method A Form

Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Per. Grass	Forb	Shrub	Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Per. Grass	Forb	Shrub
1								51							
2								52							
3								53							
4								54							
5								55							
6								56							
7								57							
8								58							
9								59							
10								60							
11								61							
12								62							
13								63							
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15								65							
16								66							
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39								89							
40								90							
41								91							
42								92							
43								93							
44								94							
45								95							
46								96							
47								97							
48								98							
49								99							
50								100							
								TOTALS							

TASK D (Continued) — Transect Survey

Summarize your data below:

Item	Total ( ) ÷ 100 = Percentage of Total
Animal sign	
Rock	
Bare Soil	
Litter	
Annual grass	
Perennial grass	
Forb	
Shrub	
TOTALS	

Which items had the greatest percentage _____, coverage _____,

the least _____.

Do certain plants tend to be associated with certain areas, such as bare places, rocks, protective shrubs, etc? Which ones? _____

_____

_____

_____

What reasons can you give for this? _____

_____

_____

TASK E

TECHNICIAN'S GUIDE TO RANGE CONDITION CLASSES

Use this guide to determine the condition of the range in your area.

UPLAND PLAINS SITE

Green-Group Plants	Yellow-Group Plants	Red-Group Plants
DECREASERS: Plants that disappear when range is abused. Percentage figures indicate approximate amount found in climax for the site but count all found on site as climax.	INCREASERS: Plants that increase when range is abused. Percentage figures indicate approximate amount found in climax for the site, so count no more than amount shown toward climax.	INVADERS: Plants that invade when range is abused. These did not occur in climax, so none of these are counted toward climax.
50% Blue grama 5% Other gramas T Western wheatgrass T Needle grasses T Winterfat T Four-wing saltbrush, blazing star, silver-leaf psoralen, licorica	20% Buffalo grass 10% Sand dropseed 5% Forb mixture — forbs other than those in Red Group, e.g., Scarlet globemallow, prairie coneflower, purple prairie clover	Cheatgrass Six-weeks fescue Three-awn Gumweed Sunflower Thistles Fetid Marigold Russian-thistle Rabbitbrush Sagebrush Snakeweek Yucca Prickly Pear

Condition: Excellent Good-to-Fair Poor

My area is in the green, yellow, red group plant condition (circle one) because of the following plants found there _____

_____

_____

_____

_____

What would this mean to the condition of the range?
Excellent, Good, Fair, Poor?

*Contact local USDA, Soil Conservation Service for local range site descriptions.

TASK F

RANGE CONDITION INFORMATION

Location _____

_____

Observers _____

_____

Date _____

(Data from Tasks C & D)

_____

Plants	% present	% in green group
Grasses and grass-like plants:		
Blue grama		
Other gramas		
Western wheatgrass		
Buffalo grass		
Other		
Forbs in Yellow Group		
Other		
Shrubs and trees		%
Total usable plants		%

100

(Data from Task E)

Condition Indicators

Condition class based on vegetation:

Excellent _____ Good _____

Fair _____ Poor _____

TASK F

TREND INDICATORS

Exposure _____

Soil erosion: _____ some _____ none

Litter: _____ many _____ some _____ none

Final trend rating: Improving _____

Stable _____ Going down _____

Trend Indicators

Rating

healthy	average	sick

Vigor of key (green group) forage plants _____

_____

_____

_____

_____

abundant	some	none

Seedlings and young key (green group) forage plants _____

_____

_____

_____

Seedlings and young key increasers (yellow group) and invaders (red group) _____

_____

_____

_____

TASK G (15 minutes)

UNITS OF LAND MEASURE

Units of land measure are used in most management decisions. Pace out the acre and hectare plots to familiarize yourself with these two common units of land measure.
Acre = 43,560 sq. ft. ≈ 220' square
Hectare = 10,000 sq. meters ≈ 328' square

TASK H (20 minutes)

MEASUREMENT OF FORAGE

This is a practical method of measuring forage volume. The method has several applications in management.

Scribe a 9.6 sq. ft. plot. Clip the grass to the crowns and place in the bag. Weigh the contents in grams and convert to lb./acre by multiplying by 10. Conversions to air dry weight may be made by using the factors given below.

Production-Utilization Plot

9.6 sq. ft.	=	20.98" radius	131.8" circumference
.96 sq. ft.	=	6.63" radius	41.66" circumference

Grams/9.6' plot X 10 = lbs./acre

For your plot _____ grams X 10 = _____ lbs./acre

Air dry Conversions *

Grams/96' plot X .25 green – no heads
Grams/96' plot X .40 green – headed out
Grams/96' plot X .50 green – in bloom
Grams/96' plot X .60 green – mature

* Confirm by air drying 30 days.

Forage Requirement

Mature cow with calf	– 800 lbs./mo. *
2 Yr. old	– 560 lbs./mo. *
Yearling 12-18 mo.	– 480 lbs./mo. *

* Figures include waste factor

TASK I (20 minutes)

JUDGING RANGE UTILIZATION

For some grasses, the proper use is considered to be removal of about one-half of the growth made in the present year. While proper use must be considered in the light of the above-named factors, "taking half and leaving half" can sometimes be used as a "rule of thumb."

To determine the amount of stubble left when one half the growth is removed, follow these steps

1. Wrap an average-sized mature, ungrazed plant with string to hold it together when cut.
2. Cut off plant at crown (ground level).
3. Adjust the wrapped plant across a knife blade to make it balance. Measure with ruler from bottom of plant to point of balance. This gives height, indicating 50 percent use for that particular species of grass. Desirable approximate stubble heights for some native grasses are:

Grass	Inches stubble left
Blue grama	1-3
Sand dropseed	4-8

4. Repeat this for 5 average plants of the species to get an average 50 percent utilization height.
5. Select 100 plants randomly, measure their heights (whether grazed or not), and average the measurements. If the average grazed height is more than the standard shown above, the range is not fully used. If it is less, the range is overused.

Grass	Inches stubble left	Utilization rate heavy-moderate-light

TASK J (10-15 minutes) Work by yourself.

1. Describe in writing how you feel about man's effect on the range environment at this site and how important this land is to us.

2. Describe at least one action you can take in your everyday life to help improve the way rangeland is managed:

   a. In YCC activities:

   b. In your home:

   c. In your community:

   d. In your consumer habits:

3. Describe the benefits of each action in #2

MAPS and COMPASSES

MATERIALS LIST (FOR A GROUP OF 10 ENROLLEES)

MAP AND COMPASS

- 21 STAKES-NUMBERED CONSECUTIVELY
- 100' TAPE
- PLASTIC FLAGGING
- 10 SILVA COMPASSES
- PENCILS WITH ERASERS
- SCOTCH TAPE
- BOY SCOUT COMPASS GAME WITH ANSWER SHEET
- STEP-FEET CONVERSION SHEET
- LENGTH OF STEP SHEET

PLANE TABLE

- CARDBOARD CARTONS (3 PER GROUP)
- UNLINED PAPER (8½ X 11)
- 12" WOODEN RULER (1 PER GROUP)
- MAP TACKS (4 PER GROUP)
- MASKING TAPE
- PENCILS WITH ERASERS
- PLASTIC FLAGGING (2 COLORS)
- HEAVY TWINE
- STAKES (2 PER GROUP)

INSTANT MAPPER

- 10 PIECES OF CARDBOARD (8½ X 11)
- 10 SHEETS OF CONTACT PAPER (8½ X 11)
- PAPER FASTENERS
- 10 AZIMUTH SHEETS (8 X 10½)
- MASKING TAPE
- SCISSORS
- ICE PICK
- ACETATE SHEETS (7" DIAMETER)
- PROTRACTER
- PENCILS

MAPS AND COMPASSES

With the completion for land use increasing rapidly and a better understanding for the need of proper zoning and land utilization, a knowledge of land measurement and spatial relationships is essential. The following activities and tasks, in this lesson plan, can provide some simple tools to involve students in land and space measurement.

Some Objectives

Behavioral Outcomes in Knowledge: As a result of these activities, each participant should be able to:

a. Compute the length of your average step, given a pre-measured 100 feet distance.

b. Demonstrate your knowledge of the compass by accurately setting a given bearing and following that bearing for a short distance.

c. Demonstrate your knowledge of the compass by sighting on an object and setting the correct bearing and following that bearing for a short distance.

d. Construct and use a plane table, you can accurately map a pre-determined area and include at least three reference points.

e. Using a constructed plane table, you can measure a non-paceable distance.

Behavioral Outcomes in Feelings, Awareness, Values and Action: As a result of these activities, each participant should be able to:

a. Describe your ability to use a compass.

b. Describe if and why you feel more secure in the environment with a knowledge of how to measure the environment.

c. Describe how you feel about the value of measurement in the environment.

Activities, List

	Activity	Materials Needed	Approximate Time	Page
I.	Measuring the Length of Your Step	21 stakes--numbered consecutively 100 Foot Tape Silva Compass Pencils with erasers Length of Step Chart Step-foot Conversion Chart, Hammer Boy Scout Compass game with answer sheet Task Card A	20 min.	299
II.	Learning to Use the Silva Compass	Silva Compass Scotch Tape Boy Scout Compass game and score cards	20 min.	300
III.	Using the Compass and Pacing Skills	Task Cards B & C	30 min.	305
IV.	Constructing and Using the Instant Mapper	Cardboard 8 1/2" X 11" Graph Paper Clear "Contact" Paper Scotch Tape Paper Fastener Acetate Disc Scissors Protractor	60 min.	308
V.	Laying out a Nature Trail	Compass Task Cards D & E	120 min.	311
VI.	Constructing and Using a Cardboard Box Plane Table	Cardboard Cartons Unlined Paper Wooden Ruler Map Tacks Masking Tape Pencil with eraser Plastic Flogging Heavy Twine, Stiker	60 min.	314
VII.	Community Feelings, Awareness, & Values about Measuring our Environment	Task Card F & G	40 min.	318

I. MEASURING THE LENGTH OF YOUR STEP

Measuring the Length of Your Step is the first task to be done before measuring the environment. Hand out Task Card A, page 319.

Questions and Discussion

1. "The distance from the first to the last stake in this course is 100'." Refer to stakes set up for compass games.

2. Walk an even, normal step all the way down, then all the way back.

3. What will be the total distance you walk? (200 feet)

4. Count the total number of steps you take on the way down and on the way back. Don't let people jam up in a line as they are walking--this will make their step uneven.

5. How will you determine the length of your step? Divide the total distance (200 feet) by the total number of steps you took. Round it off to the nearest foot or nearest half-foot, either 2 feet, 2 1/2 feet, or 3 feet for adults.

Questions and Discussion

1. When most people have finished dividing, have them turn over the Method I sheet and use Method II to check their answers. This will be funny because most people will not have looked on the back side.

2. "Using the chart, Method II, if the total number of steps taken were ____, what would be the length of step for that person? This way, if the kids haven't learned to divide yet, they can still figure out the length of their step without you having to figure it out for each one of them. This chart has been devised so that everyone can check their dividing at the same time. Left column gives total steps in 200 feet. Right column gives the length of your step if you are within that range."

3. "Another aid to help you quickly convert distances into steps or vice-versa is this Step-Foot Conversion Chart. Distribute Step-Foot Conversion Sheet showing distances and length of step and discuss how to use the chart. Left column gives distances. Right column gives number of steps you need to go to get that far."

Determining the Number of Steps in Distances

Using the table on the back of Task A, find the column for the length of your step and determine the number of steps for the distance you want to walk in the distance column.

4. For example, if you wanted to go 50 feet, and using this chart, how many steps would you take if the length of your step were 1 1/2 feet? _____ 2 feet? _____ 2 1/2 feet _____ 3 feet? _____.

5. Figure out how many steps you'd take to go 122 feet if the length of your step were 2 feet. _____ 2 1/2 feet _____. This is easier to figure how many steps for 100 feet, how many steps for 20 feet, how many for 2 feet, then add those all up.

6. We've been using steps and not paces. The length of your step should not be confused with a pace. A pace is the distance covered on the ground when a person takes two steps. For instance, if your length of step is 2 1/2', then your pace is 5'. This simplifies your math if, for instance, you want to walk 100'. By this way you could count every other step and keep running tally, 5, 10, 15, etc. Steps or paces may be used at the option of the instructor. Sometimes it's easier to start counting every step, instead of every other step which which makes a pace.

7. Have student check the accuracy of their step or pace by walking other predetermined distances and calculating the distance from steps to feet.

II. LEARNING TO USE THE SILVA COMPASS

The second task is learning how to use the Silva Compass. Using the Boy Scout Compass Pacing Game is a simple, effective game to do this. It is available at all Boy Scout supply stores.

A. Parts of the Compass

Questions and Discussion

1. Give everyone a Silva Compass and have them stand up facing you. Make sure the compass has the piece of write-on scotch tape with a pencil mark on it opposite the declination for your area. Do Not let the enrollees do this sitting down.

2. The Silva Compass is used in this lesson. It is one of the least expensive, most dependable, and one of the easiest to use.

3. Ask--"What do you notice as you look at the compass?"

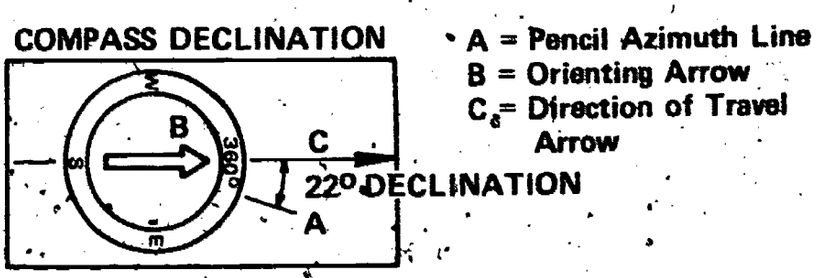
Major Parts to discuss with enrollees:

1. Base Plate
   What is on it?

Direction of Travel Arrow--always pointed directly away from you. (Clear plastic, has direction of travel arrow and two different scales.)

2. Compass Housing--a dial (azimuth ring) with degrees marked on it. It has an orienting arrow inside the bottom housing. (The orienting arrow is the thing that makes the Silva Compass different from all other compasses, and so easy to use.)

3. Magnetic Needle--red and white needle
Where does it point? (magnetic north) What makes it point there? (earth's magnetic field) (Pivots freely within the azimuth ring. Red end always points to magnetic north.)



B. Holding the Compass Correctly

It is important to learn to hold the compass correctly.

1. Stand up;
Rest base plate on your index fingers;
Hold the edges with your thumbs;
Keep your arms close to your sides for better stability;
Point the direction of travel arrow directly away from you.

2. Hold compass level. Tilt compass up and down and from side to side to see what happens when not level.

3. You and the compass are a UNIT. TOGETHER.

4. When you turn, the compass turns with the direction of travel arrow, always pointing away from you. Turn your whole body and compass, including feet, don't just twist around. Have group practices.

C. Orienting to North

Let's orient ourselves to north.

1. Turn dial and set 360 degrees on Direction of Travel Arrow.

2. Turn you and the compass as a unit until the red part of the magnetic needle and the pointing part of the orienting arrow go together.

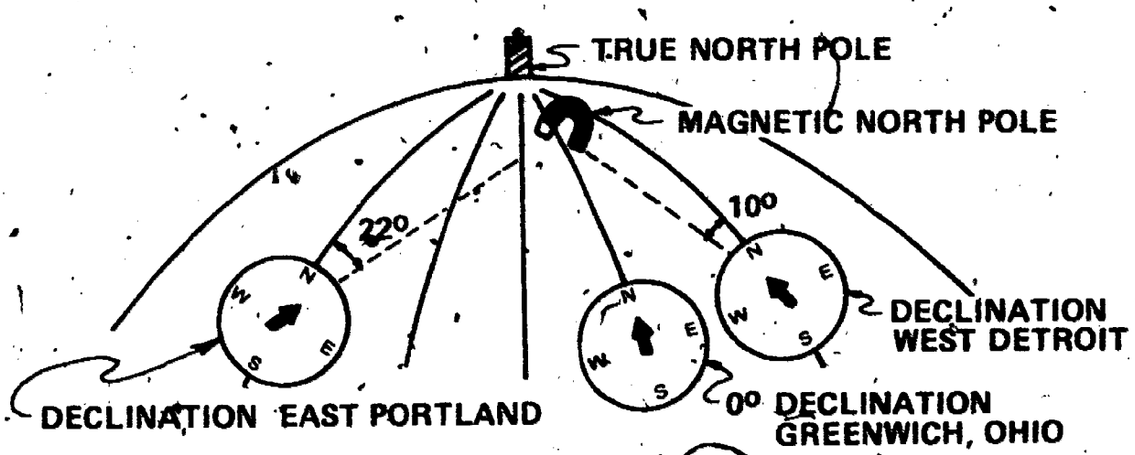
3. Where does the magnetic needle point? (North--magnetic north.)

4. Are you facing the same direction as the magnetic needle? (Yes, you should be, anyway.)

5. Which direction are you facing? Magnetic north, same as the magnetic needle.

6. Is magnetic north the same as the North Pole? No--North Pole is called Geographic North, or True North.

NOTE: Refer to chart of North Pole, and magnetic pole. (Magnetic north is located somewhere north of Hudson Bay, Canada in the Gulf of Boothia.)



If you are here (point to your location), and facing the North Pole, then magnetic north is at a ___ degree angle to the right of you, in parts of western Oregon and Washington. Find your declination--in Portland, Oregon it's about 22°.

If you're in Greenwich, Ohio and facing the North Pole, then magnetic north and the North Pole would be in the same line of sight.

Most of the maps we use are drawn according to the North Pole, or true North.

D. Correcting for the Declination (difference between true and magnetic north)

Questions and Discussion

1. On your compass is a piece of tape with a pencil line on it at ___ degrees. (22° for Portland, Oregon)

2. Turn dial and set 360° on the pencil line.

3. Now turn yourself and the compass until the magnetic needle and orienting arrow go together.

4. Which way does the magnetic needle point? (Magnetic north--it always points there)

5. Are you facing the same direction as the magnetic needle? (No--you shouldn't be, anyway)

6. Which direction are you facing? (True North)

7. You and the Direction of Travel Arrow should be facing True North. The magnetic needle should be pointing to magnetic north--at a ____ degree angle to your right.

8. From now on we will set all degree readings at the pencil line.

9. From now on we will read all degree readings from the pencil line.

10. We will continue to hold the compass so the Direction of Travel Arrow is pointing directly away from us.

E. Practice Orienting to the Four Cardinal Compass Points (N-0°, E-90°, S-180°, W-270°)

Questions and Discussion

1. Set 90° on the pencil line. Orient yourself to that degree reading. (This means you and the compass move as a unit until the red part of the magnetic needle and pointing part of orienting arrow go together.)

   -Which direction are you facing? (true east)

   -Which direction is the magnetic needle pointing? (magnetic north)

   -Helpful hint in explaining difference between magnetic and true bearing: Extend your arm in the direction of true north.

   -With your arm, make a 90° swing to the right. That should be the direction you are facing.

   -Extend your arm in the direction of magnetic north. Now make a 90° swing with your arm to the right.

   -That should be magnetic east, which should be at a ____ angle to the right of where you are facing.

2. Now set 180° on the pencil line. Orient yourself to that degree reading.

   -Extend your arm in the direction the magnetic needle is pointing--(magnetic north)

   -Now extend your arm directly opposite--(which would be magnetic south)

   -Which direction are you facing? (magnetic south)

   -Which direction is the magnetic needle facing? Which direction does it always face?

3. Repeat for 270°.

F. Following a Predetermined Azimuth Bearing

NOTE TO INSTRUCTOR: Before class, pick a point and sight on several objects (up to 10). Give the group bearings to set and then objects to sight on, until you feel they are confident using the compass.

Questions and Discussion

1. Set ____ degrees on pencil line.

2. Orient yourself to that degree reading. (Review part on holding compass correctly)

3. Select a landmark in the line of sight found by you and the Direction of Travel Arrow.

   To do this, look down at direction of travel arrow, then jerk your head up. Whatever you see on the horizon, in line of sight of the travel arrow, is your landmark.

   Repeat this several times, to make sure you are sighting on an object that is directly in line of sight of the direction of travel arrow.

4. Now that you have selected a landmark, you could put your compass away and walk toward that landmark, always keeping your eyes on that landmark and walking straight toward it.

5. Why wouldn't you keep looking at your compass as you walk along? (You could wander all over the place)

   Perhaps a chart, or simple diagram here could explain this point. People seem to have a hard time understanding that it would make any difference.

6. Orient yourself to ___ degree reading.

7. Select landmark. (Repeat previous instructions on selecting landmark, if necessary)

8. Do Task B, page 321.

III. USING THE COMPASS AND PACING SKILLS

A. Preparing to Play the Compass and Pacing Game

Questions and Discussion

1. Distribute score cards for game. (Boy Scout Compass and Pacing Game)

2. Before we explain the game, write down the number of steps you need to take for each of the distances given. Use the Step-Foot Conversion Chart.

3. When most people have finished this, select a volunteer to demonstrate the game.

   NOTE: Notice that the number of each problem corresponds with the Stake with that number.

4. Take his score card from him and yell his instructions to him while the group watches. (or try to get the group to tell him what to do)

5. Starting place _____.

6. Degree Reading _____.

   -Set degree reading on pencil line.

   -Orient to that degree reading.

   -Select landmark.

   -Put compass away.

7. Distance to walk _____.
   Tell the group the distance, the length of volunteer's step, and have them figure out how many steps he needs to take.

8. Repeat for the second instruction.

9. Repeat for the third instruction.

10. Ask him which stake he ended on. Tell him which stake he was supposed to end on.

11. Explain how the scoring works.

12. Give volunteer his score.

13. Anything above 70 is good!! If they get below 70, maybe they should do it over.

B. Playing the Game

Questions and Discussion

1. Okay, go ahead and do the problem, I have the answers.

2. Help individuals. If someone in group finishes first and was pretty good, have them help people. Or give him the answer sheet and free yourself just to help people.

SAMPLE

SCORE CARD
for
COMPASS COURSE

NAME _____

Starting Point No. 2 # Steps
Go 17 degrees for 104 feet _____
Then 150 degrees for 52 feet _____
Then 171 degrees for 55 feet _____

DESTINATION (Number of nearest marker reached) _____
CORRECT DESTINATION (Supplied by leader) _____
SCORE (Sore for correct finish is 100. Deduct 5 points for each marker player missed correct destination.) _____

Starting Point No. 3 # Steps
Go 38 degrees for 125 feet _____
Then 237 degrees for 90 feet _____
Then 187 degrees for 50 feet _____

DESTINATION (Number of nearest marker reached) _____
CORRECT DESTINATION (Supplied by leader) _____
SCORE (Score for correct finish is 100. Deduct 5 points for each marker player missed correct destination.) _____

TOTAL SCORE _____

Questions and Discussion

What things did you have trouble with in solving the problem?

More practice will help increase accuracy.

While following an azimuth or line of sight, you may lose the landmark you are walking to and need to check your location to determine if you are still on the correct line of sight. To do this, sight backward toward your starting point and then check your compass to see if you are still on the line. This requires sighting a back azimuth which is in the opposite direction from the azimuth.

Have enrollees do Task C, page 321.

Questions and Discussion

What sort of hypothesis would apply to the shooting of a back azimuth?

Possible Answer:
If the original bearing is less than 180° add 180° (in step #4).
If it is more than 180°, subtract 180° (in step #4).
Reverse the red arrow so that the tail of the red arrow is superimposed over the head of the black arrow in the compass housing (as in activity #1).

C. Taking a Bearing on a Given Object

Questions and Discussion

1. Now let's use the compass to find out in what line of direction a given object is from you. (select an object everyone can see)

2. Face the object.

3. What do you have to do now? You have to get the magnetic needle and the orienting arrow lined up together. How will you do it? (turn the dial)

4. Now read the degree reading. Where will you read it from? (the pencil line, not the direction of travel arrow)

5. Why do people on one side of the group have different degree readings than people on other side? (everyone is at different angles to the object)

6. Practice a couple of times.

IV. CONSTRUCTING AND USING THE INSTANT MAPPER.

There are many ways to make maps, but one of the easiest and most fun is by using the instant mapper. Your students can easily make the instant mapper and learn how to use it.

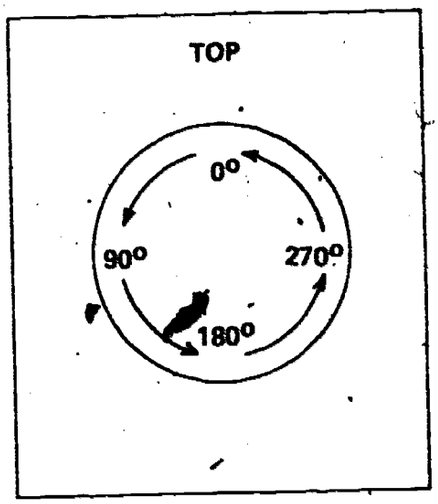
Instructions for Making Instant Mapper

MATERIALS:

1 piece corrugated carboard, 8-1/2" X 11" (smooth both sides)
1 piece graph paper, 8" X 10-1/2"
1 piece clear "contact" paper (adhesive on one side) 8-1/2" X 11"
40" scotch or masking tape, 1" or 2" wide
1 paper fastener 7/16"
1 7" acetate disc, frosted one side
Scissors

MAKING THE AZIMUTH GRAPH PAPER SHEET:

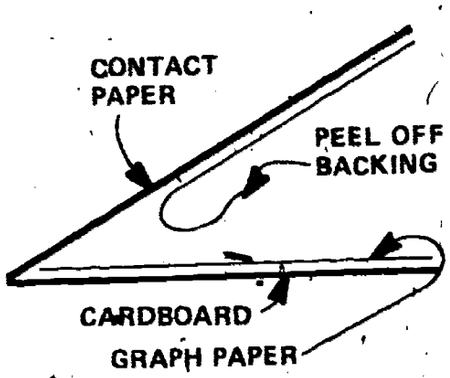
Draw 6-3/4" diameter circle in middle of graph paper. Label one end of the circle closest to the top of the graph paper, mark and label every 10' azimuth running counterclockwise on the inside of the circle. See diagram, page __. It can be Xeroxed if desired and supplied to the enrollees.



CONSTRUCTING THE MAPPER:

1. Position graph paper on cardboard in order to leave edge of cardboard exposed for contact paper to adhere to.

2. Pell back edge of paper covering the sticky part of contact paper and position the sticky part at top of carboard and graph paper. Now strip off rest of contact backing paper smoothing the clear part over the cardboard and graph paper.



3. Take scotch mystic tape or masking tape and bind edges of instant mapper.

4. Center the acetate disc over the circle on the graph paper with the rough side up.

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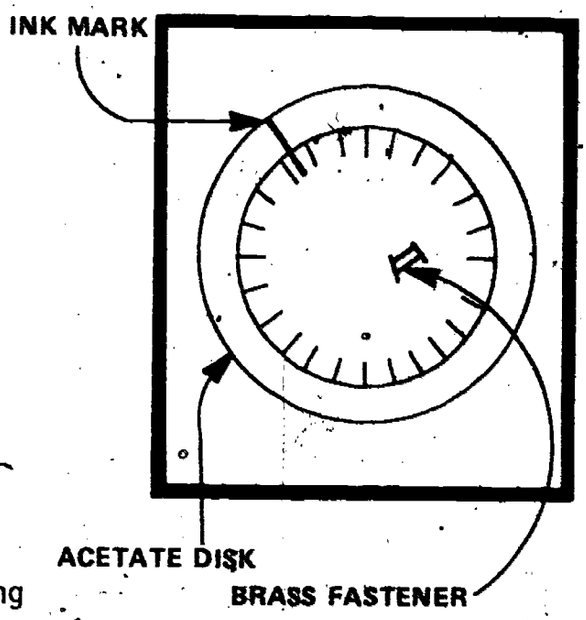
5. Make a slit hole (with knife) through the cardboard and acetate at center of the circle.

6. Push the brass fastener down through the acetate disc and the slit hole in the mapper, and bend back the fastener prongs.

7. Make one straight ink mark from any point on the edge of the acetate toward the brass fastener until it meets the circle on the graph paper. (This is your map making orienting mark.)

8. Attach a short piece of masking tape to the outside of the acetate disc to use as a handle.



MAKING A MAP:

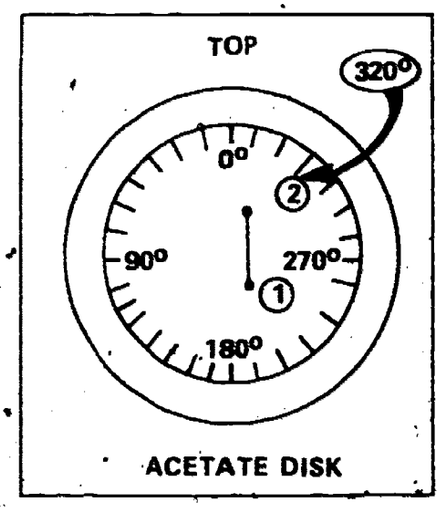
The instant mapper is designed to draw the map of your area as you determine the compass bearings and distances. (It will be easier to learn to use if you already have the bearings and distance recorded of the area you want to map. Map one of the Boy Scout Compass and Pacing Problems.)

Degree Reading	Field Notes		Dist.
320°	20'	5'	25'
225°	20'	10'	30'
85°	10'	25'	35'

1. Plotting the first bearing and distance

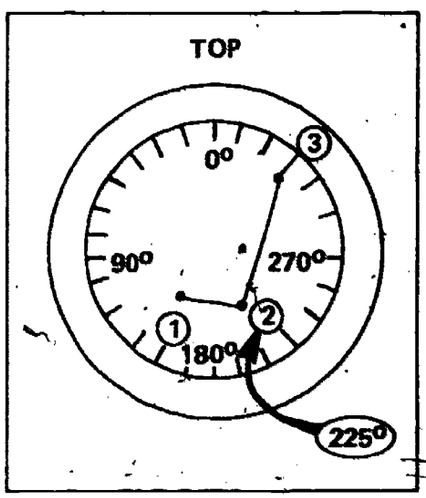
   a. Turn the acetate disc until the ink line is directly over the 320° mark on the DIAL.

b. Pick any point where two graph paper lines cross and put a dot on the acetate disc at this point and label with a ① .



c. Determine a scale for your map. Let's say that each square is 1'. (Select a scale that allows you to draw your whole map on the acetate disc.)

d. Draw a line from the point ① toward the top of the instant mapper parallel with the lines on the graph paper (for 25 squares (25 ft.)). Put a ② along side the point where the 25' distance ended.



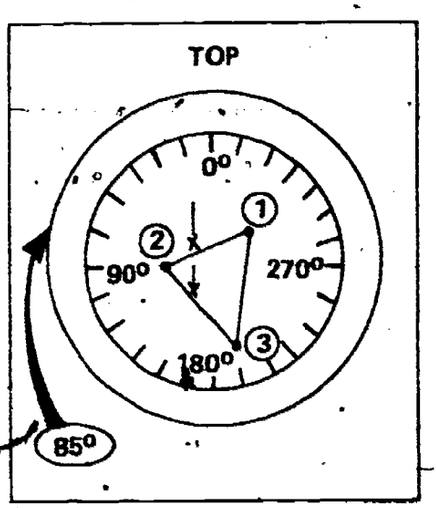
2. Second Bearing and Distance

a. Now turn the acetate disc until the ink mark is directly over the 225° on the dial.

b. Draw a line from point ② toward the top of the instant mapper for 30 feet (30 squares) parallel to the lines on the graph paper. At end of the line make a dot and label it ③ .

3. Third Bearing and Distance

a. Now turn the acetate disc until the ink line is directly over 85° on the dial.



b. Draw a line from point ③ toward the top of the instant mapper for 40 squares (40 ft.) parallel to the line on the graph paper. At the end of the line make a dot and a ④

Number ④ should coincide with your starting point ① .

DIRECTIONS TO DRAW LAND FEATURES ON MAP:

1. Stand at starting point ① and face ground point ②

2. Hold mapper waist high and turn acetate disc until the ink mark is on 320° on the inside dial.

   You and the instant mapper and the line from ① to ② should all be facing point number ② on the ground.

3. Now, measure distances along the line by pacing, put in any land features such as trees, fences, roads or buildings that you want located on the map.

4. Repeat for the other bearings and distance.

V. LAYING OUT A NATURE TRAIL

One way to apply the compass pacing and instant-mapper skills is to lay out a nature trail from a given set of bearings or distances.

Preparation

Ahead of time have a traverse layed out in the immediate area. Make a course either of these ways:

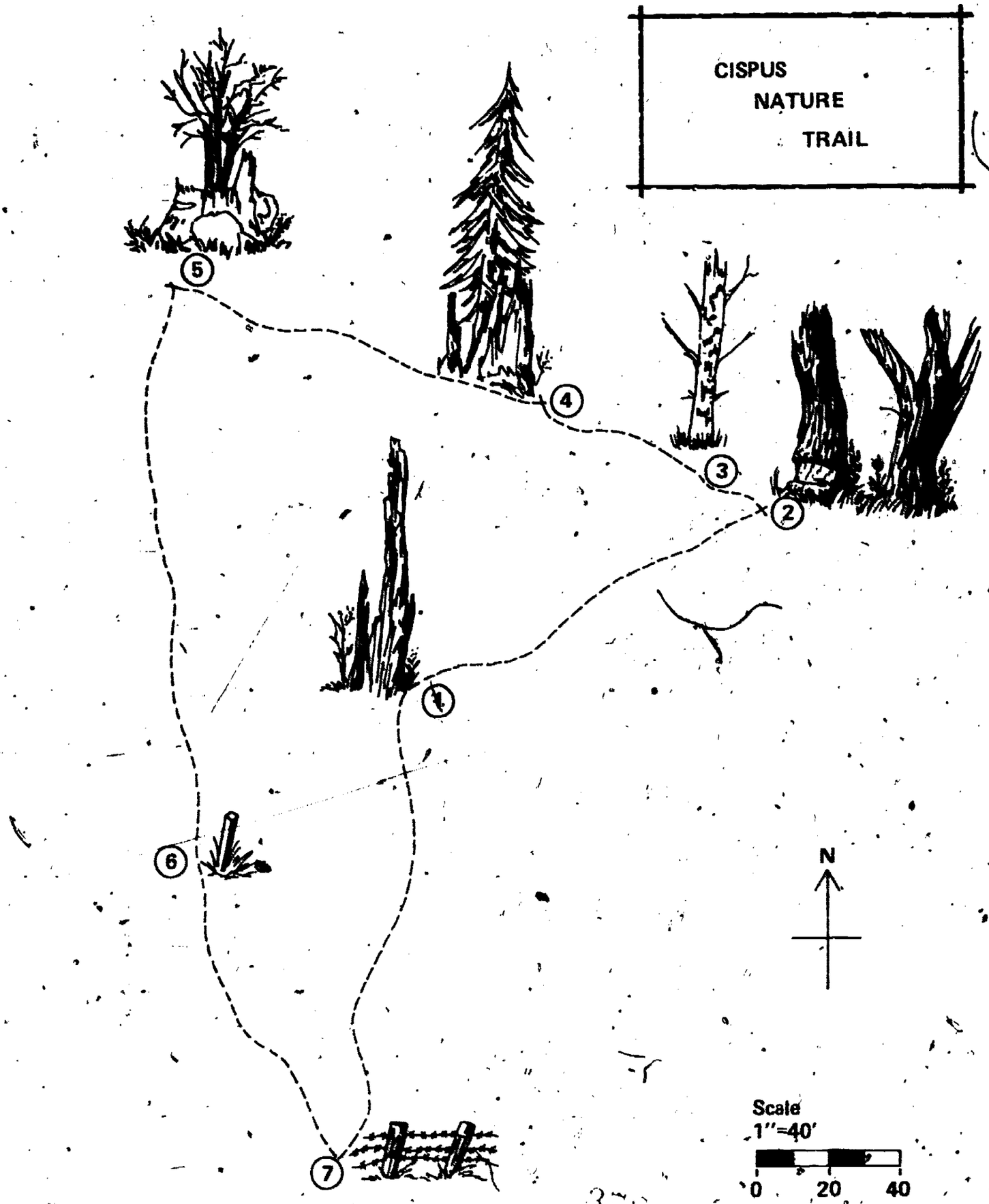
1. Lay out azimuths and distances to each point along the trail.
   Example: Starting at the apple tree, go 319° for 150', etc.

2. Describe each point (from a known beginning) and ask them to jot down the azimuth and distance to the point.
   Example: Starting at the apple tree there is an alder tree northwest of here. What is the bearing and distance, etc.?

NOTE: See pages 312-313 for sample layout.

Questions and Discussion

1. Do Task D and E, pages 323 and 324.


CISPUS
NATURE
TRAIL
5
4
3
2
1
6
7
N
Scale
1"=40'
0
20
40

Sample Task E

CISPUS NATURE TRAIL TEACHER'S GUIDE--

1. Large Cedar Snag

   What do you notice about this snag?
   How do you think it got killed?
   How does it affect the environment?

2. Beaver-Gnawed Maples

   What kind of animal do you think could have caused those scars?
   What can you tell us about this animal?

3. Cat- or Bear-Clawed Alder

   Can you make up a story about what happed here?

4. Sixty Year Old Douglas-Fir Growing in the Remnants of a Cedar Snag

   Describe what you see here.
   List the events from the oldest to the youngest that you think took place to have this happen.
   What does this tell us about the history of this area?

5. Cedar Stump, Fire Killed, Cut, and With a Hole in the Base

   What do you think happened here?
   What kind of an animal might live in that hole?

6. Old Scribed Survey Stake (Have map of area showing survey lines at stake)

   What do you notice about this stake?
   What are some reasons it might be here?
   Find the location of the stake on the map.
   What are some reasons for land surveys?

7. Remnants of a Barbed-Wire Fence

   Why do you think this fence is here?
   What is the significance to animals?
   Where does it or did it go?

VI. CONSTRUCTING AND USING THE CARDBOARD BOX PLANE TABLE

A plane table is a device for mapping an area without using compass bearings. Only one measurement is needed--that of a base line. All objects to be mapped are then located by triangulation (the intersection of two lines).

The plane table can be used to make a map of a schoolyard, an environmental study area, a schoolroom, or your own backyard.

A minimum of two and a maximum of five people/group should be used.

Equipment Needed:

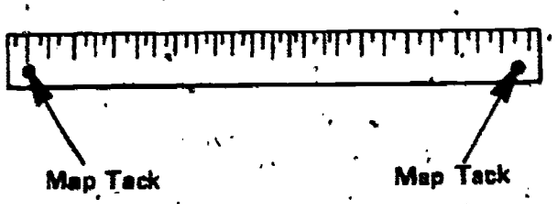
Cardboard cartons (3 per group) (Stout, like empty liquor boxes)
Unlined paper 8 1/2" X 11"
Wooden 12" ruler (one per table)
Map tacks (4 per group) (small nails will do)
Masking tape
Pencil with eraser
Plastic flagging--2 colors
Heavy twine
Stakes (2 per group)
Sacking needles (Duncan & Sons, Inc., 313-17 2nd Ave. S. Seattle, WA 98104 Phone: MA 2-1310) (optional)

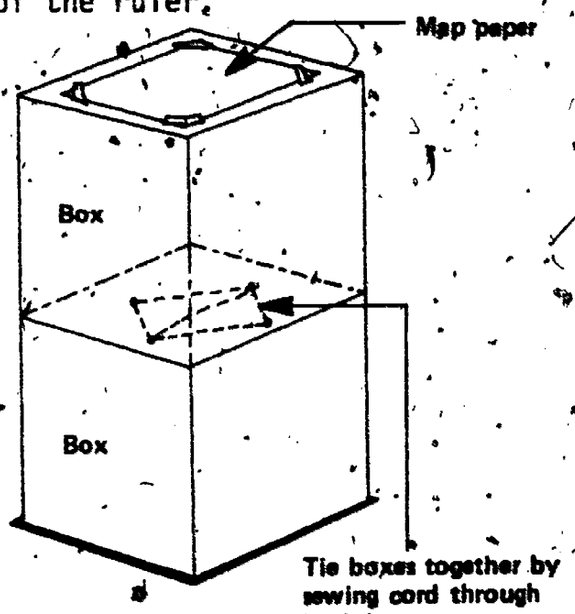
A. Constructing the Plane Table

1. Place cardboard boxes one on top of the other. Thread boxes together with a sacking needle and stout cord. (Smaller children may want them on their sides.)

2. Tape paper to the top of the box.

3. The 12" sight ruler will be used as a sighting guide. Drive map tacks into the ruler making sure tacks are equidistant from one edge of the ruler.





B. Using the Plane Table

1. Establishing a Base Line

a. After you determine the area to be mapped, pick two objects to be included in the map that are the farthest apart. Set up your plane table near one of these objects to be included in the map.

b. Drive a stake at the base of the plane table. Now pace the longest distance that must be mapped and drive in the other stake. On the way back to the plane table, measure the distance. THIS IS YOUR BASE LINE AND THE ONLY MEASUREMENT NEEDED.

c. Choose a place on the paper for a starting point for your map (this can be anywhere, just so you can get the rest of the map on the paper).

d. Stick a pin in the paper at the starting point. Put the edge of the sight ruler against the pin.

e. Get your head down toward the plane table so you can sight over the pins of the sight ruler toward Station 2, the second point on your map.

f. Keeping the edge of the sight ruler against the pin, line up the tops of the two pins on the sight ruler so that they are in a direct line with Station 2.

g. Draw the first line on the paper, from Station 1 toward Station 2. (Be sure you don't shift the ruler while drawing this line.)

2. Locating Map Features

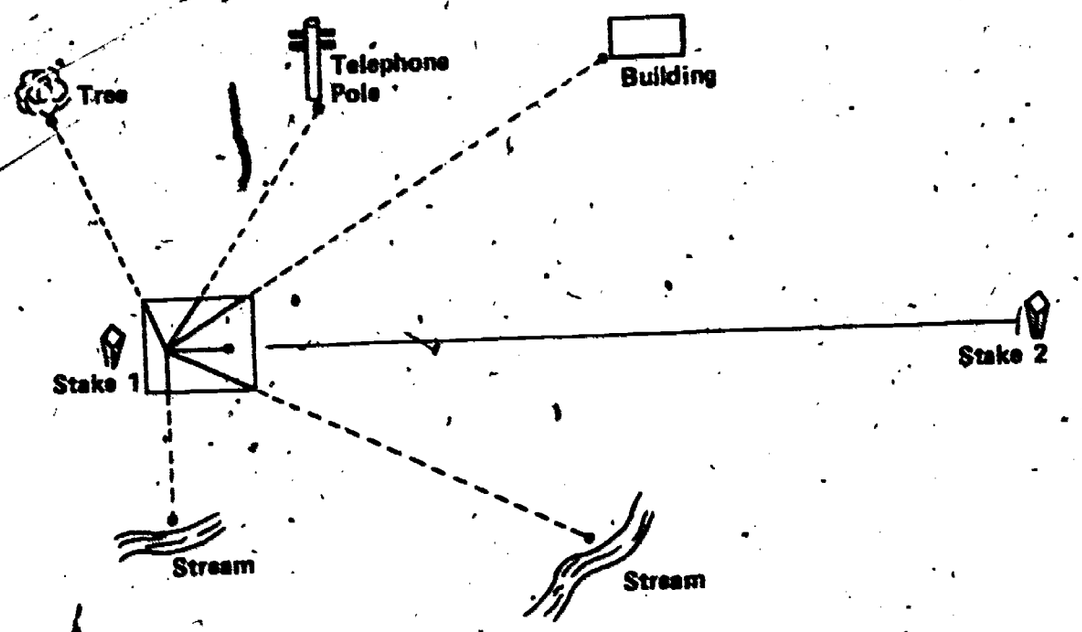
Now you are ready to draw lines toward all the other features you want to include on your map. It is done the way you drew the line toward Station 2. (The theory behind using the plane table is to locate points of intersecting lines.)

Do not move the plane table. Keeping the edge of the ruler against the pin, line up the tops of the two pins on the sight ruler so they are in direct line with the object you wish to include on your map.

Keeping the ruler still, draw a line from the pin along the edge of the ruler to the end of the ruler.

Label each line with the name of the object.

Station 1 Base Line plus rays



3. Measuring Base Line and Determining Scale

Pick up the plane table and walk to Station 2, counting the number of steps between Station 1 and 2. (This is your base line.)

The size of the area to be mapped determines the scale of the map.
Given an 8" wide paper at scale 1" = 100' Will map a space 800' wide.
Given an 8" wide paper at scale 1" = 40' Will map a space 320' wide.
Given an 8" wide paper at scale 1" = 20' Will map a space 160' wide.
(Since we are using standard rulers having inches and 1/4 inches, the scale is best divisible by 4'. Thus if 1" = 40' then 1/4" = 10'. If 1" = 20' then 1/4" = 5'. If 80', then 1/4" = 20'.)

This must be determined by observation and estimate, or by actually measuring the greatest distance between two objects to be included on the map.

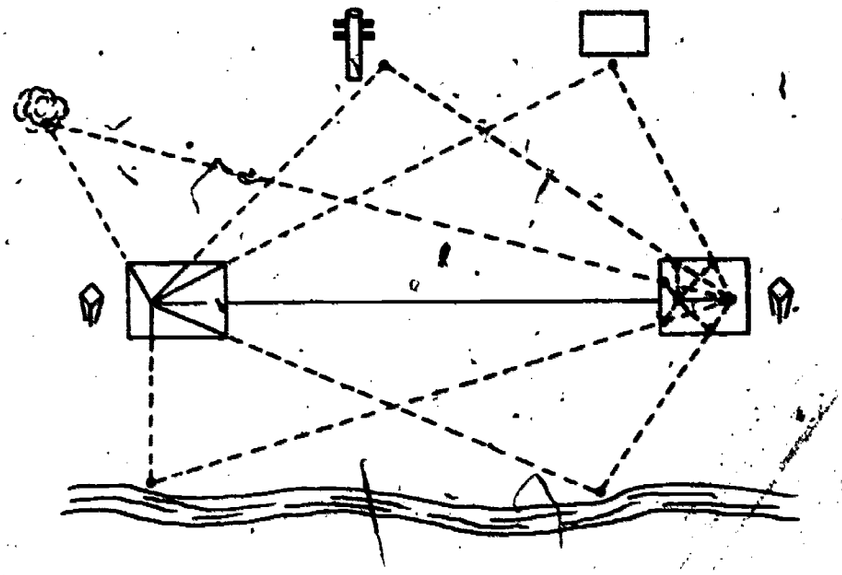
4. Orienting the Plane Table Between Station 2 and 1.

Measure and place a pin on your map at the point indicating Station 2. (Position determined by scale.)

Put the sight ruler up against this pin and sight backwards to Station 1, turning the plane table so that the edge of the ruler runs exactly along the line you just drew.

Your plane table is now oriented to Station 1. DO NOT MOVE THE PLANE TABLE AGAIN.

Station 2 plus rays



5. Plotting Features on the Map

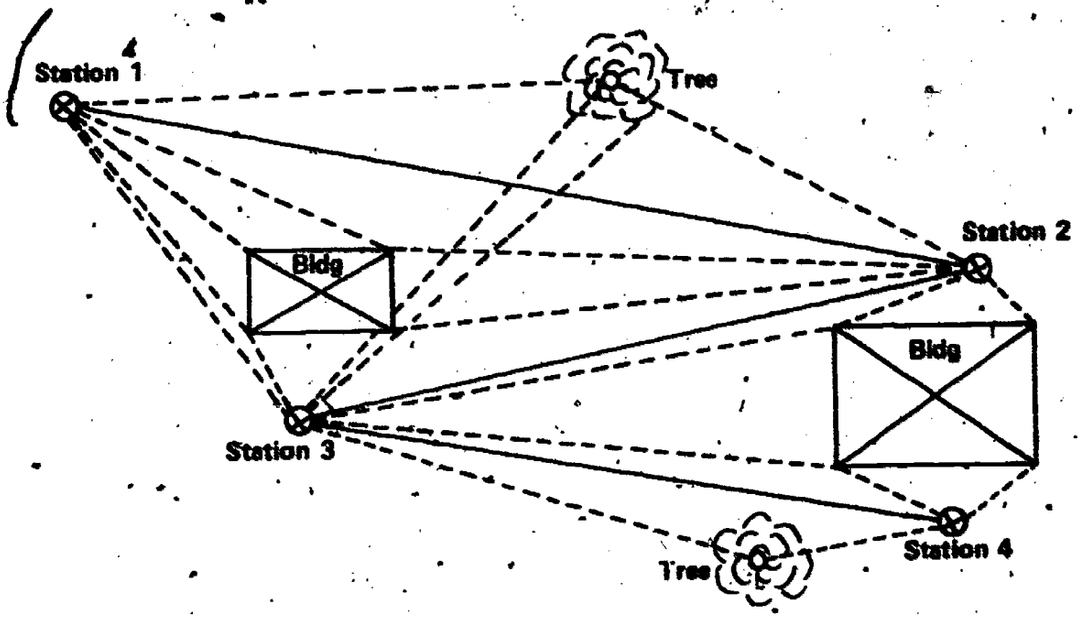
Your are now ready to locate the positions of those objects on which you sighted in Step 1.

Let's say that one of the features you wanted to include on the map was a lone apple tree. WITHOUT MOVING THE PLANE TABLE FROM ITS ORIENTATION TO STATION 1, put the edge of the sight ruler against the pin indicating Station 2, and line up the tops of the two pins on the sight ruler so they are in direct line with the apple tree.

Without moving the ruler, draw a line along the edge of the ruler toward the apple tree. The line you are drawing now should cross the line you drew in Step 1. Where the two lines cross is the location of the apple tree on the map.

Repeat this procedure for all the other features you wanted to include on the map (and for which you drew lines in Step 1).

This procedure may be carried on indefinitely--setting up a Station 3 beyond Station 2. This could be a prolongation of the base line 1-2 or it may be in another direction.



_____ Base Lines
---------- Intersecting lines to locate features to put on map.

VII. COMMUNITY FEELINGS, AWARENESS, AND VALUES ABOUT MEASURING OUR ENVIRONMENT

Have enrollees do Task F, page 325.

Questions and Discussion

1. What are some processes we've used during these activities?
2. What contributions can measuring the environment make to environmental management?
3. How can you use this in other areas?
4. What are some problems you encountered during these tasks?
5. How can we sum up our activities in 2 or 3 big ideas?

After discussions, have enrollees do Task G, page 325.

TASK A (10 minutes)

MEASURING THE LENGTH OF YOUR STEP

Walk (in a normal step) the 100' distance two times, and using the Method I chart, calculate the length of your step.

DETERMINING LENGTH OF STEP

Method I

Walk 2 times (in a normal step) the distance marked off. Record number of steps you took each time.

Number of steps 1st time_____

Number of steps 2nd time_____

Total steps (A)_____

Total number of feet in distance walked (B)_____

_____ ÷ _____ = _____

(B) (A) (C)

(total distance walked) (total steps taken) (number of feet in each step)

NOTE: Round the length of your step to the nearest half-foot: 2', 2½', 3', 3½'

Method II

# of steps in 200'	Length of step
66 – 73	3'
74 – 87	2.5'
88 – 113	2'
114 – Over	1.5'

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STEPS PER DISTANCE

Distance column	Length of steps columns			
If you want to walk this distance:	1½ feet Then take:	2 feet	2½ feet	3 feet
1 foot	½ step	½ step	½ step	½ step
2 feet	1 step	1 step	1 step	½ step
3 feet	2 steps	1 step	1 step	1 step
4 feet	2½ steps	2 steps	1½ steps	1½ steps
5 feet	3 steps	2½ steps	2 steps	1½ steps
6 feet	4 steps	3 steps	2½ steps	2 steps
7 feet	5 steps	3½ steps	3 steps	2½ steps
8 feet	5½ steps	4 steps	3 steps	2½ steps
9 feet	6 steps	4½ steps	3½ steps	3 steps
10 feet	6½ steps	5 steps	4 steps	3 steps
20 feet	13½ steps	10 steps	8 steps	6½ steps
30 feet	20 steps	15 steps	12 steps	10 steps
40 feet	26½ steps	20 steps	16 steps	13 steps
50 feet	33½ steps	25 steps	20 steps	17 steps
60 feet	40 steps	30 steps	24 steps	20 steps
70 feet	46½ steps	35 steps	28 steps	25 steps
80 feet	53½ steps	40 steps	32 steps	27 steps
90 feet	60 steps	45 steps	36 steps	30 steps
100 feet	66 steps	50 steps	40 steps	33 steps

TASK B

PRACTICING USING THE COMPASS TO FOLLOW A BEARING – Optional – if time.

Get a partner.

Give that person a degree reading.

Check to make sure that person can orient to that degree reading.

Did he set the degree reading on the pencil line?
Did he hold the compass level?
Is the direction of travel arrow pointing away from him?

Check to make sure that person can select a landmark.

Is the person looking up directly in line with the direction of travel arrow? (Most people tend to look either to the right or left, so watch them select the landmark).

Is the person holding his head straight, and in line with the rest of his body and the compass?

Repeat, having the other person check you this time.

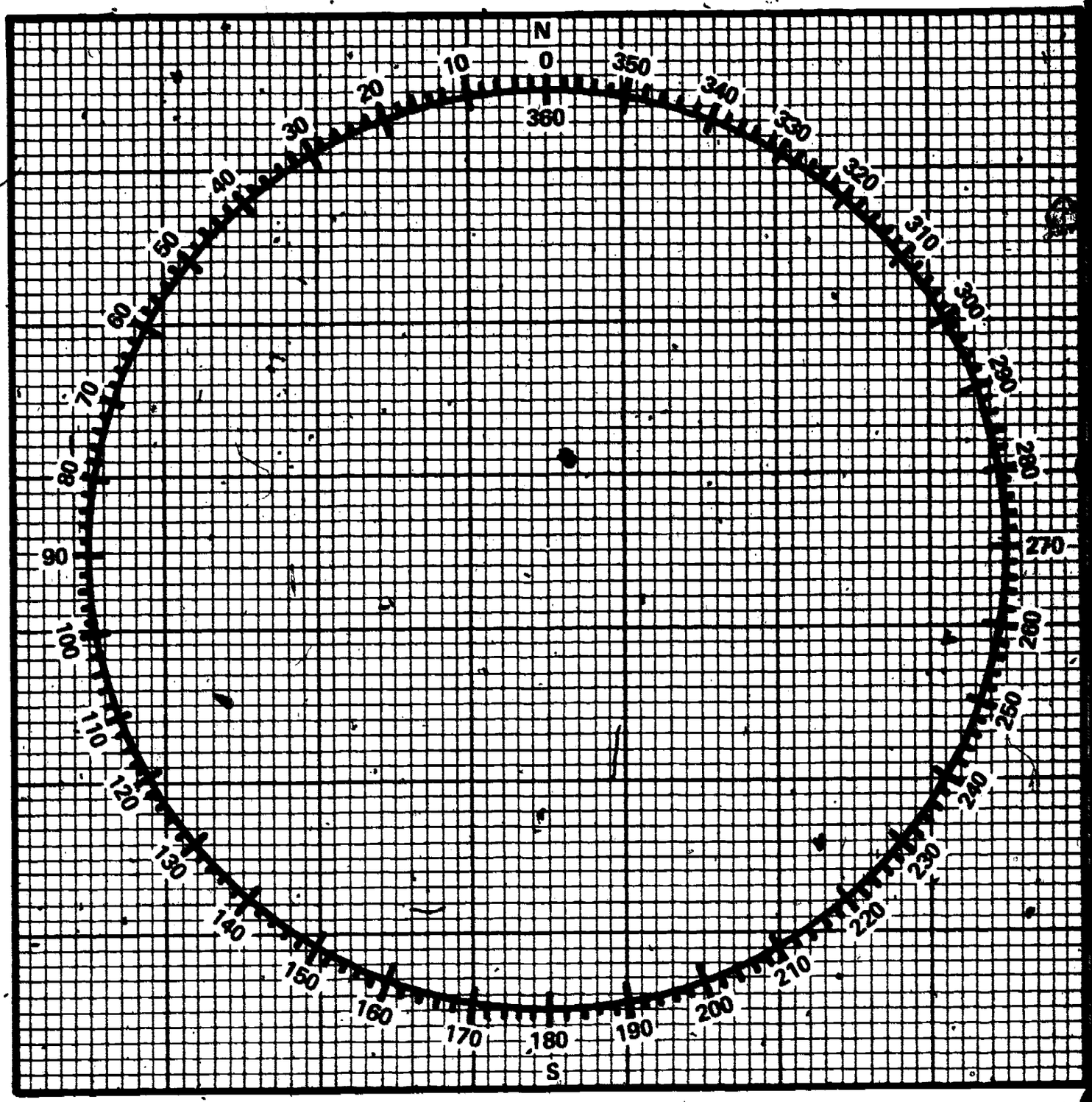
TASK C (15 minutes) Optional

Start at a given point (Point A).
Take a reading (azimuth) on an object.
Proceed to that point (Point B).
At Point B, set your compass that would return you to Point A and do so.

CAUTION:

Always hold so that the North end is pointed away from you.

Draw directly away from you and parallel with the sides of the mapper (using the graph paper as a guide).



TASK D (90 minutes) 7

LAYING OUT A NATURE TRAIL

From the bearing and distances on this sheet, construct a nature trail map using your pacing, compass, and instant mapper skills. Do TASK B as you reach each station. Include the following on your map: scale, date, north arrow, legend, title, map marker names.

Start at 40' snag
Go 120' at 60 to station 2
Then go 23' at 294 to station 3
53' at 285 to station 4
113' at 285 to station 5
173' at 175 to station 6
98' at 152 to station 7

What is the distance and direction to your starting point?

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TASK E – Fill in the following from observations made at each stop on your map.

Start at the large black cedar snag marked with blue flagging. This is Station # 1 and your first stop.

Write down your observations and questions. (Do this at each succeeding station)

1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

This is STATION #2

1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

This is STATION #3

1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

This is STATION #4

1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

TASK F

1. Describe in writing 3 contributions that measuring the environment can make to environmental management.

2. Describe at least one measurement activity that you can take in your everyday life to make a contribution to the management of your community.

   a) in your home _____

   b) in your community _____

3. Describe the benefits of each action in #2.

TASK G

Describe in writing how you feel about our session today.

E.A. PROGRAM MATERIALS

The material in this section was sent to the Washington offices from camps all over the country. It is included here as a resource for you to be used in any form that fits your camp. In most cases, some adaptation will be needed. These activities can fit into the broad plan of your E.A. program, but they do not stand alone. The material is divided into three subsections:

E.A. Activities
Living an Environmental Ethic
E.A. Evaluation

This section will be revised each year with the addition of new materials sent to Washington. Please send the materials that have worked for you to the addresses listed in the front of the guide.

E.A. ACTIVITIES

"It is our misfortune that for most of us the child's clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If asked for my expectations for our environmental awareness program this year, I would have to say the revival in [illegible] this child's "sense of wonder" was first in my hopes."

Rachel Carson
Adapted by Sandi Whitehead
Everglades YCC Camp

HELP WANTED

Michael Terzich
Camp Tallac YCC

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To identify an organism by its characteristics and survival needs.

There are many different types of roles organisms play in each ecosystem. Every animal and plant has adapted specifically to meet its needs to survive in a given area. Imagine if we made a classified want ad section in a local newspaper for each animal or plant for a particular habitat. Of course, a special twist to this activity would be to leave the name of the organism out of the description and only include the special characteristics and duties of it. One such animal/plant want ad might read like the following:

WANTED: "Softwood Logger"
-Ability to swim necessary
-Housing provided which may flood
-No dental plan available
-Apply at the nearest stream

or

WANTED: "Annoying Skin Irritator" to keep people out of unwanted areas.
-Must be willing to be different colors
-Must be able to wear black oil on surface of body
-Stationary existence a must
-Always have itching ideas in mind

You can have a great time with these want ads, using the ones for a beaver and poison oak as examples.

Have each member of your crew come up with one or two of their own "Help Wanted" ads for either a plant or animal in a habitat associated with one of your work projects. Leave the name of the organism out of the description and see if the rest of the crew are clever enough to guess what it is.

This activity could stimulate discussion on adaptation of different living things to their particular habitat.

"WANTED: IMAGINATION"

ANIMAL PAIRS

Ken Runyon, Camp Director
Duck Creek YCC Camp

Adapted from Exploring Your Environment

GOAL #1: To increase awareness of ecological principles that govern the environment.

To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To view the environment through the eyes of another organism.

Working with another person, take this sheet and evaluate this area as you think a pair of animals would.

"We are a pair of _____ ."
(Animal)

1. How would you rate this area for your following needs?

   a. General habitat:

   b. Winter and summer food supply:

   c. Evidence of predators:

   d. Other factors:

2. What evidence can you find that others of your kind live here? How will they feel about you two moving in?

3. Which of the habitat types will you choose? Where will you locate your home next, burrow or den?

4. What evidence can you find that shows that man has changed this area?

5. How do you animals feel about the changes that have been made here?

6. Why are you important to this environment?

7. Considering all things that we have investigated here, we _____ remain here. (will, will not)

8. Are things usually considered from an animal's viewpoint? Are decisions made with animals in mind? Do they ever get to vote? Should they be able to vote?

PREDATOR-PREY

Mike Luque
Duck Creek YCC Camp

Adapted from Project Learning Tree

GOALS #2 & 3: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

To increase awareness of the wide range of attitudes and personal values relating to the environment.

Purpose: To relate facts regarding the environment to wildlife populations and attitudes.

Given the information provided, have the enrollees solve the problems posed.

Given:

One mountain lion can eat approximately 1,095 lbs. of venison (deer meat) each year (in addition to rabbits, porcupines and other small animals). The lion probably only consumes about 50 per cent of each deer he kills; coyotes and other scavengers get the rest.

One deer eats approximately 3,650 lbs. of vegetation/year in the form of grasses, herbs, brush and tree leaves.

One sq. mile of deer habitat produces 800 lbs. of vegetation acceptable as deer food/year. (Note: This varies depending on the region, condition of the range, and other factors.)

Problems:

1. What is the minimum number of sq. miles of habitat needed to support one deer?

2. If each deer averages 150 lbs. in weight, how many deer are needed to feed one lion for one year?

3. How many sq. miles of deer-lion habitat are necessary for one lion to survive? (For the purpose of this problem, assume that one deer and one lion will provide continuation of the species, although of course, in reality, continuation would require many animals.)

4. Use a map of a region you are familiar with (on your camp) and outline an area large enough to serve as habitat for one lion. Ignore all roads, communities and other developments which do not produce food for deer.

5. On the same map, again outline an area large enough to support one lion, but this time take into account the number of producing acres. How much larger is the second area you outline?

6. Notwithstanding all the developments present in the United States today, there are more deer in this country now than there were when the first European settlers arrived. How do you explain this? What impact did the growth of the deer population have on other species of wildlife?

7. How would you feel about the deer-lion habitat if you were: (1) a sportsman, (2) a developer, (3) a tourist, or (4) an elected official? How do you feel?

WILDLIFE HABITAT

Mike Luque
Duck Creek YCC Camp

Adapted from Project Learning Tree

GOAL #2: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To relate facts regarding the environment and predict the effect of manipulation.

Using the information provided, have your enrollees calculate answers to the problems listed.

Given:

One acre of meadow can produce 5 lbs. of forage/year.

One acre of forest can produce 1 lb. of forage/year.

One deer requires 3,650 lbs. of forage/year and, for the purpose of this problem, 39 per cent of this forage comes from brush, 53 per cent from meadow, and the remainder from forest.

(Note: These figures are realistic, but will vary widely depending upon local conditions.)

Problems:

1. How many deer could be supported on the area sketched below? (Conversion factor: one acre = 10 sq. chains)

2. How could vegetation be manipulated if your goal was a larger deer population?

3. What would be the general effects, short-term and long-term, on the deer population if:

   a. A freeway were built from the southwest corner to the northeast corner?

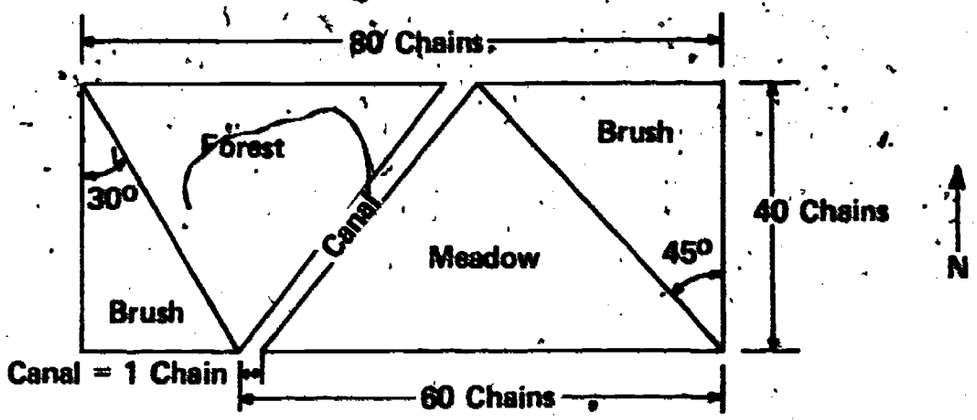
   b. A development of summer homes were located in the forest?

   c. The timber were harvested?

   d. A YCC camp was constructed?

4. If you were managing the land for timber, what effect might an increase in deer population have on new tree seedlings?

NOTE: The canal banks are parallel.



WILDLIFE OBSERVATIONS

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To identify, collect, record and compare wildlife observations.

1. Make lists of birds common to your area. NOTE: their markings, interesting behavior, distinguishing characteristics.

   e.g. Ruddy Duck or Butterball

   a. Small chunky body

   b. Unpatterned except for conspicuous white cheek

   c. On water, it spreads its tail vertically

   Herons, Bitterns, and Egrets

   a. Stork-like wading birds with long necks and legs

   b. Long pointed bill

   c. Fly with neck folded back in S-slope

2. Make a wildlife check sheet and observations record for the common wildlife in your area.

e.g. Species	Notes and Observations	Date & Location of Sighting
Cotton tail rabbit	etc.	etc.
Elk	"	"
Etc.		

3. Take an owl prowl at night. Be sure to check the area for owls first yourself. You could combine it with star gazing.

4. Take spider field trips, mushroom field trips, etc.

5. Make insect collections. Make sure you identify rare insects before starting the project so that enrollees do not include them in their collections.

FOOD CHAIN STORIES

Adapted from Ecology: Science of Survival

GOAL #1: To increase awareness of ecological principles that govern the environment.

To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To provide enrollees opportunity to demonstrate their understanding of food chains through development of creative narratives illustrating the principle.

Stories can be a good way for enrollees to express their ideas and make the learning of ecological concepts more fun. They can be done individually or as a small group effort. Discuss the stories after they have been told.

The following food chain story is true. Read it and then see if you can write your own food chain mystery. Be as crazy as possible! Your story can be a comedy, a mystery, a love story, a nature story, anything you want. Just make sure you have a food chain in it. See if you can make fiction stranger than truth!!!

Strange things have been happening in Borneo recently. The government sprayed large amounts of DDT (a pesticide) all over the countryside to get rid of mosquitoes. The mosquitoes died all right, but so did the predatory wasps. These wasps eat large numbers of a certain kind of caterpillar. The caterpillars were not harmed by the DDT. And they were not eaten by the dead wasps. As a matter of fact, they began to increase in numbers. All of these caterpillars needed more and more food. They were so hungry that they began to munch on the thatched roofs of the native people's houses. The caterpillars ate the people out of house and home!

But the story does not stop there.

Soon the government began to spray DDT indoors to kill houseflies. Normally, these flies were eaten by geckos--lizards with tiny "suction cups" on their feet. (They can walk on the ceilings and catch flies!) The geckos began to die from eating the poisoned flies. The house cats which ate the geckos also got poisoned and died. Since there were so few cats left, the rats began to invade the people's houses. Many of the rats in Borneo carry a deadly disease. The people became very afraid of dying from this disease. So, the government had to parachute in a new supply of cats to kill all the rats.

FIELD DAYS

Michael Terzich
Camp Tallac YCC

GOAL #6: To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To promote communication and cooperation with host agency while providing agency information to enrollees.

This activity provides an option for an individual enrollee to choose to spend a working day with an employee from the supporting agency. For example, an enrollee could accompany a Fire Prevention Technician, a Lookout, a Timber Cruiser, etc., in their daily duties. This activity not only serves as an educational experience to see what seasonal or regular employees do on a daily basis in the particular agency, but it also promotes communication and cooperation with employees outside the YCC Camp.

The coordinator of a field day should first offer this opportunity on a one-crew-at-a-time basis. A sign-up sheet should be posted for the different slots available with an explanation of the positions if needed. Check with the employee's supervisor before you assign an enrollee with him/her and also explain the objective of the program to the employee. Request the agency employee to explain how his job helps to accomplish the agency mission and to provide background information on the agency. Also set up times and meeting places convenient to both sides.

This activity has gained an overwhelming response and has stimulated requests for more help as well as expressions of personal interest from other employees outside the YCC program.

EFFECT OF COLOR

Adapted from OBIS

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To investigate how color is used by birds.

This activity demonstrates food color preference in jays. It takes patience so it is a good activity for a lunch or work break. Choose a work project site where blue jays, stellar's jays, or gray jays are active.

Prepare the bait: Pre-cook a package of macaroni without salt. When tender, divide it and the cooking water into 5 equal parts in separate bowls. To each add one teaspoon of food color (red, blue, green, yellow) and stir until all macaroni is covered. Leave one portion uncolored-white. Add more dye if the macaroni is not a bright, rich color. Rinse and drain each color separately and package in 5 plastic bags. Use the macaroni within 5 days.

At the work project, lay the macaroni out in a long row alternating the 5 colors, so that no one color is clumped together. Leave 4 cm. between each piece. While eating lunch or on a break, make observations of what happens, but stay at least 6 meters away from the site and sit quietly. Assign 1 color to each enrollee or group of enrollees and have them watch it. After 8 pieces of 1 color are eaten, end the trial. Run several trials on the same or different days.

Questions: Which color did the birds prefer? (Usually it is white.)
Do 2 birds feed at the same time or only one?
How many birds were attracted?
How many different species of birds were attracted?
How many pieces do they pick up at one time?
Do they eat it immediately or fly away with it?
How long do they stay near the food?
Do the birds communicate with one another?

Suggestions/Variations: Try to change the color preference of the birds by covering the favorite color with salt, cayenne, or hot sauce. Conduct 2 trials with flavored macaroni. On the 3rd trial go back to unflavored macaroni. Had the jays learned to avoid the color? How quickly did they learn to avoid it?

Do the jays like different colors in different places? Do they prefer one color on the ground, another in a tree?

Find out if the jays will eat their least favorite color if it is the only one available.

PLANT DIVERSITY AND ANIMAL/INSECT POPULATIONS

Adapted from OBIS

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To demonstrate the environmental concept of diversity by investigating if the diversity of plants has an effect on the numbers of organisms.

Materials: Mist nets, collection bags or bottles.

An unmanaged area is likely to support a greater diversity of animals than a managed area. Find a site near a work project that has these two different areas. Divide your enrollees into 2 groups. Have each group sweep one area with a sweep net. In order to make valid comparisons, they must sweep both areas the same number of times. If you don't have a sweep net, let them collect insects and other creatures in plastic bags or collecting bottles for 10 or 15 minutes in both areas. When they finish compare the kinds of animals found in both areas. If you like, put the animals in small vials, 1 to a vial for comparisons.

Questions: Which area had the greatest diversity of animals?
What would be some of the advantages for an animal in having a diversity of plants and animals in an area?
How does man influence animal diversity?
How do you account for the differences in the two areas?
How were the plants in the unmanaged area different from those in the managed area?

Suggestions/Variations: Choose a sunny day. More animals are active. Put all animals back when you are finished.

While the other enrollees are collecting animals, have 2 others make plant collections for each area. Include 1 sample of each plant found in each area and compare the diversity.

Divide the enrollees into pairs and assign each pair to a plant. Go into the field again and collect 1 animal of each species found on the plant. LOOK CAREFULLY! Bring them together to compare results. Which plant had the greatest diversity of animals on it? Which plant was the most popular? Did you notice certain animals associated with only one kind of plant?

THE ANSWER PERSON

D. Jeff Creamer
Hahns Peak YCC

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To cultivate and respond to the interest and curiosity expressed by enrollees regarding their environment.

Enrollees of the Hahns Peak YCC Camp were encouraged to submit questions regarding their camp and local environment. The Environmental Coordinator then used local resources--including the telephones at the District Office, resource people in the Supervisor's Office, local newspapers and the Steamboat Public Library--to find the answers to the questions. The Environmental Coordinator tried to promise a 2-day turnaround time in questions answered; however, in the case of very difficult questions the answer time would take approximately a week.

Some of the questions that were turned in this year on "Answer Person" blanks were:

Why do mosquito bites swell up and get white and puffy?
Are spruce trees bisexual?
How old is the (Village) theater building?
How were the Flattops (wilderness area) formed?
Why are bamboo hollow?
What is that foam that forms on lakes and streams?
Can you get your daily iron by drinking from Iron Springs?
Is there a map of the springs in Steamboat Springs?
Why can't they put the high tension wires in Strawberry Park along the road rather than clearing a whole 'nother area?

In the process of turning up the answers to some of the Answer Person questions, it was possible to establish some good public relations with members of the local community, as well as to focus on some areas in which knowledge is needed. In the case of Steamboat Springs, for instance, we discovered that no testing has been done on the water in these springs for perhaps 80 years! Steps were taken to initiate testing of these sites by the Routt National Forest Supervisor's Office and by the Water Resources Division of the U.S. Geological Survey.

Copies of the completed answers were returned to those enrollees who asked the questions; and xeroxes of all questions/answers were handed out to crew leaders, for use with their crews as needed.

A sample "Answer Person Answer" is on the following page.

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SAMPLE ANSWER PERSON ANSWER.

QUESTION:

Why do mosquito bites get white and puffy?

ANSWER:

When the mosquito bites, its mouthparts (a bundle of exceedingly slender tubes known as "stylets") carry a certain amount of saliva down with them into the skin. That is fortunate for the mosquito, since its saliva contains an "anticoagulant" agent that prevents the blood from clotting. (Who wants a sticky dinner?) Unfortunately for the victim who is getting lunched on, the substances in the saliva are "believed to give rise to an allergic reaction, which in turn produces skin lesions..." (Encyclopedia Britannica, V.368) (You might ask yourself a more difficult question--which is why does an "allergic reaction" involve a swelling?)

Incidentally, you will be surprised to learn that YOU HAVE NEVER BEEN BITTEN BY A MALE MOSQUITO. Only the females bite. It seems that they find the blood protein to be excellent material for producing eggs, while the men drink things like nectar and plant juices. (If you want to find a male mosquito--who doesn't bite--they are distinguished by their more bushy antennae.)

The mama mosquito is only in her adult period for a matter of days or weeks. After she gets a blood meal, she may digest this for two days to a week and then lay from 100 to 400 eggs (usually on the surface of water, since the "wrigglers" live there.)

CREW LEADER: Try doing this WHAT IF? question: What if we eradicated all mosquitoes?

REFERENCES:

Book of Popular Science 3.287 (flies & mosquitoes)
Audubon Nature Encyclopedia 7.1209 (mosquito)
The New Encyclopedia Britannica (1974) VII.48 (mosquitoes)
" " " " " V.368 (insect bite and sting)

CAMPGROUND SURVEY

Michael Terzich
Camp Tallac YCC

GOALS #2 & 3: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

To increase awareness of the wide range of attitudes and personal values relating to the environment.

Purpose: To inventory use of an area, assess the environmental impact of the use, and identify personal feelings.

The campground survey on the next page is one suggestion for use in any campground work project.

FALLENLEAF CAMPGROUND SURVEY

TYPE OF PEOPLE	MOTORCYCLES	SMALL CARS	LARGE CARS PICKUPS	CAMPERS & TRAILERS	MOTORHOMES	TENTS	OTHER
A SINGLE INDIVIDUAL							
COUPLES							
MIXED GROUP OF 3+							
FAMILY OF 3							
FAMILY OF 4+							
OLDER COUPLES 50 YRS							

From these observations what can you conclude?

How do most visitors use this campground?

Which of these visitors consume the most amount of nonrenewable resources during their travel? ...the least amount?

Do these campers expect a maximum level of comfort while visiting their National Forest?

FALLENLEAF CAMPGROUND SURVEY (Cont)

List some observations you have noticed.

If your family were camping here, which category of visitor would fit into and what type of vehicle would you have?

Would you choose to stay at this campground? Why? or Why not?

How can this site be improved?

EITHER-OR Choices:

Fact: There are reported shortages in natural resources, especially gasoline for the future.

a) While people are vacationing, they should select a means of transportation that consumes the least amount of gasoline.

b) People should continue their present use of gasoline and hope that new inventions and sources of energy will replace the need for gasoline.

CAMOUFLAGE AND DISGUISE

Peter Stontz
Taylor Lake YCC

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To give enrollees an appreciation and understanding of the environmental _____ known as adaptation.

Equipment Needed: Crayons, pins or tacks, heavy paper or shelveboard, scissors, colored toothpicks.

Description of Area: Forest "Edge" near clearing is best to provide many different habitats.

Procedural steps:

A. Background: Concealment by camouflage or disguise is essential to the life of many animals. It can be either protective, as in animals trying to escape the notice of predators, or aggressive as in predators seeking to ambush their prey. Often it may serve both purposes at different times. Many small predators are also eaten by larger animals.

1. Camouflage--makes an animal blend with its environment by breaking up the shape and outline of the body with colors.

2. Disguise--makes an animal like like something else, like a leaf or twig which a predator would not be interested in.

3. Adaptation is not a conscious process brought on by reasoning; it is the result of survival of the fittest.

B. Setting the Stage:

1. Seat the enrollees in a comfortable place.

2. Introduce the concept of concealment adaptation. Give an introduction and examples like the peppered moth in England which changed from light colored to dark as its habitat changed with air pollution.

C. The Activity:

1. Demonstrate adaptation. Prior to the activity, hide dozens of precounted colored toothpicks. Tell the enrollees that the toothpicks represent insects and the enrollees are predators who eat them. Give the "predators" a time period to hunt or starve. Then, when the time is up, take a tally. What color

survived the best? Discuss why. What if the background color changes? How do animals adjust to seasonal color changes? (migrate, hibernate, change color)

2. Try it again. Let everyone hunt as hard as they want even if they really concentrate on finding the best camouflaged ones.

   This is a good opportunity to show that most predator animals "eye in" on a particular prey and get much better at finding that species. Experiments have shown that individual birds which have developed a very strong searching image for certain prey will, at least for a while, overlook alternative prey which has become more abundant.

   Did the enrollees start to "specialize" on any colors? Do most animals?

   Was the shape of the toothpicks an advantage in hiding? What about walking sticks and leaf-mimicking insects, or spots on a fawn deer?

3. Talking over the concept.

   By now the enrollees should have some questions or "exceptions to the rules." Talk them over if they do. If they don't, try suggesting some questions.

   Why aren't all animals camouflaged? (Social reasons--flocking, recognition, etc., or there is just no reason to be selected for it. Examples?)

   Does camouflage work against all predators? What about bloodhounds? Or against bats?

   What kinds of animals are camouflaged? (animals that rest during the day, eggs and young mothers, and animals that turn the same color as the food they eat)

   Do camouflaged animals run away when predators come close? Why or why not?

   How do many animals hide their bright eyes? (squint)

   Position a volunteer behind a tree so his shadow shows. Ask how everyone knows that he is there. What do animals do to hide their shadow? (flatten themselves)

   Are more cats or dogs camouflaged? (hint camouflaged animals usually lie in wait or stalk closely)

4. Pass out colors, paper and scissors. Each enrollee gets to create an animal and camouflage it. Make a rule that it must be at least as long as the toothpick and at least an inch wide and must have an animal shape. Make some ground dwellers,

some tree climbers (like caterpillars) and some bark resters, like moths..

Have each enrollee hide his animal, one at a time without the others watching, in a small (say 50 x 50 foot area). Then release the predators (enrollees) to hunt. Examine the "stomach contents" of all predators at the end of the game and discuss the results. It might be a good idea to time how long it takes to find the last insect creation.

Follow-up Activities:

1. Try to locate camouflaged animals.

2. Talk about animals and their coloration. Cows, tigers, dogs, frogs, etc. Do they have protective coloring?

3. Have students create their own camouflage by painting old clothes to be judged in an old field or a woods.

POPULATION

Brad Dubbs
Yakima YCC

Adapted from Zero Population Growth

GOAL #2: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To involve enrollees in activities and thought processes leading to an understanding of population growth.

Objectives:

1. Give 2 reasons for the high demand on water and irrigation.
2. Discuss 2 reasons for the increasing world population.
3. Give 2 reasons why their actions might put more demand on water use.
4. Give 2 examples of how they can help conserve water.

Procedure:

1. Have enrollees act out world population trend--8050 BC-2040 AD. Experience crowding. Pretend a 25 sq. ft. area represents the world and spread everyone out in it. Announce it is 8000 BC, population 5 million. In 150 seconds it will be 1650 AD and the world population has doubled. Have everyone move into 1/2 the original 25 ft. sq. area--within 150 seconds. At the end of 150 seconds announce that it is 1850 and the population has doubled again. They must now move into 1/4th the original area--but they have to reach this in 20 seconds because the population has doubled in a shorter time (200 years). Continue reading the year and the time in which population doubles.

   1930 doubles in 8, 1975 doubles in 5, 2010 doubles in 4.0, and 2040 doubles in 3. (Add one zero to get time in years.)

   The total activity takes 190 seconds.

2. Have each enrollee share their feelings about the experience. What is happening? What would happen if population increased indefinitely? Discuss how population affects water and food consumption and pollution. What happens when the number of persons consuming is increasing and the amount of resources each person consumes is also increasing? Two reasons for high water demand: (1) increasing population, and (2) consumption.

World population is increasing because: (1) medical advances lower the death rate, and (2) there are more people of age to have babies. Even if all families from now on had 2 children, world population still increases because many young people still want to have kids.

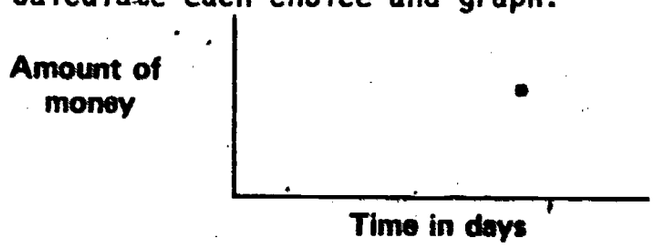
3. Complete attached activity and discuss objectives 3 and 4 above.

Geometric and Arithmetic Growth Curves

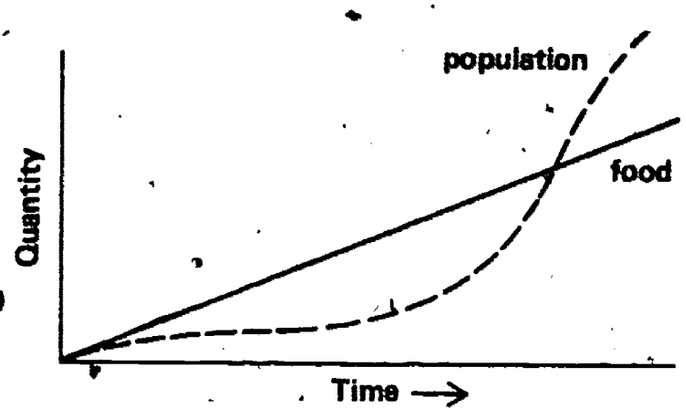
Learning Objective: Enrollees will be able to recognize the principal difference between geometric and arithmetic curves.

Teacher: -Ask enrollees, "Which would you rather have, $100,000 a day for 30 days or 1¢ the first day, and the opportunity to double your money each day for 30 days?"

Students: -Calculate each choice and graph.



Discussion: -Examine the difference in the way each amount of money accumulates. Which of the 2 would you like?
-Consider this problem with your crew:



-When does each member of the population shown on the graph have the most food?
-When can the population just grow enough to feed itself?
-What happens after this point is reached?
-Have we reached this point in our country?
-Do animals in nature ever reach this point?
-What are some solutions to this type of problem?

You'll need: Graph Paper.

Suppose you own a pond on which a water lily is growing. The lily plant doubles in size everyday. If the lily was allowed to grow everyday unchecked, it would completely cover the pond in 30 days, choking off other forms of life in the water. For a long time the lily plant seems small, and so you decide not to worry about cutting it back until it covers half the pond. On what day will that be?

Another riddle helps enrollees to understand that in spite of the number "4," 4 billion people on earth is an enormous number. "Your rich uncle has just died and has left you $1 billion. But if you accept the money, you must count it for eight hours a day at the rate of $1 per second. When you finish counting, the $1 billion is yours and then you may start to spend it. Do you accept your uncle's offer?" "Sure" most enrollees reply. After doing the math work, however, few are ready to spend the 95 years of counting required.

The riddles are enjoyable to enrollees, but nonetheless help facilitate an understanding of a very serious topic. In addition, they are "value fair," the exercises deal with size and timing of population growth, but do not attach a "good" or "bad" label to the outcomes.

A discussion following the calendar riddle may ask the enrollees what the world population will be when they are, say 88 years old, given the present doubling times, and then how they feel about the answer. What kind of life might they expect at that time as the elderly? What differences in growing up might their grandchildren expect? Can the world population keep on doubling the way the pennies did? Is there an optimum population after which doubling would be undesirable? Has it been reached? What can we do now to deal with population growth in a desirable manner? Are all methods of control morally desirable? Practical? Possible?

Some Population Statistics

U.S. population is growing at 3400 per day, thus 100,000 per month. To accommodate them, a city the size of New Haven, Conn. has to be built every month.

The world population is growing at a rate of 2% every year. 2.2 people per second. 70 million every year.

Man's number has passed the 4 billion mark. Half of this number since World War II.

It took from prehistoric times to 1830, about 200,000 years, for the world population to reach 1 billion. By 1930, 100 years later, the number had doubled. The 4 billion mark was reached in 1975. At its present rate, the world population will double every 30-35 years.

The present population explosion has not been caused by drastic increases in the number of babies born. Birth rates, in fact, have shown a slight decline. The widespread control of infectious diseases has resulted in a sharp reduction of the death rate. Control of the malarial mosquito has cut the death rate in half in much of the underdeveloped world. This decrease in the death rate has brought about an increase in the population growth rate. Even if every couple in the world limits itself to two children, the population would still double before stabilizing.

SUGGESTED ENVIRONMENTAL AWARENESS ACTIVITIES FOR CREW LEADERS

Michael Terzich
Camp Tallac YCC

GOALS #1, 3 & 6: To increase awareness of ecological principles that govern the environment.

To increase awareness of the wide range of attitudes and personal values relating to the environment.

To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To assist crew leaders to develop E.A. integration with work projects.

Each work project and surrounding area has many opportunities to increase environmental awareness. If the work leaders take advantage of these opportunities, environmental awareness will come to be a part of the everyday activities. Anytime we carry out a work project, we experience change through a given period of time, and work leaders should capitalize on clarifying that change. Here are some suggestions that will analyze that process of change and will clarify to the enrollees why they are working on a particular project.

1. Locate the project area on a topographical map and identify the terrain of the area as well as origins of streams, watersheds, high peaks, roads, etc.

2. What type of aspect does this particular area have and how has it affected the plant growth?

3. Name habitats that can be found in the immediate area; list some specific living things that are associated with these habitats (wildflowers, birds, trees, fungi, animals, etc.).

4. What type of impact (physical and living) will our project make on these habitats?

5. What are man's reasons for manipulating this particular environment? How does the public use this one (grazing, hiking, skiing, fishing, logging, recreational use, etc.)?

6. Do some of the uses above enhance or destroy other possible uses of the land?

7. Why are we working on this project? What are the unit's management goals for this area?

8. What favorable or detrimental unavoidable impacts (social or cultural) will the project incur?

9. Is there any historical or cultural significance related to this particular area?

10. Develop an "environmental word for the day" and keep a record of this until the end of the project.

11. Test and keep a record of soil and water conditions for the project area and compare this to other areas you've worked in.

12. Try to culminate every major project you complete with an activity below that will demonstrate change, feelings, knowledge, understandings, emotions, etc., about the project:

    a. Write Cinquain poetry

    b. Produce a Historical tape of the work accomplished

    c. Write a news article as a group

    d. Develop a cartoon for the project

    e. Have a circle discussion on change

    f. Carry out an art project

LAND USE PLANNING

Marilyn Kelley
Angeles National Forest

GOAL #5: To experience problem-solving and decision-making processes which are applied to environmental management concerns.

Purpose: To involve the enrollees in the land use planning process, including assimilation of information, problem-solving, alternative evaluation and compromise.

The following was designed for the Angeles N.F., but can be adapted to your needs.

The enrollees were given background information on the area in question which included the following:

1. Location
2. Topographic map
3. Visitation levels
4. Manager's conclusions concerning the area

   i.e. existing recreation facilities are deemed inadequate to meet demands

5. Available facilities
6. Characteristics of the public using the area including kinds of recreation most prevalent
7. Possible alternatives suggested by park managers

The enrollees were then divided into groups and given Task A to complete. Each group analyzed the possible use. After all groups had completed the task, presentations were given by each one and a consensus reached by the group as to the best plan to use. They then developed an outline for a land management plan for the site.

Task A

The Angeles National Forest is visited by more than 7 million people annually, and many citizens' groups have expressed an interest in the Burro Canyon site. Considering the recreational needs of this large

number of people, list possible uses of the land below. Each group will take one use and analyze it for positive and negative effects.

Uses: 1. _____

2. _____

3. _____

4. _____

5. _____

Use _____

_____

Advantages:

Disadvantages:

WORK PROJECT ENVIRONMENTAL ANALYSIS

Sally Wisely
New Mexico BLM YCC

GOAL #6: To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To involve enrollees in analyzing work project impacts (positive and negative) on the environment.

Introduction:

Writing a small environmental analysis on work projects, or on the camp itself, may be a valuable experience. The actual impact of our actions become more apparent. You might want to write an impact statement before you do the project.

A. Work Project

1. Description of project:

2. Purpose of project:

3. Environmental setting:

B. Probable Impact of Project: How will the project affect the following:

Environmental Aspects	Positive Impact	Negative Impact	No Impact
air			
water			
soil			
wildlife			
vegetation			
sound			
economics			
human aspects			
aesthetics			

C. Will these impacts be long or short term?

D. Can negative impacts be mitigated?

E. Alternative actions, projects or precautions which should be considered.

YCC WORK PROJECT ANALYSIS

GOAL #6: To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To involve enrollees in analyzing work project impacts (positive and negative) on the environment.

Crew No._____

Group Leader_____

To be completed at work site (One copy to be completed by each crew for each project engaged)

I. Project Title_____

A. Date project began_____

B. Project location (be specific)_____

_____

C. Description of project_____

_____

D. Purpose of project_____

_____

E. Materials necessary for project_____

_____

F. Time allotment for project completion_____

G. Number of persons to work on project_____

II. Survey of project area environment

A. General description of project environment (i.e., lakeshore, dry hillside facing east, etc.)_____

_____

B. List any evidences in project area and surrounding area of wildlife_____

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C. Description of plant types present in area. Include relative abundance and condition_____

_____

D. List any evidences of man's influence in project area_____

_____

E. List sources of water for wildlife and plants listed in B and C_____

_____

III. Justification for work project

A. How do the plants and animals in B and C above interact?_____

_____

_____

B. What immediate impact will this work project have on this environment?

1. Negative_____

_____

2. Positive_____

_____

C. What long-range effect will this project have on this environment?

1. Negative_____

_____

2. Positive_____

_____

D. Will this project increase or decrease human influence in this area? Explain_____

_____

E. What will be the long-range effect if the project is not completed?_____

_____

F. In your opinion, is this project a valuable expense of YCC time and money? Explain on back.

G. List on back any suggestions or comments relative to this project.

Signed _____
(Youth Leader)

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MINI-ENVIRONMENTAL ANALYSIS

GOAL #6: To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To involve enrollees in limited analysis of work projects.

The objective of project_____Date_____

1. Impact on the primary resources.

2. Impact on other agency resources--which resources?

3. Precautions needed to prevent or reduce undersirable impact on resources.

4. Impact on aesthetics.

5. Public health and safety considerations.

6. Suggestions for improvement of the project--other courses of action available.

DICHOTOMOUS KEY

Purpose: To teach enrollees the processes involved in observing and classifying information.

This activity uses problem-solving skills. It has been designed using leaf specimens; however, it can be used with tree, brush or grass samples, animal skulls, pelts, etc.

Divide into groups of five people. For this activity you will need one complete identical package of various leaf specimens for each group. Each person in the group gets one leaf specimen.

Questions and Discussion:

1. "Look at your own leaf specimen for 1 or 2 minutes and look for its observable characteristics. Since we are looking for observable characteristics, I don't want to hear any tree names."

2. Now have each person share what they observed about the characteristics of their sample with other members of their group.

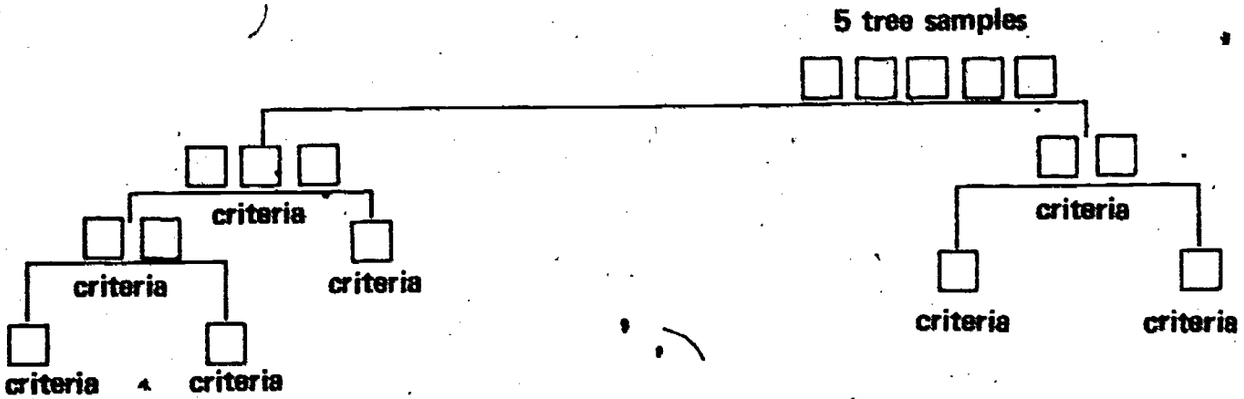
3. Have each group put all of the leaf specimens into two piles based on the major likenesses and differences of the leaf characteristics. Write down the criteria or reason you used to do it.

4. Ask each group to tell the reasons used as you list them on the board. Point out that some groups used different starting points.

5. Your next task is for each group to construct a dichotomous key. What does dichotomous mean? (You may want to draw a sample key on the board to illustrate.)

   (Give each group a piece of paper and a felt pen. Tell each group to construct their key so that everyone can see it.)

TASK A Construct a dichotomous key using your own criteria or starting point for putting the samples into two piles. Divide each pile into two piles of samples based on the major likenesses and differences of their leaf characteristics. Continue dividing piles until you only have one specimen left in each pile. (This is one way to make a key--you may want to use another way.)



TASK B Now that you have finished your key, as a group: Select one sample, and using the words in the key that describe that sample, write a description of it in sentence form.

Questions and Discussion: (After most of the group have finished constructing their key)

1. Have each group read their description while the other groups select and hold up the sample they think is being described; have the members of the group that read their description check the other groups to see if they selected the right sample or not. (You may have to ask people to hurry so as not to drag out this part. It is important, though, for each group to read their description.)

2. After #1 say: I noticed that not all groups selected the sample being described and that not all groups started at the same point. If we assume we have as many different societies in this room as groups (each with our own way of working as a group, and each with our own language), then how could we use this classification activity to increase and improve the communication between society? (Committee, common vocabulary, etc.)

3. What else can we do with this key now that we've built it? Discuss groups' suggestion.

ACCLIMATIZATION AND SENSE SHARPENING EXERCISES

Adapted by Frank Stewart, Indians Ranch YCC
from Acclimatization and Acclimatizing by Steven Van Matre

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: These activities are all related to perceiving the environment in new ways, becoming aware of more subtle facets of the environment, and discovering the different perspectives that different people have.

Very often, identification, collection, and observation are used as ends in themselves in nature study. Many enrollees are asked to learn 20 wildflowers or 20 trees, collect 50 insects, or observe two animals. These activities become ends in themselves rather than a means to an end. The real goal, the real "end" we wish to achieve is a sense of the interrelatedness of life, a respect for the wholeness of the environment and man's place in and dependence on it. To do this, we must first develop appreciations and feelings for the natural world and help the enrollees to understand it on their own terms.

One program designed to do this was developed by Steven Van Matre who calls it Acclimatization (see bibliography to order). To acclimate means to become accustomed to a new environment. The program is designed to employ all senses in exploring lakes, bogs, forests, meadows, etc., and to completely involve the participants in the habitat--acclimating them to it. It does not replace collecting, observing, experimenting or identifying. It is an additional approach which can add a new dimension to your program.

1. The following is an example of a sense sharpening exercise conducted at a YCC camp:

   The first part included several walks which the enrollees took in pairs for about 20 minutes each. One person was blindfolded and the other guided him by hand. They remained silent unless safety required speech. A second set of walks allowed no physical contact between the two; the blindfolded walked was required to self-orient and self-direct, and the guide only spoke as safety demanded. In the third walk the blindfolded person was brought to a plant and was allowed to explore it in any non-visual ways he chose. After being disoriented and led away, he was required to go back unblindfolded and relocate the plant. For the last activity, the enrollees were given various natural objects (leaves, flowers, bones, rocks, and pine cones) and drew them without seeing them. They could hold the object in a box which allowed them to feel what they were drawing, or they could be blindfolded which allowed them to smell or taste the objects.

After each part of the activity, the crew members reassembled to discuss and compare their experiences. The crew leaders and Environmental Educator often participated in some of these activities, and suggestions from everyone were incorporated into the activity as it progressed. This produced many creative variations; for example, the walks also became "crawls," "climbs," and "runs;" enrollees themselves selected objects to be drawn by their companions; and they could choose to dispense with a blindfold in favor of keeping their eyes shut on their own.

Some of the discoveries made during this activity included wind changes on different slopes, the different textures and qualities of ground covers, subtle temperature changes between micro-environments, some effects of livestock on the ground and vegetation, the amount of noise produced around buildings, and our exclusion of non-visual senses in the majority of our perceptions. Each person discovered something different and had a different experience.

From the experiences in this activity, enrollees were able to identify more subtle environmental parameters in later activities, could discuss problems with a better understanding of others' different viewpoints, could better recognize environmental problems not visually apparent, and were aware of many more effects on the environment by the work projects.

2. Other examples include:

The Muir Trek: A day long hike that begins before dawn so the sun is rising while hiking.

The Bosun's Chair: A swing chair on a block and tackle designed to raise a person thirty feet above the forest floor for a "bird's eye view."

Sensory loops: Nature trail loops that each concentrate on a different sense.

NATURE QUIZ

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To offer enrollees the opportunity to demonstrate environmental knowledge they have learned in camp.

Number of Players: Optional

Area: Indoors or Outdoors

Type of Game: A game for the quick-minded. Remembering of facts about objects in nature.

Equipment: Sharp ears and a quick train of thought.

Purpose or Concept: Distinguishing between true and false statements made about nature.

Divide the group into two teams. Chose a leader and let him read a list of statements, one to each team. They are to distinguish whether the statement is true or false and give a reason for their answer. Example: elephants have wings, snakes live in caves, bears hibernate, all animals have hair, rabbits are insects, toads cause warts, horses have stripes on their backs, plants have no roots. The game should be played in the form of a spelling bee.

TREASURE HUNT

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To teach enrollees to follow directions while becoming aware of the environment.

Divide the group into teams. Each team gets a sealed envelope. At a given time the envelopes are opened. There is a card inside which reads something like this:

"Go to the tallest oak you see from this point." At the oak is a sign. The sign reads, "Follow the direction of the longest branch to the smallest pine tree." There the team finds another message, "Turn southwest and walk to the boulder." In the crevice there is another message. It reads, "To apple tree." There is only one apple tree in the area, it must be it. The messages keep going until the last one which is, "Look under the stump which came up out of the ground due to the ice storm." Here the winning team finds the treasure--candy, peanuts, or what have you.

OUT-OF-PLACE HUNT

Adapted from OBIS

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To test previously acquired knowledge of an area by placing items out-of-order.

Preparation: Set up a trail and place along it natural objects in areas where they do not belong. For example, a pine cone in a maple tree, a seeling "dry soil" tree in a small pond, or a damp area on dry ground in bright sunlight.

Procedure: After the trail is set up, give the enrollees a specified period of time to find all the out-of-place objects.

Variation: Divide the enrollees into 2 teams. Have each team make up an out-of-place trail for the other.

SCAVENGER HUNT

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To introduce enrollees to outdoor areas, sharpen their observation skills, and provide opportunities for them to demonstrate understanding of the ecological principles they have learned.

Description: Depending on the size of the group, have the participants divide themselves into groups of 2, 3, or 4 enrollees. Give them a list and about 20 minutes to collect their things. When all the groups have returned, let them share with the others what they found. You may have to elaborate a bit on some of the articles listed depending on the age and sophistication of the enrollees. Also, don't be afraid to make up your own list or make changes in these lists.

I. Each group will collect evidence of the following:

1. A simple machine
2. Three simple shapes
3. A sweet and sour taste in nature
4. A pleasant and unpleasant smell in nature
5. A trace from an animal
6. Three primary colors and two secondary colors
7. Three different textures
8. One sound from nature
9. An example of non-biodegradable litter being degraded
10. Something older than you and something younger
11. A producer, a consumer, and a decomposer

II. Each group will:

1. Find a seed that travels by wind.
2. Find food for a deer, beaver, snail, bird, frog, etc.
3. Find evidence of a snake, man, mammal, insect, etc.

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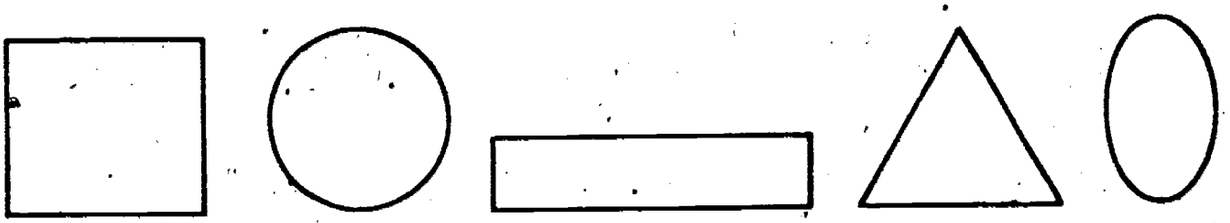
4. Find natural objects that have these shapes.



5. Find a non-biodegradable object.

6. Find evidence of wind, water, erosion.

7. Find five leaves each of a different shade of green.

PROGRESSIVE PUZZLE

Dick Cory, Chico YCC Camp

GOALS #1 & 2: To increase awareness of ecological principles that govern the environment.

To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To provide graphic opportunity for enrollees to learn environmental principles.

This progressive puzzle gives enrollees a basic understanding of ecology. It can be used as an ice-breaker at the beginning of the program and, when completed, remain on display throughout the camp period. Although its construction is a time-consuming task, it becomes a part of the permanent staff resource library and can be used year after year if made out of masonite or very thin plywood. A progressive puzzle is made of several smaller parts (in this case, environmental parameters) which fit together into a larger puzzle picture. The enrollees are divided into groups and each group is given one of the small parts to piece together. When all groups have their parts complete, all parts are combined to complete the picture. The ecology puzzle (illustrated on the next page) is a visual display of the interrelatedness of the natural world.

Instructions for making the puzzle: Use the picture on the attached page as a model. Make your puzzle large (4' x 5'). Paint the puzzle on a piece of masonite board. If you have no available artists, try to piece a scene together from pictures and paste onto the board. You can also buy a commercial poster which shows the same or similar habitats. Cut the board into puzzle pieces by marking the back in a puzzle configuration and cutting it out on a jigsaw.

Suggestions:

1. You may want to make a race out of completing each component.

2. You may want to color code the pieces by parameters in order to separate them easily.

3. Discussion questions to ask:

   a. What problems did you encounter in doing the progressive puzzle? Why?

   b. How is the puzzle related to ecology? As far as: (1) theme (2) materials (3) the activity

   c. How is the puzzle related to YCC projects? Discuss similarities and differences.

d. What parameters did you use in solving this puzzle?

e. Have we listed all parameters on this sheet? Can you think of any that are missing?

f. Are all the parameters of equal importance in all environments? Give examples to support your answers.

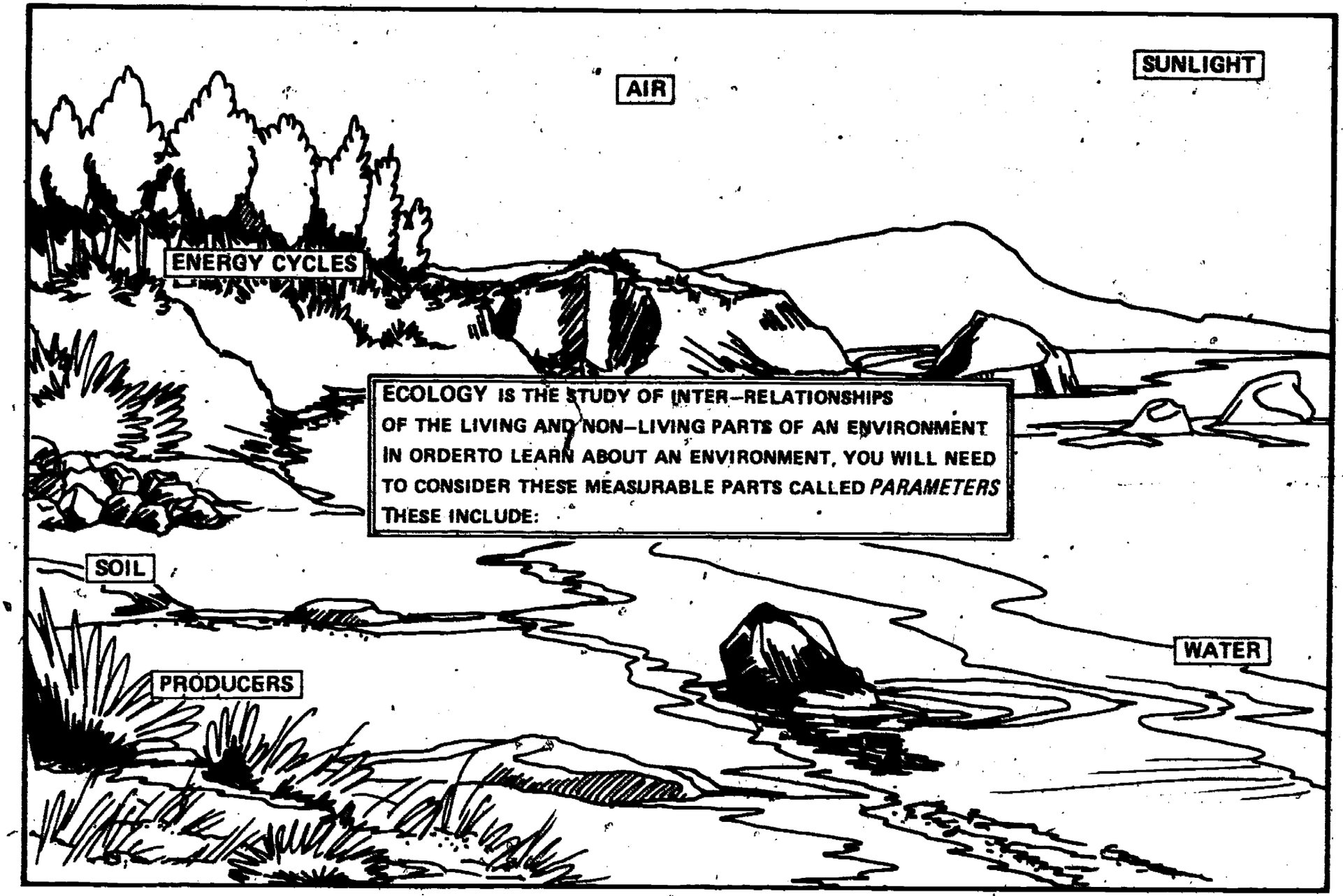
g. Are we always aware of the parameters affecting an environment? How do we gain awareness of these parameters?

h. What limitations were there in doing this puzzle?

i. What limitations are there to environment study on a YCC project?

j. What value is this project to:

VALUE	US	OTHERS
(1) immediate		
(2) lasting		


SUNLIGHT
AIR
ENERGY CYCLES
ECOLOGY IS THE STUDY OF INTER–RELATIONSHIPS
OF THE LIVING AND NON–LIVING PARTS OF AN ENVIRONMENT
IN ORDERTO LEARN ABOUT AN ENVIRONMENT, YOU WILL NEED
TO CONSIDER THESE MEASURABLE PARTS CALLED *PARAMETERS*
THESE INCLUDE:
SOIL
WATER
PRODUCERS

FOOD CHAIN GAME

Adapted from OBIS

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To teach enrollees the environmental principle of food chains.

Feeding relationships are often difficult to observe. In this activity, enrollees gain some understanding of these relationships by assuming the roles of animals playing tag and simulating feeding relationships. The kernels of popcorn represent plants, which are food sources for the plant eaters. Some enrollees play grasshoppers (plant eaters), some play frogs (which eat grasshoppers) and some play hawks (which eat frogs). The object of the game is for each animal to get something to eat without being eaten before the "day" (five minutes) is over. In nature, the populations of plants and animals are usually large enought to insure continuation of the species if some are lost. In this game, populations (popcorn plants, hoppers, frogs, hawks) are so small that the survival of even one of each kind will be considered an indication of a "balanced" ongoing community. You can repeat, encourage the enrollees to change rules of behavior and numbers of each kind of animal until a "balance" is achieved in your corn-hopper-frog-hawk food chain.

SURVIVE AS AN ANIMAL IN A MAKE-BELIEVE FOOD CHAIN BY GETTING ENOUGH TO EAT WHILE AVOIDING BEING EATEN YOURSELF.

Materials: For each animal -sashes about 20 cm x 100 cm (see Preparation section for number)
-1 plastic bag "stomach" (sandwich bag)

For the group -4-5 liters of popped corn
-1 data board
-1 marking pen
-1 timer
-a roll of masking tape

Preparation: At least ten enrollees are needed for best results.

SASHES: Make the sashes from strips of cloth in three different colors. Have enough sashes for 3/4 of the group to be grasshoppers, 1/3 to be frogs, and 1/3 to be hawks. The unbalanced ratio provides the opportunity to change the population numbers in the game.

PREPARE THE STOMACH BAGS: Place a strip of masking tape across the sandwich bag so the bottom edge of the tape is 4 cm from the bottom of the bag.

SITE SELECTION: A section of lawn 15 meters on a side is sufficient. The group may decide to designate potential home bases such as trees, a walk, etc., where hoppers and frogs can hide or be safe.

Action: Introducing food chains. Ask the participants if they know what mice eat and what eats mice. "Mice eat seeds and snakes eat mice," they may respond. Diagram the relationship they describe and introduce it as a food chain. (Arrows point in the direction that the food goes.)

Food Chain Game:

1. Describe the limits of the gaming area. Spread popcorn over the area. (Save a little for later.) Tell the group that you are distributing plants that grasshoppers eat.

2. Hand out a plastic bag and a grasshopper sash (all one color) to 1/3 of your group. Tell the enrollees to put their "food" (popcorn) in their "stomachs" (bags) when the game starts.

3. Hand out a bag and a frog sash to a second 1/3 of the group and hawk sashes to the last 1/3. When the game starts, frogs will try to capture (tag) hoppers, and the hawks will pursue frogs. When a frog captures a hopper, the hopper's stomach contents are transferred to the stomach of the frog. When the hawk captures a frog, he takes the frog's whole stomach. Hawks do not eat hoppers in this game.

4. State the challenge. Set the timer for five minutes and holler "Go!" The first game usually lasts only a few seconds with one of two things happening. Hoppers are gobbled up before they have a chance to forage or the frogs are gobbled up and hoppers continue to eat popcorn and get fat.

5. Analysis. How many animals survive? For a hopper to survive, popcorn must fill the stomach bag to the bottom of the tape (4 cm). For a frog to survive popcorn must fill the stomach bag to the top of the tape (6 1/2 cm). Hawks must have equivalent of one frog with sufficient food to survive. If at least one of each kind of animal survives, you have an ongoing food chain. Return the corn to the activity area after each game.

6. Instant Replay. Learning by making rule variations. Ask for suggestions or rule changes that might result in more of a balance after the five minute day. Usually one rule is changed for each replay. When you have settled on

your new rules, play again. Suggest these changes if the kids can't offer any:

a. Change the number of hoppers and/or frogs and/or hawks.

b. Let each hopper come back as another hopper once after being captured and transferring "stomach" contents.

c. Provide a safety zone for frogs and/or hoppers where they can be safe.

d. Timed releases. Let hoppers go first to forage unmolested. One minute later release the frogs and later the hawk(s).

e. Spread out more popcorn.

f. Spread out some caramel corn. Let it represent DDT in an ecosystem to show how it concentrates at higher trophic levels.

Note: You may want to eliminate bickering over who will be which organism by drawing markers from a hat to assign roles for replays.

Food for Thought: After each game, analyze the results. How many hoppers got a full stomach? How many frogs? The hawks? Encourage enrollees to compare game results after each rule change, and to comment on how the game "balance" compares with balance in the real world. In nature's balance, there are more plants than plant eaters and more plant eaters than animal eaters. You might wish to graphically represent the results on your data board.

What would happen if there were only half as many popcorn plants? What would happen to the animal that depends on those plants?

If there were no frogs, what would happen to the plant population? The hopper population? The hawk population?

Do hawks need plants to survive? Explain!

Can you describe some food chains that you are part of?

Are there any plants or animals that are not part of any food chains?

More Links in the Chain: Look for evidence of plants being used for food. Can you find the animals responsible? Make sun prints of the evidence you find. (See Habitat Sun Prints, Set 1 of OBIS.)

Find some ladybugs, or better yet, some ladybug larvae. Put them in with some aphids in a small container and observe. Describe the food chain they are part of.

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ORIENTEERING GAME

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To provide enrollees with an opportunity to learn and apply map and compass skills while investigating their environment.

Materials Needed:
Topographic maps of area
Compasses and instructions
Markers and index cards
Watch

Introduction: This game is an excellent way for enrollees to practice their map reading skills and could be part of the YCC Olympics.

Preparation: Prepare a course based on the procedures and instructions given below and divide your group into teams of 3 or 4 each. (More if you like.)

Procedure: Each team will be given an enlarged section of a topographic map on which several points have been marked. It is the team's objective to visit five of the designated points on the team map within the time limit. Points may be reached in any order chosen. A marker with an attached card will be found at each point. When team members reach the point, the team leader must sign the card. Each marker will have the same point value; however, additional points may be given to the team that returns to the starting point in the quickest time. Going over the time limit will involve a loss of points. Winning team will be determined by total points in event. High scores in this event will depend on the team's ability to read a map, its selection of course, compass reading, distance judging and speed. Teams will be started at intervals. A team may only sign 5 cards. A penalty of 10 points will be given to a team that signs over 5 cards.

ECO-PYRAMIDS

Judith James
Rice Lake YCC

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To offer enrollees the opportunity to compete in a game based on the environmental knowledge learned in camp.

This game is played like the T.V. game show "$25,000 Pyramid" except that all of the subjects deal with natural resources and their relationship to one another:

1. Begin with two teams of two, with six subjects to choose from.

   Example: Parts of a tree

   Birds in a marsh

   Divisions within the Department of Interior

   Mammals in a forest

   Sources of power

   Water pollutants

   Seven words or terms related to the subjects will have to be printed on 3 x 5 cards ahead of time; i.e., parts of a tree (roots, bark, leaves, limb, cambium layer, trunk, heartwood).

2. Team #1 picks a subject and is given 30 seconds to try and name the seven terms related to the subject chosen. One member gives clues to his/her partner to get the partner to guess the word on the 3 x 5 card. The seven 3 x 5 cards have been given to the clue-giver facedown. He/she gives clues about each word as the cards are turned over (in a way that partner can't see the word). The person giving the clues can describe the words/terms using synonyms, antonyms, homonyms, etc.--anything but a part or form of the word/term.

3. After Team #1's time is up, the number of terms guessed correctly is recorded, and it is now Team #2's turn. And so on, until each team has had three turns.

4. The team that has the highest cumulative score after three rounds wins.

5. The losing team steps down and a challenging team comes in to play against the winners. A new set of six subjects will be used.

6. The grand winners of the evening are the ones that have won the most games.

DISCUSSION TOPICS
FOR HIKES, BUS RIDES, EVENINGS

GOALS #1 & 2: To increase awareness of ecological principles that govern the environment.

To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To help staff members integrate E.A. into non-work related activities.

1. Discuss the good and bad points of trails as you hike.
2. Discuss differences in plant life while driving. Every 10 miles note what plants grow and how the vegetation zones change.
3. Discuss differences in cultures concerning attitudes about land ethics, consumer practices, happiness, leisure time activities, etc.
4. Analyze lifestyles (including patterns of recreation, consumption, transportation, job, shelter) with respect to the following:
   a. Its impact on other people.
   b. Whether resources are renewable or non-renewable.
   c. Whether or not the products are biodegradable.
   d. Whether activity is based on need or want.
   e. Whether activity shows concern for present or future.
   f. Whether activity shows concern for life forms other than man.
5. Read up on the geology of the area through which you are traveling. Point out geology features as you go.

FEDERAL AGENCY CROSSWORD PUZZLE

Michael Terzich
Camp Tallac YCC

GOAL #6: To increase understanding of the overall benefit of the YCC work program on the environment.

Purpose: To provide enrollees with opportunity to learn basic missions of Federal agencies, including some hosting YCC.

ACROSS

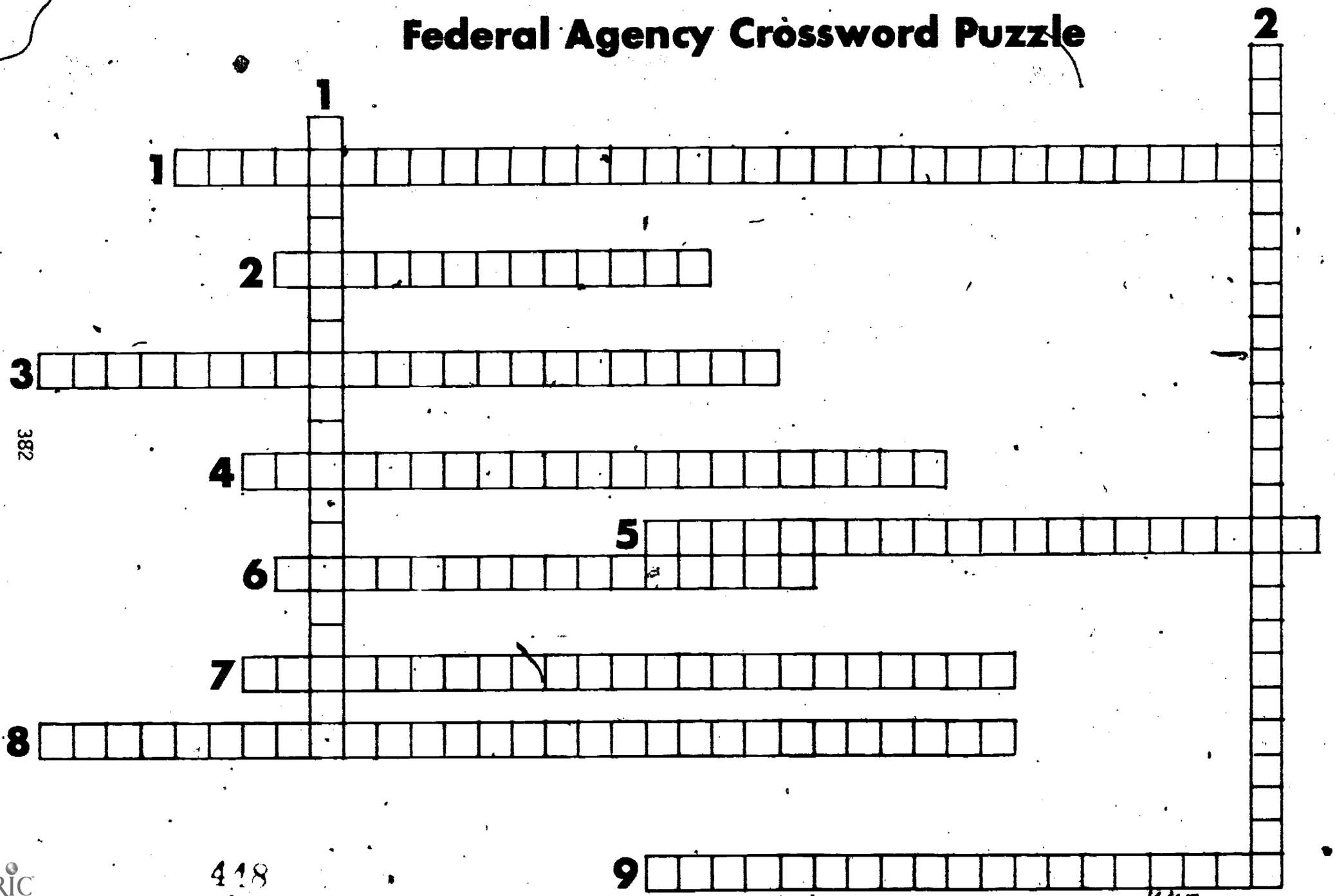
1. An Indian tribe of the Northwest is concerned over the protection of a Salmon spawning grounds and notifies this agency.
2. A large fire has broken out in Arizona on public forested lands. This agency takes responsibility.
3. A grazing permit has been applied for on public property other than a national forest or national park. This agency is involved with issuing the permit.
4. A new school is being proposed on an Arizona Indian reservation. This agency would be directly involved.
5. An inspector at Boulder Dam found a small crack in the concrete wall and quickly called this agency in charge of supervising construction.
6. This agency has been carrying out extensive study on earthquakes to help predict this geological phenomenon.
7. A private property owner has extensive erosion occurring on his land and calls this agency for consultation.
8. This agency brought to court a textile factory in Baltimore for not keeping with the air pollution standard of that city.
9. A new dam is proposed on the Stanislaus River for flood control and hydroelectric power. This agency oversees the project.

DOWN

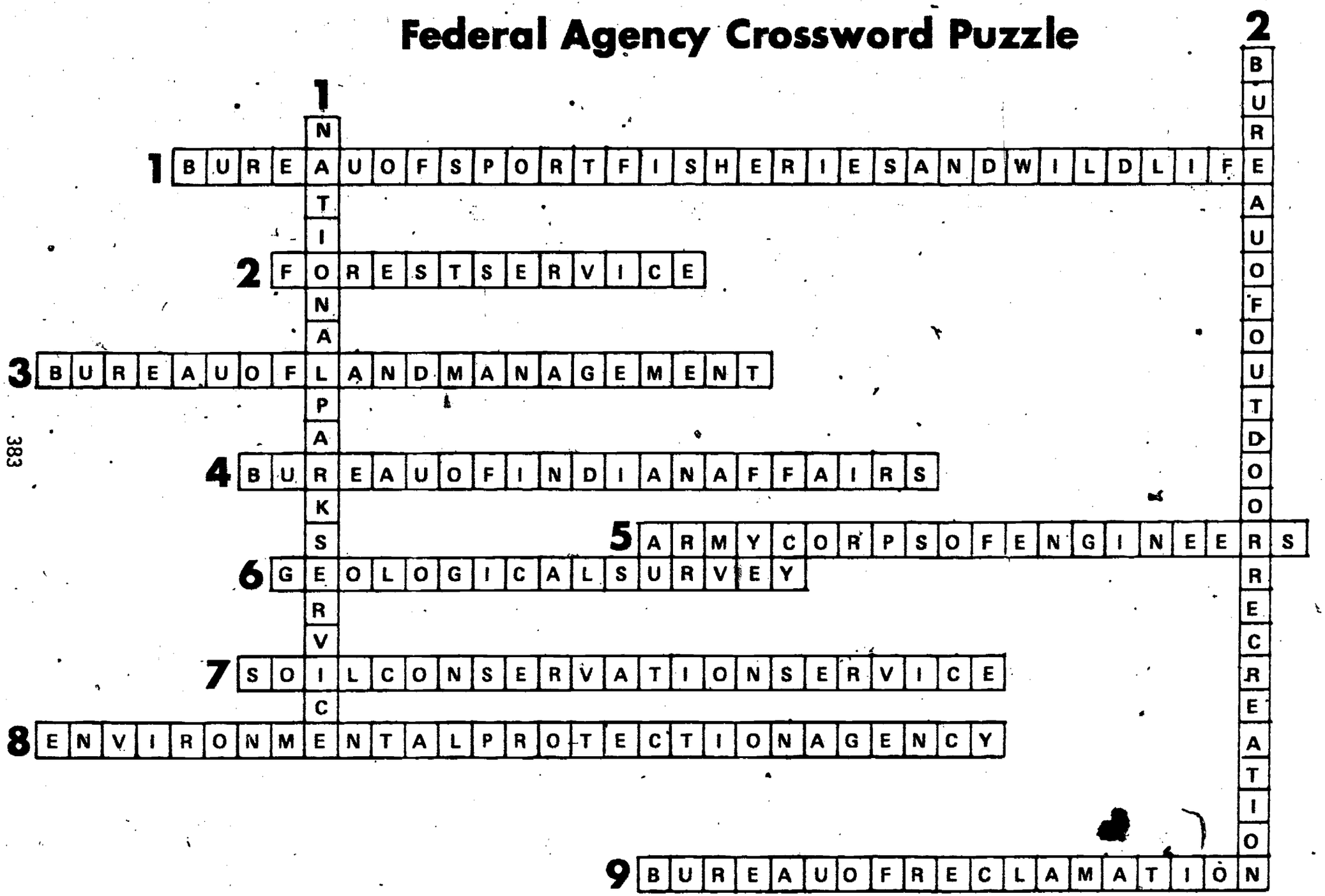
1. This agency preserves the natural environment for the enjoyment of the American people.
2. A state is applying to this agency for a grant to develop plans for a new recreation site.

*This puzzle is to be used with the explanation of these federal agencies. Appendix, pages 496-500.

Federal Agency Crossword Puzzle



Federal Agency Crossword Puzzle



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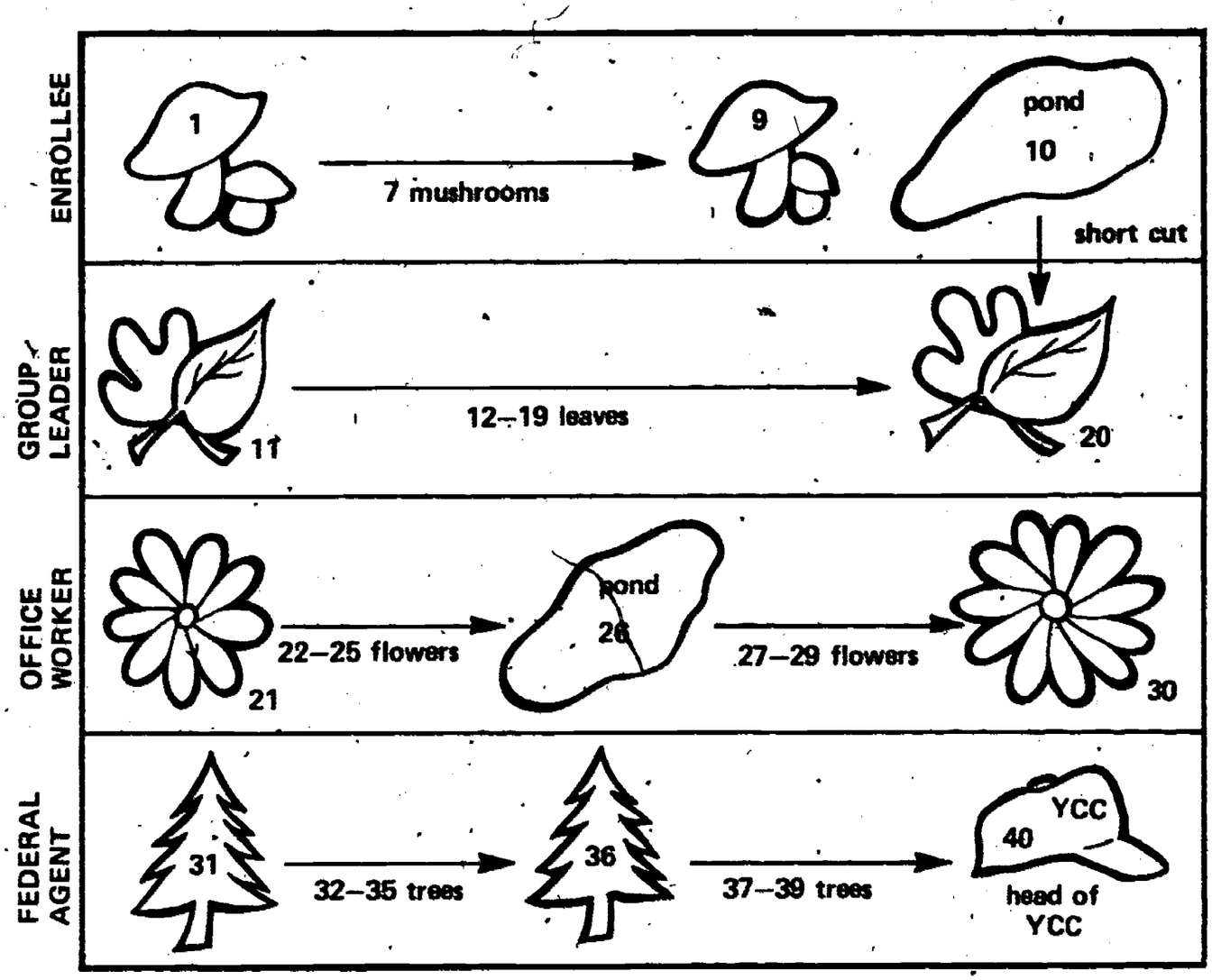
GO TO THE HEAD OF YCC

Rhode Island YCC Enrollees, 1977
John L. Curran YCC Camp

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: This game was developed by YCC enrollees to measure and practice the environmental awareness they learned over the summer. Playing it with your enrollees may encourage them to develop games of their own.

Materials: Gameboard (constructed by enrollees or staff from available materials)
Dice
Markers



This game operates on the same principle as "Go to the Head of the Class." All players start out as "enrollees" and work up through group leader and office worker to federal agent.

To Play: Choose one person to act as moderator. Each player is asked a question in turn. If they answer correctly, they may roll 1 die and move that number of spaces. When a player lands on a pond, he or she may take a short cut to the next level after answering a hard question correctly. The first to reach space #40 wins.

E.A. Coordinators and/or enrollees should develop their own questions relevant to their camp; however, the following are provided for suggestions:

Enrollees' Questions

1. Name 5 things that enrollees should always have with them. (1) helmet, (2) boots, (3) gloves, (4) pants, (5) long sleeve shirt.

2. What type of pine has five needles?
(White Pine)

3. How close should you clip a branch and why?
(Fully off to the bark, danger of someone getting poked)

4. _____ lives near water, resembles Queen Anne's lace and is poisonous. (Water hemlock)

5. What are the 3 stages of old-field succession?
(1) shrubs, (2) soft woods, (3) hard woods

6. What is the proper way to carry a saw?
(Blade facing forward-away from you)

7. What type of birch is edible?
(Black-birch)

8. What do the initials Y.C.C. stand for?
(Youth Conservation Corps)

Group Leader

1. What is exploitation?
(A type of use geared to short-term gain, usually of an economic nature)

2. How many queen bees live in a colony?
(One)

3. Where does the sun rise?
(East)

4. Why are fire towers necessary?
(To spot fires immediately)

5. What is biomass?
(The amount of living organisms in a specific area)

6. To what group of plants does a mushroom belong?
(Fungus)

7. What is condensation?
(Collection of water vapor)

Office Worker Questions

1. What color are most producers in the food chain?
(Green-chlorophyll)

2. Are fresh water clams edible?
(Yes--if water is not polluted)

3. What is the name for the group of gnawing animals?
(Rodents)

4. Is a pine plantation a monoculture?
(Yes)

5. Name 4 types of precipitation.
(1) rain, (2) snow, (3) sleet, (4) hail

6. Do firemen use fire as a tool? How?
(Yes, in forest management)

7. What percent of the funds comes from the state for YCC operation? (20%)

Federal Agent Questions

1. Name 4 States that begin with the letter A.
(1) Alabama, (2) Alaska, (3) Arizona, (4) Arkansas

2. Is the YCC supported in all 50 states?
(Yes)

3. Name a bird that cannot fly.
(1) Penquin or (2) Ostrich

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4. What is harvesting trees on a rotation basis?
   (Sustained yield management)

5. Using a pest's natural enemies to limit its population refers to what?
   (Biological control)

6. Other questions such as: What is this?
   (Show anything, plant, animal track, seed, etc. for identification)

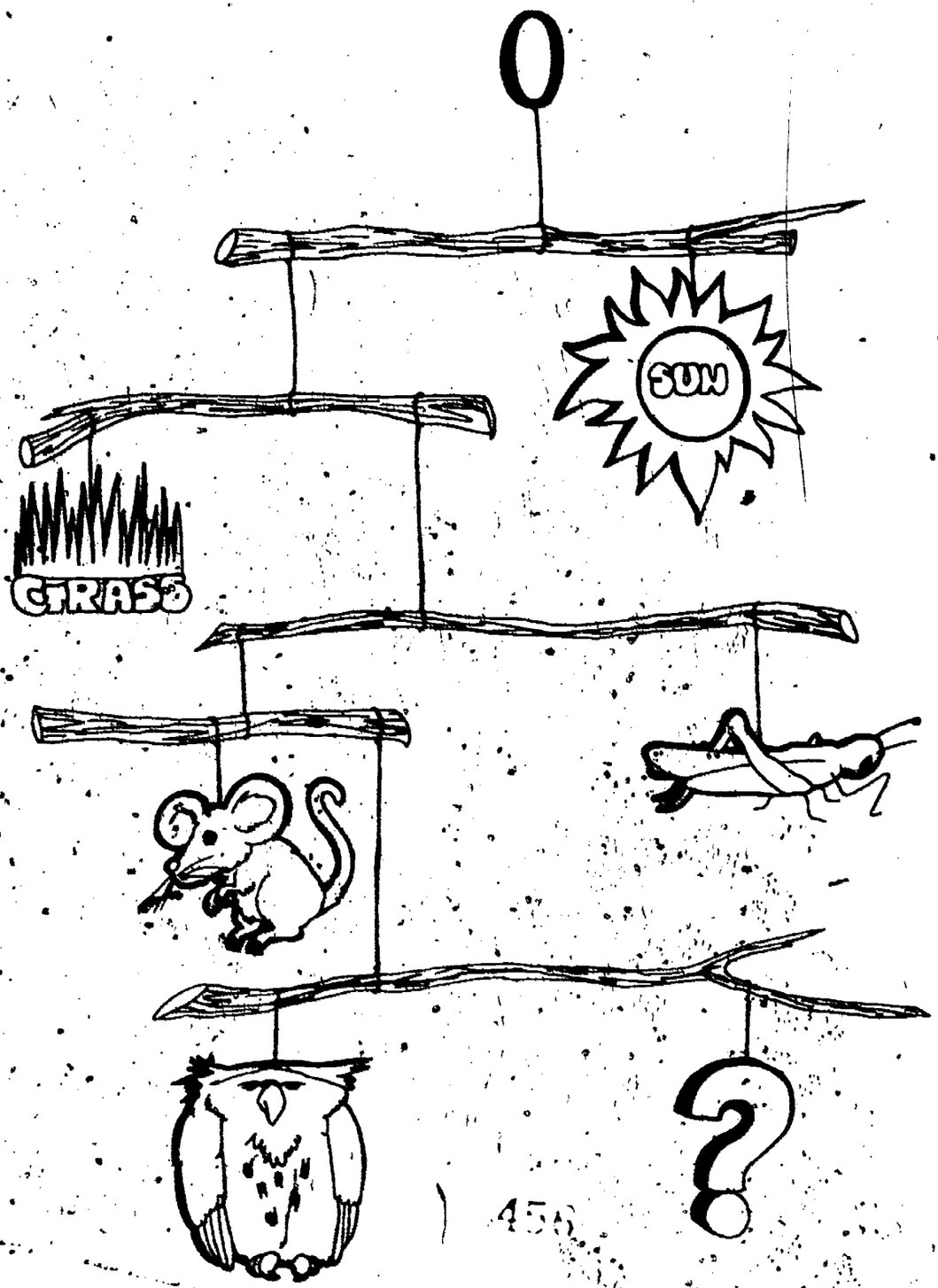
MOBILES

Adapted from Central Wisconsin Environmental Center

GOAL #1: To increase awareness of ecological principles that govern the environment.

Purpose: To show enrollees through a graphic illustration how tricky it is to keep nature balanced.

Construct mobiles on the balance of nature.



Eventually, your students will ask what happens to the energy when an animal dies--is not eaten, but merely dies? Be ready with some suggestions for discovery of the "DECOMPOSERS."

LIVING an ENVIRONMENTAL ETHIC

"We are not here to mold these young people to our way of thinking. We are here to involve them. If we involve them, they will mold themselves."

Don Barry, Camp Director
Inks Dam NFH YCC Camp, 1977

YCC camps provide excellent settings for enrollees to integrate environmental awareness into their everyday lives and develop a positive environmental ethic. They are settings in which staff members can practice what they preach and help enrollees find ways to develop an environmentally aware lifestyle both at camp and at home. The example set in camp can be a powerful and lasting learning experience.

The following material ranges from philosophy to activities — all leading to establishment of environmental awareness as an integral part of the YCC group living experience. Each activity will help meet a YCC E.A. goal and has a specific purpose. Once again, they should be used to enhance concepts within the framework of your environmental awareness program.

"Eat it up, wear it out, make it do or do without."

Richard J. Vogl

FUTURES

Brad Dubbs
Yakima YCC

Adapted from Values Clarification

GOAL #5: To experience problem solving and decision-making processes which are applied to environmental management concerns.

Purpose: To involve enrollees in difficult, realistic, decision-making processes.

These activities can be used in conjunction with a simulation game or with a discussion on government environmental policy and decision-making processes.

I. Assigning Priorities

Read: Many people see an urgent need of maintaining a strong national defense. Others voice concern over social and economic problems, such as unemployment, inflation, crime, slums, drugs, and the environment to name a few. Scientists also tell us what mineral resources are being used up faster than replacements are discovered. Most people agree that our air and water resources are being destroyed at quite a pace. Keeping these factors in mind, imagine that the government has appropriated $100 million dollars for research and development for the next year.

Instructions: Break up into groups. Each group represents a government committee assigned the task of awarding research grants to groups requesting government funding. Examine the following requests, decide which to fund (you can partially fund some), and then discuss the decisions made by the small groups.

Requests:

1. 30 million for a mass transit system for urban centers.
2. 8 million for a hand carried laser weapon for defense.
3. 10 million for a desalinization program for converting sea water to fresh water.
4. 20 million to mass produce food from petroleum.
5. 30 million to explore the sea for new resources.
6. 25 million to research the elimination of cancer.
7. 10 million to create artificial life in the lab.

8. 6 million for research in the area of extrasensory perception.

9. 15 million for a giant offshore windmill program for generating electricity.

10. 15 million to develop a new people killing bomb that will not damage the environment.

11. 15 million for the development of a nonpolluting car.

12. 5 million to develop a 100% effective and reversible one time birth control pill.

13. 50 million for space program.

14. 20 million for a program that will bring cable TV to most American homes.

15. 10 million for research on the constructive use of leisure time.

16. 30 million for research to control heredity.

17. 35 million to research elimination of heart disease.

18. 18 million to explore new mineral fields.

19. 5 million to explore weather and climate.

20. 10 million for research into the cause of racial unrest.

II. The Colonization of Aquarius

Aquarius is the name given to a small planet that orbits a Sol-type sun, just to the right and a little beyond Polaris, the North Star. Discovered in the year 2073 by the Stapp Expedition, Aquarius is reported to be a bit smaller than Earth. Like Earth, the planet's surface is mostly water, with two large land masses and three smaller ones, all of them large enough to be considered continents.

Aquarius has abundant plant and animal life on its surface and in its waters, but no traces of intelligent life have been discovered by the previous exploratory parties.

Because Aquarius is very much like Earth with good air and water and soil, it has frequently been considered for colonization. After much preparation, the colony is about to be established. The supplies have been gathering and are waiting on the ship. The only question is.....who will be the colonizers?

Your group is the committee that will decide which persons will go to Aquarius. Below is a list of 15 short descriptions of persons who have applied and are considered suitable. But, because of space limitations, not all will be able to go. There appears to be room for 10 persons, but it is unknown exactly how many persons will be going. The colonists will be supplied from Earth regularly, but there will be NO additional personnel added to the colony for at least 20 years.

It will be up to you to make the selections following the guidelines:

Each individual is to take about 10 minutes to make his own selections by ranking the persons 1 through 15 in the space provided. Number 1 is your first choice for colonization, etc.

After the individual rankings are finished, your group will meet for 15 minutes to make its final decision. The group is to rank each person in the spaces provided. ALL MEMBERS OF THE GROUP MUST AGREE ON EACH RANKING.

It is permissible to attempt to influence the rest of your group, but try to avoid arguing for your own rankings, look for alternatives, avoid changing your mind only in order to avoid conflict, avoid conflict reducing techniques such as majority vote or averaging.

The Colonizers:	Ranking	Rank	Dif.
Dave Doleson, 36, auto and truck mechanic and amateur archeologist, American White	_____	_____	_____
Laura Lee, 26, physical therapist, expert on coral formations, Chinese-American from Hawaii	_____	_____	_____
Charles Dubois, 41, architect and city planner, French	_____	_____	_____
Michael Rech, 34, prize winning journalist, author, TV newsman, Israeli	_____	_____	_____
Richard Lee, M.D., 48, general practitioner, American Black	_____	_____	_____
Evelyn Ansell, 50, dietician and home economist, British	_____	_____	_____
Doris Eberly, 37, electronic engineer, Australian	_____	_____	_____

The Colonizers:	Ranking	Rank	Dif.
Fred Davison, 41, carpenter and plumber, Danish .			
Dr. Cynthia Phillips, 32, micro-biologist and ecologist, American			
William Jamison, 47, millionaire, president of a large corporation, sportsman and big game hunter, American			
Henry Bortner, 36, dairyman and farmer, German			
Emily Payne, 27, high school English and history teacher, British			
Peter Michelson, 20, university student and amateur skin diver, Swedish			
Henry Banks, 50, surveyor-construction supervisor, British			
Marlene Richardson, 26, concert violinist and guitarist, American Black .			

LIFESTYLE DECISION

Adapted from Tallahassee Museum Materials

GOAL #5: To experience problem-solving and decision-making processes which are applied to environmental management concerns.

Purpose: To involve enrollees in difficult, decision-making processes.

Divide your group into three sub-groups. Place each sub-group into a "situation" as described below--each with limited resources. Let the sub-groups interact for thirty to sixty minutes, deciding what they can do, and should do. Then, give them the "new developments" and let them interact about what they can do and should do now. Later, in the large group, discuss the alternatives perceived and the ethical decisions made.

SITUATION 1:

With eleven other adults and three young children, you have been shipwrecked on a small tropical island. The island is three miles wide and five miles long, with a couple of mountains, lots of trees, and a good freshwater supply. The soil seems fertile and the lagoon is clear and sparkling. Fortunately, you have been able to salvage the following items before the ship broke up on the reef:

two lifeboats, one damaged beyond repair
three coils of rope (300 feet)
two canteens
one first aid kit
two hand axes and four knives
six blankets
a flare gun and eight flares
a copy of the Torah and three old Newsweek magazines
six oars, one splintered
three fish hooks and 100 yards of line
three tins of Sterno (canned heat)
one roll of aluminum foil
some pencils and 100 sheets of paper
fifteen lifejackets (inflatable)
one broken bottle and six empty tin cans

SITUATION 2:

With a group of ten friends you have obtained a plot of ground in the Western United States and in this isolated region you are setting up a rural commune. The people in the group seem to have various motives, but basically they all want to live a "more natural" life, without contact with the urban-industrial society that makes up mainstream America. The group moves into its new setting bringing only limited

resources and absolutely no currency or coin! This is a list of the "possessions" which were carried to this natural area:

one hand axe and a whole carpenter's chest full of tools
some nails, screws, and a bale of wire
several large rolls of plastic (12 ft. wide)
box after box of plant seeds
hoes, rakes, a hand plow, and some shovels
twenty blankets and bolts of colored cloth
a large first aid kit
a few pots and pans
each person's clothing
four chests of books
three bags of flour (50 lbs. each)
several tins of salt and pepper
some dried fruit and vegetables
personal items for each person, carried in small bags:
a Bible, a copy of the I Ching, razors, pocket knives, a few photos, handkerchiefs, headbands, etc.

SITUATION 3:

Unfortunately, your plane crashes in the cold north woods with you and five other persons onboard. Fortunately, no one was injured, but due to winter cloud cover it looks like you will have to survive on your own at least until spring. You have the wreckage from the plane, but the engines and radios will not work. Also, you have the following resources:

a large first aid kit
100 feet of rope
one rifle and 100 rounds of ammo
an axe and two knives
three parachutes (nylon)
a flare gun and twenty flares
two canteens
an inflatable raft with two oars
ten blankets
a broken compass and the ashes of maps burned during the crash

---

Once you have worked out your resource allocation, made some lifestyle decisions, and raised the ethical issues, consider this new development.

SITUATION 1:

Another shipwreck occurs and 15 new adults come ashore without any resources. They too want to survive. What happens to your island lifestyle? What issues are introduced? How do you respond to this "population explosion?"

SITUATION 2:

Winter has set in, but now twenty friends from the city arrive at the commune. They have given up city life and want to joint the commune. Unfortunately, they don't have any resources to share--except their personal abilities and their sweat. How do you respond to this? How do you justify this response?

SITUATION 3:

In the depths of winter another plane crashes, burns completely, and you receive four more persons in your group--without any resources to share. How do you respond to the entrance of these new persons?

By this time you must feel like the man who worried about his reactions if and when, during nuclear attack, his neighbors were trying to get into his backyard bomb-shelter. When the stakes are high, the decisions are tough! But remember that we too as humans are in a situation where ecologists tell us the stakes are high. We are riders together on a little speck in the vast universe, very dependent upon meager resources--many of them non-renewable.

YCC JOURNAL

GOALS #3 & 4: To increase awareness of the wide range of attitudes and personal values relating to the environment.

To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To chronicle change and growth experienced by enrollees.

Have enrollees keep individual, crew, or camp journals. Suggest (or require) that they be posted on a regular basis (daily or weekly). Encourage enrollees to express facts and their feelings, success and failure, attitudes, values regarding themselves, the camp, and the environment, etc. Encourage creativity--enrollees who have difficulty expressing themselves verbally or in writing may have other outlets: i.e., art, music, photography, etc. Offer them an opportunity to share their thoughts, to develop a perspective over the camp period, and to speculate historically and futuristically about what they have felt and learned. If some of the camp E.A. activities are written, such as the Task Cards in the Environmental Investigations, have the enrollees put them in their journals. The journals then become a record of their YCC summer.

MAKING AN ENVIRONMENTAL COMMITMENT

Laurie McCartney
Washington State

GOAL #4: To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To make the enrollees aware of the need for conscious lifestyle decisions and constant evaluation of their own actions in terms of the environment.

Many camps give Sierra or other reusable cups to the enrollees when camp begins. They are worn on belt loops and used for all drinking--even at meals--eliminating the need for paper cups, etc. At camps which use them for meals, a basin of scalding water is set out for sterilization purposes. Before receiving their cup, each enrollee at the Crater Lake YCC camp makes an environmental commitment of some sort, e.g., "I will use my electric hair dryer only twice a week." "I will shut off my shower water while I shampoo and soap myself." They are periodically reminded of their commitment over the summer by the staff and other enrollees. Midway through the following year, usually in a camp Christmas card, the statement of commitment is mailed to each enrollee to remind him or her of their experience. Many find it a revealing example of just how easy it is to slip back into American consumptive lifestyles!

A COMPARISON--THE ECO-MEAL VS. THE UN-ECO-MEAL

Judith James, Camp Director
Rice Lake YCC Camp, 1978
&
Denny Doak
Mount Rainier National Park YCC Camp

GOAL #2: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To identify the consumptive habits that Americans have formed.

The enrollees should be responsible for planning, buying, and preparing a meal--half of which is the most ecological that they can find and half of which is the most unecological they can dream up.

The Eco-meal

This meal is planned for 40 people. 4 packages of brown rice cooked for 25 minutes. Add vegetables such as onions, green pepper, carrots and cook 10 more minutes. Add vegetables such as celery, broccoli, zucchini, and sliced cabbage and cook 5 more minutes. Add delicate vegetables, e.g., sprouts or a few pounds of grated cheese and nuts, and salt to taste. Cook until cheese is melted.

If a salad is made, yogurt and cottage cheese can be used for dressing. Fresh fruit can be dessert. Good old water can be the drink. This meal should cost 50 to 60 cents per person. Use non-disposable dishes and silverware--as few as possible.

The Un-eco-meal

Anything will do for the unecological meal. It is best not to plan ahead too much, but to look through the store for eyesores. Things like individually wrapped cheeses and lunch meat on white bread, small bags of potato chips, pudding in individual aluminum cans, individual cans of punch or soda. A sample meal might include:

Instant soup
T.V. dinners
Snack Pack puddings
Milk in 1/2 pint cartons
Individually packed potato chips
Chip dip in individual containers

This meal can be served on paper or plastic plates with styrofoam cup and plastic silverware. After you finish your meal, dispose of the packaging in large, clear plastic bags. This dramatizes the situation

and leads to a values clarification discussion including the following topics:

1. Amount of natural resources used in one-time packaging
2. Quality and taste of food consumed
3. Nutrient, values and chemical additives and preservatives
4. Cost

After the discussion, the enrollees were asked to compose their own version of the Pledge of Allegiance for the un-eco-meal. The creation can be either serious or humorous.

Example: I pledge allegiance to the fast-food franchises of America and to its quick service for which it stands, one meal under a dollar, indispensable, with indigestion and high cholesterol for all.

In conclusion: Do Americans sacrifice nutrients, flavor, money and environmental quality for a little convenience?

NUTRITION

Sally Wisely, E.A. Coordinator
New Mexico BLM YCC Coordinator

GOAL #2: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To make enrollees aware of the effects of their food and eating habits on the environment.

A consciousness of the food we consume can be an important learning experience. The phrase "you are what you eat" does have some meaning.

In terms of environmental education, this study has relevance in understanding our most primary and immediate environment--ourselves. A look at nutrition can inform us about our bodies, our relationship to the land, cultural influences, the impact of industrialization, etc.

A study of food can be done in either a non-residential or residential camp setting. The extent of the study can be determined by enrollee interest. Make it an active study that has relevance to the enrollees.

Possible Activities and Ideas

Cultural influence of food

Ingredients of processed food--could be a list showing the ingredients and chemicals used to prepare and preserve food and their effects on the body

Human food habits compared to animal food habits

Current food habits compared to habits of natives and pioneers of the area

Number of calories consumed compared to number of calories burned

Keep a food diary--determine if minimum requirements are met

LIFESTYLE ANALYSIS EXERCISE

Adapted from the Human Potential Seminars
Participant's Workbook by McHolland and Trueblood

GOAL #3: To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To make enrollees consciously aware of the many areas in which they can practice sound environmental concern.

The list of statements below relates to behavior and the environment. If the enrollees' behavior is "strongly consistent" with the statement, they should put a 1 in the space beside it. "Fairly consistent," put a 2 in the space, "Not consistent," put a 3 in the space.

Scoring: Have enrollees total individual scores. Ask them what the scores mean to them in analyzing their own lifestyles.

CAUTION: These statements are only samples and may not be appropriate to your camp situation. Use them to develop a lifestyle analysis relevant to your enrollees.

1. I buy soft drinks in returnable bottles.
2. I buy food with minimum packaging.
3. I recycle all my magazines, newspapers, bottles, and cans.
4. I use recycled or used paper for most of my correspondence.
5. I have live plants and flowers in my home.
6. I depend on mass transportation for most of my mobility.
7. I don't smoke cigarettes.
8. My automobile is always in tune.
9. I compost the leaves from my yard.
10. I try to use fewer and fewer electric appliances.
11. I quickly fix leaky faucets in my home.
12. I put my food scraps in a compost pile--or feed them to my dog.
13. I would never buy a garment made of the fur of an endangered animal.
14. I use biodegradable detergent.

15. I have regularly attended local government meetings in my community.

16. I have campaigned for a political candidate with a strong environmental platform.

17. I turn off the lights when I leave a room which no one is occupying.

18. I wrap and send packages in old paper bags.

19. I don't litter.

20. I reuse plastic bags I get from the grocery store instead of buying them.

21. When I need to go to another floor in a building, I walk if it is only up or down 2 or 3 flights.

22. I try not to use paper towels unless absolutely necessary.

23. I try to walk if the distance is not too great.

ENVIRONMENTAL VALUES AUCTION

Adapted from the Human Potential Seminars
Participant's Workbook by McHolland and Trueblood

Goal #4: To increase awareness of the wide range of attitudes and personal values relating to the environment.

Purpose: To help enrollees clarify their value priorities and identify the things they value.

The 20 items listed here are to be sold at auction to the highest bidder, according to the following rules:

1. You are to pretend that you presently have none of the items.
2. You have a total of $5,000 to spend.
3. You can spend no more than $2,500 on any one item.
4. Bids must open at no less than $50 and no more than $500 and must proceed by increments of no less than $50 and no more than $100.

NOTE: This auction is not a measuring device. It helps to clarify value priorities and valuing processes and to stimulate dialogue about the same, nothing more. Individuals are encouraged to experiment with this game, modifying its content and its procedures in any ways that seem appropriate.

	Initial $5000 Budget	Highest Amt. I Bid	Top Bid
A long life free of illness			
Travel and tickets to any cultural or athletic events as often as you wish			
The love and admiration of friends			
Television			
An unspoiled natural setting for your home			
Complete self-confidence with a positive outlook on life			
A complete library for your personal use			

	Initial $5000 Budget	Highest Amt. I Bid	Top Bid
A happy family relationship			
An automobile			
A large fruit and vegetable garden			
A very satisfying love relationship			
The ability to speak many languages			
A chance to eliminate sickness and poverty			
Electricity			
A chance to preserve endangered species			
An understanding of the meaning of life			
Unlimited funds for the enjoyment of music			
A world without prejudice			
Commercially canned and frozen foods			
A world without air and water pollution			

VALUES CLARIFICATION STRATEGIES FOR THE ENERGY CRISIS

Adapted from Clifford E. Knapp
Director of Environmental Education
Ridgewood, New Jersey

GOALS #3 & 4: To increase awareness of the wide range of attitudes and personal values relating to the environment.

To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To increase the awareness of the wide range of attitudes and personal values enrollees have toward the energy crisis. When used in supportive groups, it allows each person to examine their own feelings, and those of others, in a non-judgmental way.

I. Voting--After each question is read, people take a position by a show of hands. Those agreeing raise their hands and those disagreeing point their thumbs down. Those who are undecided fold their arms and those who want to pass take no action at all. (Enrollees should be given time to discuss their rationale after each question.)

A. How many of you think it's right to stockpile gas for the car if you have the storage facilities?

B. How many think you should trade your car for one that consumes less gas?

C. How many have cancelled any trips you were going to make because of the fuel shortage?

D. How many think that carpooling is a good way for you to save gas?

E. How many think it's right to remove the anti-pollution devices from your car to save gas? How many would change their vote if they could save five gallons for each tank of gas used. . . ten gallons for each tank of gas used?

F. How many think that every homeowner should invest time or money to reduce energy loss from the home? How many are willing to invest two hours next week to do this. . . ten dollars next week to do this? How many <u>have</u> invested time or money to do this within the last two months?

G. Do you think it would be right for trucks and buses to be allowed to go at a speed of 55 miles per hour while cars could only go 50 miles per hour?

H. How many are willing to lower your thermostat 6 degrees to save energy?

I. How many are willing to change their lifestyles in some ways to save energy?

J. How many would resent waiting in line more than 30 minutes to fill your gas tank? Who or what do you resent if you do?

K. How many would favor laws promoting carpooling. . . financial incentives for carpooling?

L. If it could be enforced fairly, how many would agree to an energy tax which would decrease if you used less energy and increase if you used more?

M. Do you think it is fair to use all the gas you want if you have enough money to pay for it?

N. Should businesses be forced to reduce their lighting for advertising even if they have proof that it reduces their profits?

O. Is it right to allow coal with a high sulphur content to be burned instead of a "cleaner" fuel?

P. Should the Federal government keep track of the oil reserves available in this country even if the oil companies object?

II. Rank Ordering--The alternative choices for each question should be ranked according to each person's value preference by placing numbers 1, 2, and 3 before each set. (Discuss in trios with a time limit, changing trio members frequently.)

A. In a severe energy crisis what is the order that the following should be affected?

Churches and Synagogues	Department Stores
Schools	Factories
Municipal Government	Restaurants
Movie Theaters	Roller Rinks
Bars	Bowling Alleys
Sports Arenas	Gymnasiums

B. Rank in order of your preference for a means of travel to _____ (someplace you are going near you):

Car Train Airplane Hitchhiking Bus
Driving a car for someone else in return for a free ride

C. Rank in order those appliances you would be willing to use less to save energy:

Electric heater in the winter	Dishwasher
Air conditioner in the summer	Clothes dryer
Television	Stereo

BRINGING IT HOME

Brad Dubbs, E.A. Coordinator
Yakima YCC Camp, 1987

GOAL #4: To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To help enrollees transfer their "environmental consciousness" to their home environment.

What good is this summer's experience if you can't put it to some use at home? And when you go home, think about what you've learned so far this summer about people, about work and E.A. Discuss things with your folks. Have you changed at all? Do your parents or friends think you've changed?

The following will be your E.A. for Monday when you come back. Briefly, we are asking you to share the YCC experience with people back home and then bring that to share with your friends back at camp on Monday.

Do any or all of the following:

1. If you don't have any, set up a little recycling in the household. Explain the advantages of recycling (moneywise and environment). How easy is it? Do they think it's worth it? Do you think it's worth it?

2. Go outside your house, apartment, or whatever. What services, lines of power, pipes, etc. come into your dwelling above and below ground? What happens if their sources are cut off? What are their sources? Are they renewable or non-renewable? What pipes or wires come out of your house? Why? Are they used further down the line? Could your house exist as a self-contained unit. . . now? In the future? What alternatives could supply your home?

3. Find one thing in your home, that because of your newly found brilliance in environmental science, might be ecologically unsound. Why and to what extent is it unsound? Examples might be water consumption, recycling (lack of), etc. How do your homefolk feel about your decision? (Don't get them mad at you.)

4. What are the things you could live without?

ELECTRIC APPLIANCES	WATER (USES)
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

List 12 things first.
Then take off 5 you could do without.
Then take off 3 you could live without.
List the last 4 in priority.

FUTURE DAY

Judith James, Camp Director
Rice Lake YCC Camp, 1978

GOAL #2: To better understand man's social, economic, historical, cultural and physical relationships with the environment.

Purpose: To stimulate creative thinking about everyday life and resource utilization in the year 2000 through "future" games and activities which provide the proper setting for such imagination.

I. Future Costume Contest

Require that everyone wear costumes which represent each individual's prediction for future lifestyles, philosophies. Ask that explanations be given as to why people dressed as they did. Award prizes to the most creative costumes.

Example: One girl truly felt that future civilizations will be gender-blind in employee selection, and in clothing selection. Therefore, she simply dressed in uni-sex attire: jeans, shirt, shoes, and hat.

II. Foods of the Future

Future meals will be fast, nutritious, compact, and easy--no matter how unappetizing they may appear. In order to achieve this, you'll need: a blender, several plastic sandwich bags (with twisties), gummed labels/tape, pen and food. (If you have left-overs from previous meals, this is the time to get rid of them!)

Grind or blend foods to spreadable, squeezable consistency and spoon into plastic bags and close with twisties. Label the bags according to their nutritional contents--not by the actual, common name of the food itself.

Example;	FOOD	NUTRITIONAL CONTENTS
	Ham and cranberry sauce	Protein + Vitamin C
	Pizza	Vitamin C, Protein, Calcium
	Lasagna	Vitamin C, Protein, Calcium
	Peas	Vitamins A & D
	Cheese	Calcium

To serve, snip corner of bag and squeeze contents onto Rye Krisp (for roughage). For new and different taste sensations, try combining some of these delicacies: The protein + vitamins C, A & D go well together.

Use your Imagination!

You can create a vitamin-packed beverage with orange juice, raisins and pineapple juice also.

Don't tell the enrollees what they're eating; let them guess after it's over.

III. Future Fantasy

Divide the enrollees into groups of three or four. Let them pick one subject from a given list. Provide them with a 10-15 minute discussion period, during which they can fantasize about what they believe conditions will be like in the future.

Examples of various aspects of life:

- Education
- Transportation
- Medicine
- Housing
- Child care
- Family structures
- Occupations
- Energy
- Institutions
- Reproduction
- Furniture
- Fish and wildlife management

Have the groups present their ideas to each other, and leave the floor open for discussion.

IV. Olympics

Set up nine different planets (booths, stations) where enrollees will compete against each other in activities/sports that are suited to that "planet." Provide each participant with a score-card so that the station attendants may record their scores.

Neptune: Bobbing for Neptune (apples).
Clock each individual on the amount of time that it takes to bob for an apple.

Saturn: Ring toss
Give each person five washers and count how many they're able to toss onto nails that are in a board, about 4-6 feet away in distance.

Mars: Arm wrestling
Set up separate boys' and girls' divisions, with single elimination brackets in each.

Venus: Archery

Mercury: Frolf (Frisbee golf)
Have participants play in groups of three. Provide each person with a Frisbee and count the number of tosses that are required by each to hit the first "hole," or marker. (The markers may be trees, corners of buildings, etc.) Do this for the remaining holes and record the total number of tosses per individual. The lowest score of the threesome wins.
. . . The same basic rules and etiquette of golf are used in Frolf.

Pluto: Puzzle
Clock each person on the amount of time they take to put 2 puzzles together.

Uranus: Marshmallow mouths
Who can get the most amount of marshmallows in their mouth in the least amount of time?

Jupiter: Gunny sack throw
Weight gunny sack with chains, etc., and see who can throw it the fartherest. It is recommended that the group be divided into two weight classes: lightweight and heavyweight, with a separate sack thrown for each.

Earth: Turtle race
Each person has a turtle and races it at the end of the day's activities. The temporary "owners" of the first three finishing turtles score points.

V. Future Day Dance

Decorate the "ballroom" in a future motif, with synthesizer music playing periodically ("Star Wars," "Close Encounters of the Third Kind," "2001: Space Odyssey"), and lots of disco in-between.

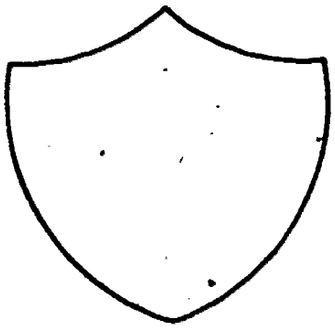
COAT OF ARMS

Adapted from Values Clarification
Simon, Howe and Kirschenbaum

Goals #3 & 4: To increase awareness of the wide range of attitudes and personal values relating to the environment.

To assist each participant in recognizing the effect a personal environment ethic has on the environment.

Several different variations of the Coat of Arms are given. Each one starts with a shield. The shield can be divided into as many sections as needed. The activity can be done individually or in small groups and can be effective for staff and enrollees.



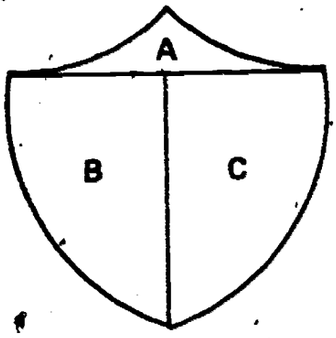
I. Personal Symbols

Purpose: To help enrollees clarify their own environmental values.

A. Your greatest personal ecological achievement.

B. What would you do in one year if you had the opportunity to improve the environment?

C. One thing that has been done to make you happy with our environment.



II. Camp Symbols

Purpose: To create an awareness of the camp's environment and to develop a group spirit among the enrollees.

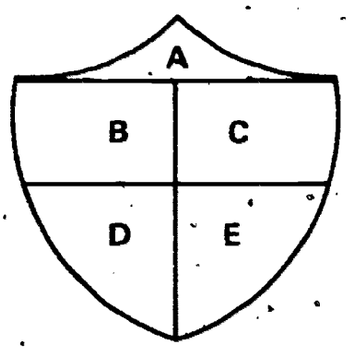
A. Camp name and/or landscape.

B. Wildlife representative of the area.

C. The camp's most important environmental goal.

D. The symbol characteristic of the camp and its environment.

E. Bureau or state characteristic.



III. Personal and Group Environmental Attitudes

Purpose: To help enrollees recognize possible reasons for the different value systems held by different people.

A. A symbol that represents you or your group.

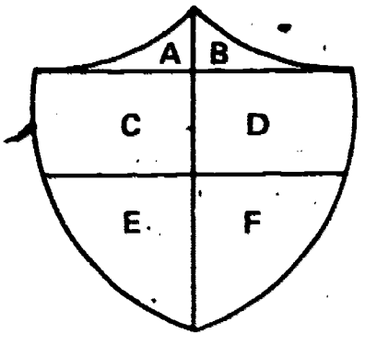
B. A symbol that represents how you wish others to see you or your group.

C. A symbol that represents your primary goal or objective.

D. A symbol that represents the greatest single obstacle to achieving your goal or your group's goal.

E. Symbol that represents the most important contribution that you or your group can make to your camp this summer.

F. A symbol that represents what your camp would be like if you or your group were not here.



IV. Another Personal Symbol

A. One value to which you are deeply committed (a value from which you would never budge).

B. How would your life be different if you won $1 million in a lottery?

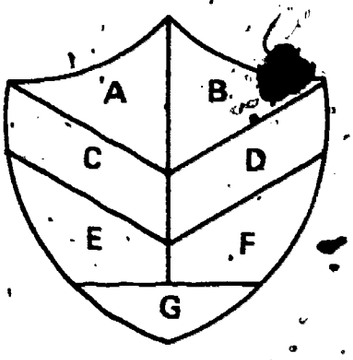
C. Your greatest sacrifice for the environment in the last year.

D. Your material possession of most value.

E. Your greatest success symbol.

F. Something you are striving to obtain (material, personality trait, abstract, etc.).

G. One thing you are thankful for.



A CAMP ENVIRONMENTAL PLAN

Gary Nichols, Camp Director
Crater Lake YCC Camp, 1977

GOAL #4: To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

Purpose: To show enrollees how to begin to practice conservation in their own lives.

A camp environmental plan is primarily a set of rules and attitudes which the staff and/or enrollees agree to live by that enhance environmental quality or conserve natural resources.

For example:

1. Buying soft drinks in recycled bottles.
2. Recycling paper, aluminum, plastic bags, etc.
3. Using Sierra or reusable cups for all drinking.
4. Sharing washing machines.
5. Prohibiting smoking in enclosed areas or prohibiting it completely.
6. Buying reusable containers for lunches to replace plastic or waxed paper bags.
7. Conducting seminars on ways to alter lifestyles for more environmental living.
8. Setting up forms and processes for mini-impact statements and many more on work projects. The enrollees can develop the camp environmental plan themselves. As the summer progresses they will add to and modify their plan. Hopefully, they will take their modified behavior home!

EVALUATION

"Those who cannot remember the past (or learn from it) are condemned to repeat it."

George Santayana
1905

OTHER GREAT IDEAS

The material in this section is not directly EA-related; however, the workshop team felt it was too good to lose. We have included here a mixed-bag of materials on:

Group Dynamics and Discipline
Recreation
Other Areas

ENROLLEE EVALUATION OF ENVIRONMENTAL AWARENESS PROGRAM

Dave Haring
Allegheny National Forest YCC

Purpose: To provide specific enrollee input into evaluation of current camp and planning for next year.

1. E.A. training this summer was:
   A. Fantastic
   B. So So
   C. Put me to sleep
   D. Other_____

2. Time devoted to E.A. was:
   A. Just right
   B. E.A. What's that?
   C. Too much
   D. Other_____

3. My crew leader's attitude toward E.A.:
   A. Enthusiastic
   B. Neutral
   C. Didn't care
   D. Other_____

4. E.A. topics were:
   A. Understandable
   B. An insult to my intelligence
   C. Too difficult to understand
   D. Other_____

5. The E.A. Coordinator's time spent with us:
   A. He should be here more
   B. Adequate to cover the information
   C. Wish he would leave us alone
   D. Other_____

6. The E.A. 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. My questions were:
   A. Answered satisfactorily
   B. Answered in too much detail
   C. Not answered
   D. Other_____

9. The overall E.A. program is:

A. I didn't know we had one
B. About right
C. Too much
D. Other_____

10. What suggestions would you make to improve the E.A. program for next summer:

ENVIRONMENTAL AWARENESS EVALUATION

Purpose: To provide enrollee input into evaluation of current camp and planning for next year.

Rank the following activities. Make an X under the appropriate column.

ACTIVITY	Disliked Very Much	Dislike	Fair	Like	Liked Very Much
Mapping Exercise					
Clinometer					
Tree Diameter					
Increment Borers					
Solar House					
Gasoline Exercise					
Electricity Exercise					
Strip Mine					
Water & Boating Safety					
Fish Hatchery					
Sandy Creek Activities					
Pollution Puzzle					
Plant Word Game					
Films					
Tree Classification					
Red Cockaded Woodpecker					
Edible Plants Slides					
Poisonous Plant Slides					
TMA Sawmill					
Champion Paper Co.					
Reynolds Recyclings					
Snake Show					
Turkey Calling					
Soil Profile					
Play--Trail for Life					
Bow & Arrow					
Game Laws & Hunting Safety					
Wheeler Dam					
Litter Survey					

RECREATION EVALUATION

ACTIVITY	Disliked Very Much	Dislike	Fair	Like	Liked Very Much
Volleyball					
Softball					
Tug-of-War					
Ice Cream					
Watermelons					
Hot Dog Cookout					
Swimming					
Critter Race					
Nature Hunt					

Suggestion for other activities: _____

GROUP DYNAMICS and DISCIPLINE

"People are amazing. When they work together, they can surpass the finest products of the best machinery. When they work independently, competitively, or without organization, the end product, more often than not, is only as good as the one head and two hands that created it. I believe the most satisfying and rewarding experiences of this summer have been those which have challenged by the need for a group effort. And many times, I have seen us meet that challenge and, perhaps, used it to our advantage."

Martha Pool staff
Everglades YCC Camp, 1976

A YCC camp assemblies as a collection of individuals who must function as a team within a very short period of time.

The following activities help enrollees and staff to understand and speed up the team-building process. Enrollees and staff who understand and trust one another are able to open their minds and explore with curiosity and interest the Environmental Awareness program.

These activities provide support to the Environmental Awareness program and can be applied to all elements of YCC.

INITIATIVE GAMES

Brad Dubbs
Yakima YCC Camp

Purpose: To assist YCC enrollees and/or staff to understand the effectiveness of working together to solve problems.

What is an initiative game? ... a clearly defined physical and/or mental task which a group is required to do. The initiative game is so designed as to require a joint effort to complete the task. It is a lesson in determination, teamwork and planning.

While promoting group interaction, the tasks require the participants to work cooperatively on the task at hand, taking advantage of each group member's abilities. The group must also deal with the handicaps of the members of the group whether these limitations are ones of weight, strength, and so on. In doing this we learn by doing.

Reasons for an initiative game ... helpful in developing a participant's awareness of the decision-making process, the roles involving leadership versus fellowship, and the obligation of each and every member of a group confronted with a problem. "IG's" help develop strength, both physical and people-wise. They are a morale booster. "We did it!" (If you make sure the task is feasible for the group and that they have other chances to achieve if the first try didn't work. Give each group the opportunity for success, but don't be surprised when the chips are down and somehow they come out on top. Give some encouragement.)

The initiative game presentation ... usually two at a time will suffice. Initiative games can get old if used too often. As mentioned, try to choose a task which is suited to the ability of the group. Always consider safety of the group and use spotters when some danger is possible.

In presenting these facts, the instructor should make all rules, procedures and safety considerations perfectly clear before the activity begins. Then state the objectives. When this is done, the leader steps back and allows the group the opportunity to devise a plan to solve the problem. The instructor should not belabor the presentation. He or she should keep the atmosphere light and use humor whenever possible.

As far as time and completion there are two schools of thought. One method is to have the group keep trying until the task is completed. The second method is to allow enough time for the group to solve the task, but after a disproportionate amount of time on one task without progress, stop the group.

At some time before initiative games are used, it might be helpful to discuss with the participants the steps in solving a problem. The three-step approach consists of: (1) recognize and accept, (2) think

and analyze, and (3) negotiate. In doing the task the group should recognize the problem, accept the task, and begin analyzing the situation. The members of the group should think about the task as an individual potential.

While the game is being attempted by a group, the key word for the instructor is patience. The instructor probably knows the solution but should let the group work on it alone. Sometimes the group may need a hint. If the group is not working together it might be wise to have them start again.

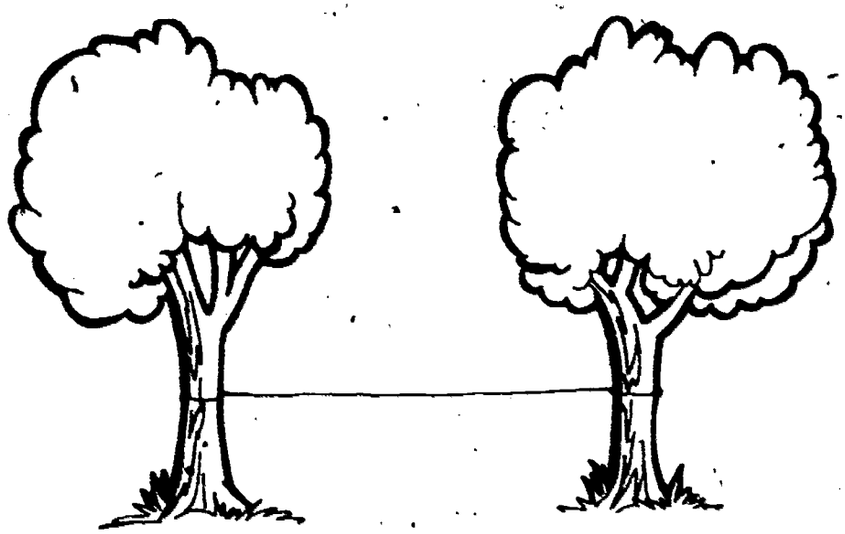
After a group has either completed or attempted an initiative game, the instructor should take the time to discuss with the group all that happened. Questions that might be asked include the following: Who said what? Who did not say anything? Why did someone not talk? What was the group supposed to do? What about the roles of the male versus the female, the young versus the old, the strong versus the weak? The discussion should be thought provoking and if possible, done by the participants willingly. Otherwise the instructor ends up leading the conversation. How do these experiences relate to solving real life problems? What are ways this relates to our work and the quality and enjoyability of a job?

I. Electric Fence

Problem: To get the entire group over an "electric fence" without any group member touching the fence in any way. The group must use only themselves and an eight foot beam. "An electric field extends from the top of the fence to the ground," and it can not be penetrated. The support posts can not be used either.

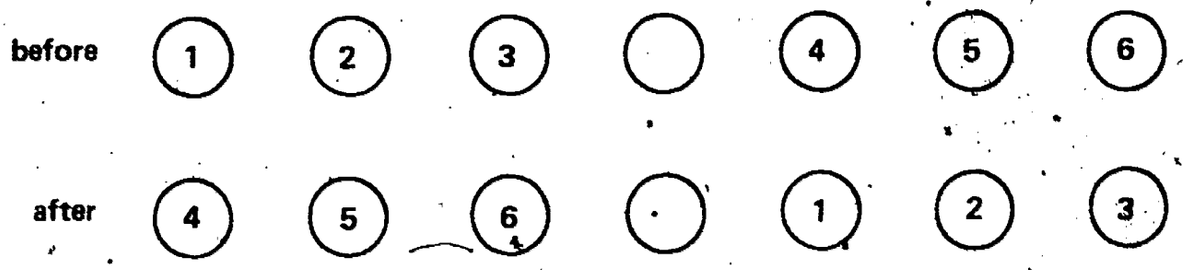
Equipment: one eight foot beam or log and nylon cord or rope ("Electric Fence").

Recommended Method: have group hold beam over fence while a few go over...the biggest can hold the beam from the other side.



II. Traffic Jam

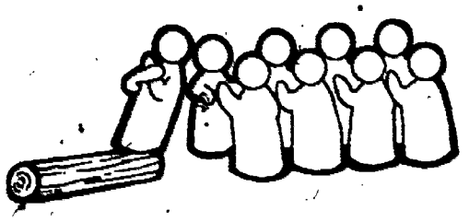
Problem: To have two groups of equal number exchange places on a line of squares or other marking that has one more place than the number of members in both groups. All members to the left of the center must end up on the right and vice versa. To begin, both groups face the middle unoccupied square. Using the following moves, the two groups attempt to exchange places: (1) a member may move into an empty space in front of him, and (2) a member may move around a member from the other group into an empty space. Illegal moves consist of: (1) any move backwards, (2) any move around a member facing the same way, and (3) any move which involves two members moving at the same time.



III. Trust Fall

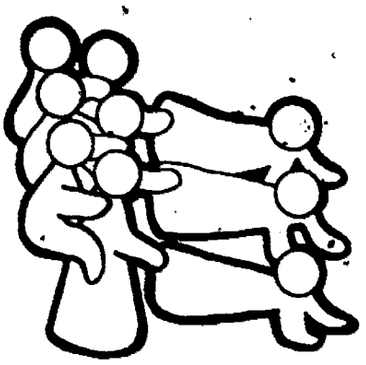
Problem: The group forms two lines facing each other behind a member on a short platform or log. Their arms are stretched out with palms up. The "falling" participant crosses his arms over his chest, closes eyes, stiffens his body and leans back. Make sure a small group is able to catch and support the falling person. Do over soft bed of pine needles or sleeping bags at first if people feel too unsafe.

Another Method: The group forms a circle facing inward with one group member in the center of the circle with his eyes closed. The participant falls in any direction keeping his body stiff and erect with his feet in the center of the circle. The group supports him and keeps him moving, pushing him across to other members.



IV. The Monster

Problem: The group must join themselves together to form a monster that walks with both hands and feet on the ground. The monster must have one more foot than the number of group members, and one less arm. Once the monster is created, it must move five feet and make a sound.



"9 MAN MONSTER"

6 legs/6 arms

TANGLE

Sally Wisely
New Mexico BLM YCC
Adapted from The New Games Book

Purpose: To promote group cooperation and problem solving.

Number of players:	10 to 20
Area:	Open
Equipment:	None

Have participants stand shoulder to shoulder in a circle, placing their hands in the center. Instruct individuals to grasp the hands of 2 other people. Rules: 1) no one holds both hands of the same person. 2) no one holds the hand of a person standing next to them. (Note: you may pivot handholds as long as you don't actually break your grip). The group has one task: untangle the knot they have just created. This problem is often difficult and frustrating. Success in the task should result in the formation of a circle, or a couple of circles.

Possible discussion questions: What parts of yourself did you use in working on this problem?
What did you have to do to be successful?

GROUP ROPE COURSE

Sally Wisely
New Mexico BLM YCC
Adapted from Cowtails & Cobras

Purpose: To promote group cooperation and problem-solving.

Number of players: 2 to 15
Area: Any
Equipment: Large rope, flagging tape

Prepare an obstacle course through the area. Mark the trail with flagging tape. Arrange enrollees into groups no larger than 15. Without any explanations, tie the group together with a large rope, while they are standing casually. (Result: group tied closely together, individuals facing in every direction). Instruct the group to maneuver the course you've laid out. Stress safety. The group has two tasks: 1) to safely complete the course, 2) to answer the question you've given them.

Sample questions: What do you like best about this group?
Name one of your group strengths?
What were you most afraid of when you first started this obstacle course?

When the group returns, ask the group for each individual's response to the question.

After the activity is completed, you might want to hold a short discussion.

Sample questions: What happened in this exercise?
Why do you suppose we did it?

STAGES OF GROUP GROWTH

OR

IS GRIPING A PART OF YCC?

Adapted from Michael Giammatteo, Ph.D.

Purpose: To assist staff members to understand group growth, including the "griping" process.

The following material is a discussion base to use with staff members.

Every group has to spend time and energy learning how to work together. YCC is no Exception. Feelings (emotions) can run high. It takes time for group members to learn how each can fit into the group and contribute best. So things often seem "all mixed up," and group members may quite naturally become disturbed and discouraged--even aggravated with each other.

It helps to know that these are natural "growing pains" of democratic groups, that these feelings among members tend to follow a predictable cycle or sequence, and that in most cases the group will soon become productive and efficient as people work to solve group problems.

Let's take a look at the stages in this developmental process.

1. "Groping": When the group is first trying out how to plan and work together they may not all agree. They don't know and understand each other well enough to really trust the group, and they still have to determine each others' skills, knowledges, situation, and attitudes. So they often feel uncomfortable and lost.

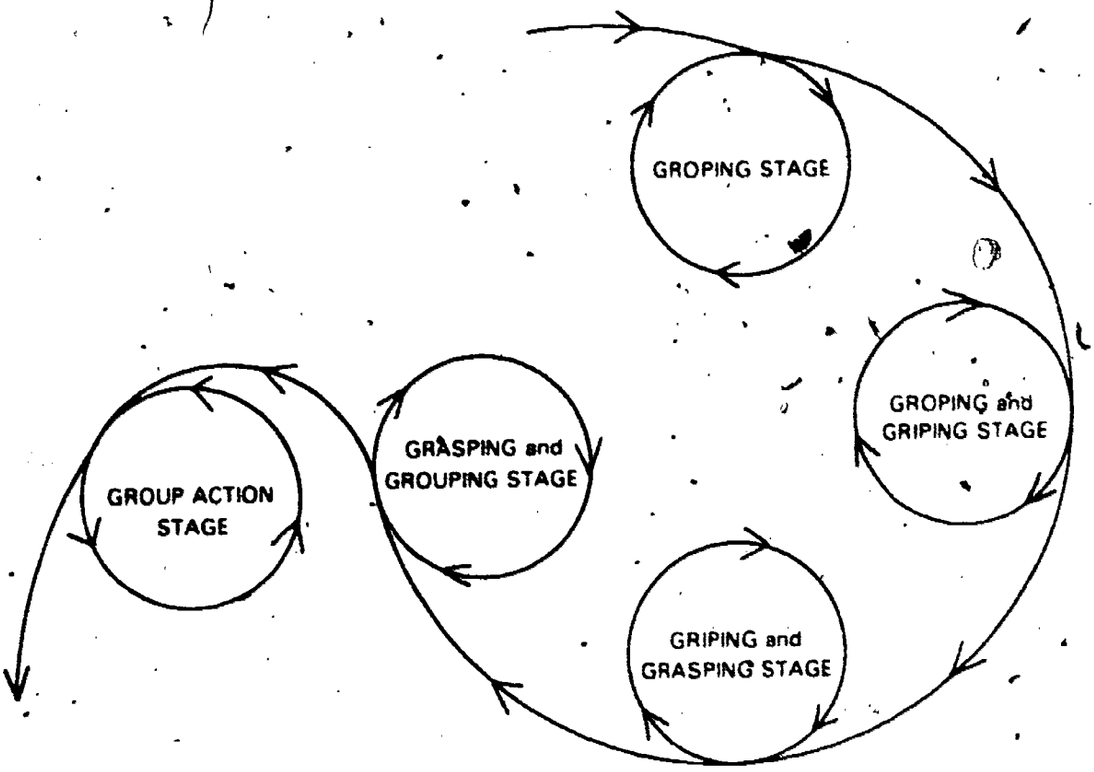
2. "Griping": The group gets discouraged when they can't seem to work together, when there isn't much progress, and their attempts are frustrated. They say wrong things to others, play negative roles and block group action because they are uncomfortable. This is the place for more "self-other" understanding, to remember that they are all different but they all want to do a good job and be liked by others. Maybe they can learn to understand why others are griping, and learn to give themselves time to work things out.

3. "Grasping": Now ideas and suggestions are beginning to fit. The group begins to agree on questions, and can start to see some direction to group activity. Everyone begins to feel more comfortable and now they are getting somewhere.

4. "Grouping": They are really getting to know each other, and can understand and enjoy how each one works and fits into the tasks to be done. Group tasks, building, and maintenance roles come into play, and a surge of enthusiasm spreads through the group.

5. "Group Action": Now the group is in full swing, with members playing constructive roles, leadership shared, everyone participating. It was difficult at first, but worth it to learn to work well together. They have shared in making plans and decisions, have learned together, and feel this is a good group with which to work. They are busy making their group more democratic.

Following is a picture of these feeling stages people go through together as they work at problems they all want to solve.



Now they are ready to tackle other jobs. It can be expected they will still go through some of these early stages, but each time it can be less disturbing, more effective.

So it is important to recognize <u>how</u> they feel about others in the group, to know that these feelings are <u>natural</u> whenever they really tackle important jobs, to realize that the group can move ahead toward better feeling relations among members. As they get to know each other better, this group gradually becomes <u>their</u> group because they have shared plans and work, and have tried to practice ways of behaving which are cooperative, considerate, friendly, democratic.

IDENTIFYING ROLES PLAYED IN GROUPS

Adapted from Michael Giammatteo, PH.D.

Purpose: To assist staff members to understand roles people assume in groups and to deal effectively with these roles.

Procedure

1. Duplicate Group Roles on pages 440 and 441, one copy for each 4 people.
2. Cut Group Roles into separate pieces, keeping pieces from each copy together.
3. Have players arrange themselves in groups of four.
4. Pass out slips of papers with roles--one complete set to each group of four people.
5. Tell group the problem -

   The Problem you are to solve is:

   It is 90°F outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

6. Groups solve the problem through role playing.

After the groups have finished, continue the following questions and discussion, adapting to the interest level and experience of the group you are leading.

1. Identify the roles which were played. Which were easiest to play? Which were easiest to identify?
2. Review the following productive roles which people assume in groups to share in solving a problem or making a decision:

   a. Initiator--suggests an idea, proposes a solution, says "let's do this."

   b. Energizer--prods the group to decision and/or action, stimulates the group, reminds them of the purpose of the group of meeting.

   c. Information Seeker--asks for facts, for background information, for clarification, helps group see need for sufficient information for decision-making.

d. Orienter--helps group define its position in relation to its goals (where are we now?), points to departures from goals or objectives, raises questions about the direction the group is moving (Where are we going?).

e. Summarizer--pulls together ideas, suggestions, comments or relevant information to help group understand where it is in its thinking or action process. (Gets us back on the right track).

f. Encourager--accepts and praises contributions of others, sets atmosphere of friendly acceptance, tries to arrange for everyone to contribute, gently urges group forward. "Let's work together." Aids approval of idea.

g. Harmonizer--points out similarities instead of differences, helps keep group on problems and away from personalities, works toward consensus. "It seems both your ideas are about the same." "That's a good idea but don't you think we ought to consider what Mary just added?"

h. Follower--goes along with the group, passively accepts ideas of others, provides an audience for active members, supports through his presence. "I'll go along with that."

3. Review the following nonproductive roles--which people assume to stop action. (Roles that attempt to satisfy individual needs first.)

a. Dominator--tries to get his own way without regard for others; uses flattery, authoritative behavior, sarcasm, etc. Downgrades others' contributions.

b. Blocker--tries to prevent something from happening, argues, openly rejects ideas, deals in personalities. Interferes with progress by going to tangents, personal experiences on unrelated things, argues unnecessarily on a point, rejects ideas without all facts, may weaken an issue.

c. Special Interest Pleader--tries to gain decision or action favorable to a special group or project regardless of group wishes, uses stereotyped phrases or cliches, appeals to emotion, cites precedents, usually refuses to compromise, etc. States own biases, a special program for his personal gain.

d. Playboy--makes a display of his lack of involvement in the group's efforts and activities, indulges in horseplay, unrelated jokes or comments, "penlicking" or "rubber-band snapping," or other attention-getting behaviors. "Anyone want some gum?" "Have you seen the new TV show?"

4. Give each group 5 minutes to discuss and list five ways to deal with the nonproductive roles above.

5. Discuss specific ways to avoid nonproductive roles in YCE.

GROUP ROLES

PLACATOR

You are to play the placator role in solving the problem.

The Placator--always soothes over a discussion: "Everything in due time," "The sun will shine tomorrow," etc.

The Problem:

> It is 90° outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

ATTACKER

You are to play the attacker role in solving the problem.

The Attacker--always attacks ideas presented or will be negative. "You know the Camp Director will never go along with that," "People don't care, our crew would never do that if we lose pay for taking off early."

The Problem:

> It is 90° outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

IRRELEVANT

You are to play the irrelevant role in solving the problem.

Irrelevant always gives ideas that do not relate to the topic (evader). "Did you see the movie last night?" "Do you know what I dreamed last night?"

The Problem:

> It is 90° outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

SENSIBLE (YOU ARE TO START THE DISCUSSION)

You are to play the sensible role in solving the problem.

Sensible--always tries to be as sensible as possible. "Let's review where we are" "Why don't we get back to the purpose of the meeting?"

The Problem:

It is 90° outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

505

SIX-BITS

(Solving a Problem through Group Interaction)
Adapted from Michael Giammatteo, Ph.D.

Purpose: To assist enrollees and/or staff to understand the effectiveness of working together to solve problems.

Procedure

1. Duplicate Six-Bits of information on page 444, one copy for each 6 people.
2. Cut Six-Bits of information into separate pieces, keeping pieces from each copy together.
3. Have audience arrange themselves in groups of six, or have chairs grouped that way ahead of time.
4. Pass out the "6 Bits of Information" problem, one bit of information to each person. One complete set to each group of 6 people.
5. Tell group that there is a problem to solve. They can tell their group what is on their paper, but they must not show it to others.
6. Task: Groups identify the problem and solve it through group interaction.

After the groups have finished, continue the following questions and discussion, adapting to the interest level and experience of the group you are leading.

Questions and Discussion:

1. What kept you from solving the problem to begin with?
2. What helped you solve the problem later?
3. What were some characteristics of this problem-solving exercise? (List comments from the group and discuss)

The people who developed this problem-solving exercise feel that it contains elements of involvement that almost all groups go through; it also illustrates the way groups work together on common problems.

They hypothesized that the following things would take place during the problem-solving exercise. (Write each item on the board, or have a chart made up with the items listed.)

a. TRUST (will develop). You must trust that the instructor gave you a solvable problem. Must trust each other.

b. RITUALISTIC LISTENING (will take place) This is a type of polite listening--really without caring too much, because the data offered have no relevance at that time.

c. REAL LISTENING (will take place) When statements become more meaningful--data mean something. When people interrupt and say, "Say that again!"

Using this type of activity at the beginning of a session is important for these reasons:

a. The problem could not be solved without the contributions of each person in the group.

b. People feel more committed to a session if they contribute by saying something, the earlier the better.

c. It is easier to talk to each other in a small group than to talk to one instructor in front of a large group.

d. This exercise illustrates that each person in a group brings information and skills that can be used by the entire group to solve common problems. THE PIECES OF PAPER REPRESENTED THE INFORMATION AND SKILLS THAT EACH OF YOU BROUGHT TO THE GROUP.

You will be concerned this summer with providing ways for each enrollee to contribute knowledge, information, and skills to the solving of common problems. The content and activity itself are not always most important--what is important is the idea that you can use different techniques to get people talking to each other and contributing as a group.

NONE OF US IS AS SMART AS ALL OF US. (Printing this on the board during the problem-solving exercise helps in the understanding of the concept).

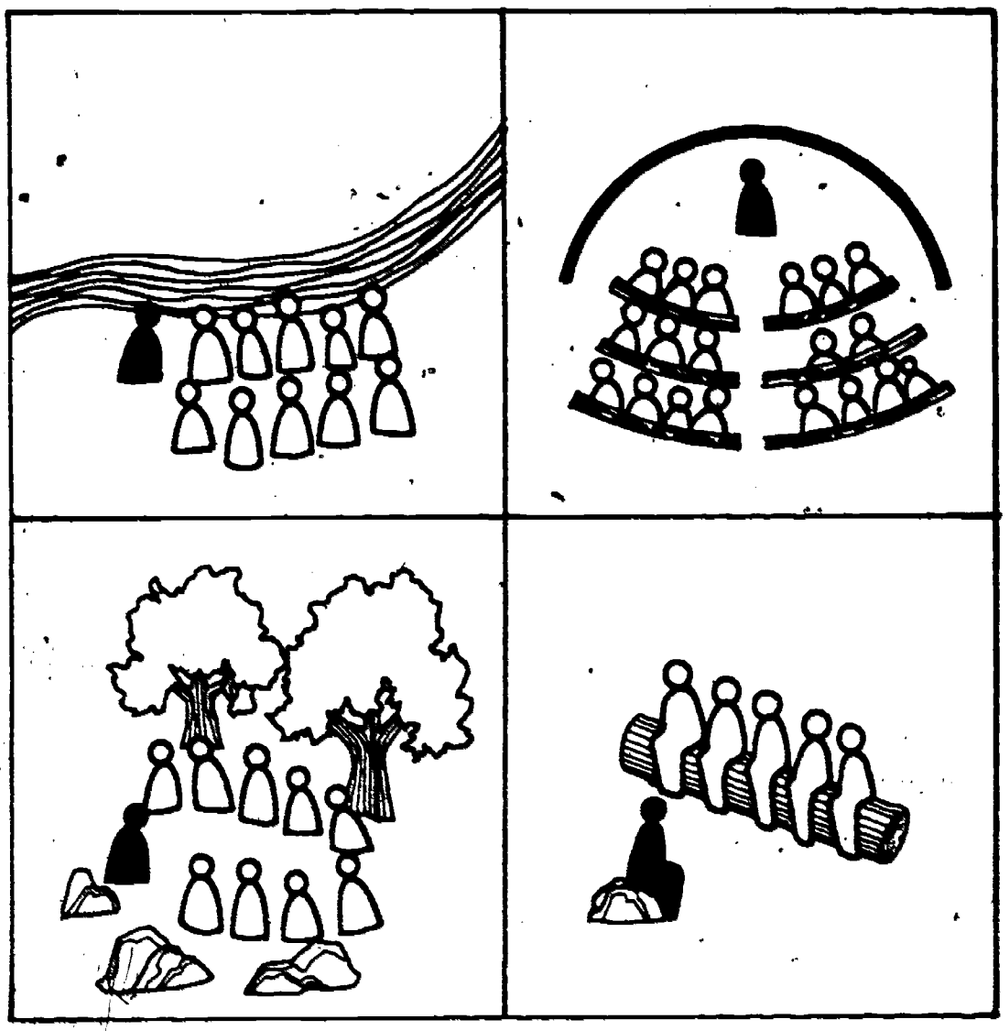
1. Although you may tell your group what is on this slip, you may not pass it around for others to read.	2. Although you may tell your group what is on this slip, you may not pass it around for others to read.
Information In 1960, The Hawaiian Goose was plagued with pesticides. In 1972, the Trumpeter Swan was plagued with water pollution.	Information In 1966, the Bald Eagle was dying because of the air pollution in Portland. In 1968, the Whooping Crane was considered our most endangered species because of the land pollution.
3. Although you may tell your group what is on this slip, you may not pass it around for others to read.	4. Although you may tell your group what is on this slip, you may not pass it around for others to read.
Information In the same year that the Hawaiian Goose was plagued by pesticides, the Bald Eagle was plagued by land pollution. In 1972, the Whooping Crane was plagued by air pollution. In 1968, the Hawaiian Goose suffered from air pollution.	Information The four years in which the different animals were plagued by different types of pollution, were 1960, 1966, 1968 and 1972. Eight years after the Hawaiian Goose was plagued by pesticides, the Trumpeter Swan was plagued by pesticides too.
5. Although you may tell your group what is on this slip, you may not pass it around for others to read.	6. Although you may tell your group what is on this slip, you may not pass it around for others to read.
Information The four different birds were plagued by pesticides, water pollution, air pollution and land pollution, each in one of four different years. In the same year as the Bald Eagle was dying because of air pollution, the Hawaiian Goose was having problems with the water pollution in Hawaii.	Information In what sequence did the Trumpeter Swan become plagued with the various types of pollution, etc.?

GROUP ARRANGEMENTS

Purpose: To assist staff members to understand the effect of physical arrangement of groups.

Procedure

1. Have staff review following group arrangements:



2. Discuss and answer the following questions:

   a. Which group arrangement:

      suggests 'we talk, you listen', or 'you talk, we listen'?

      suggests limited 2-way communication (audience responses directed at one person)?

      will allow for maximum participation by the most number of people for the most time (where people talk to each other)?

will allow a maximum quantity of information to be presented in a fairly short time?

will allow input from all participants on an equal level?

b. What does this exercise tell us about group arrangements?

c. What does this exercise tell us about planning group arrangements to lead to a high level of enrollee involvement?

DISCIPLINE AWARENESS

Gary Nichols
Crater Lake YCC Camp

Purpose: To share a discipline technique used effectively by one YCC camp.

In order to impress upon the enrollees the seriousness of certain offenses in YCC camps (e.g., drinking, drugs, etc.) a list of these rules is prepared which includes the following affidavit:

> *"I certify that I have read the above rules and understand them and that I may be dismissed immediately from the YCC program if I break rules in Part A (Non-negotiables) and eventually, if I break rules in Part B. (negotiables)"*

The list of rules as agreed upon by the camp staff is sent out with the affidavit and attached to the orientation letter.

511

A CIRCLE MEETING FOR CAMP GOVERNMENT

Roger Lees
Lakehurst Naval Air Station

Purpose: To provide a means of communication and interaction in a YCC camp.

Government of the Whole or the Camp Meeting approach is one method of camp government that has been used with success. It is democratic and involves each member of the camp community. It is based on the premise that a circle provides more interaction.

The circular Camp Meeting is a sophisticated and efficient communications and governmental system. There is a certain type of special magic that occurs when people sit in a circle. People feel physically a part of something, they feel closer and more comfortable with each other. They feel less inferior or superior to each other, because pecking orders or hierarchies need straight lines and lots of space for definition. When corpsmembers sit in a circle with the director, group leader, or all the staff they feel flattered. They feel they have been granted a share of his/her status, which they have. When enrollees realize they are being taken seriously, that their viewpoint counts and can influence the camp, they pay more attention to themselves and to others, and they begin to assume much more responsibility for themselves and the camp.

There are three (3) cardinal rules for the Camp Meeting:

1. Everyone gets a turn.

2. Everyone who takes their turn gets listened to without interruption or challenging.

3. No Personal attacks (Killer Statements, put-downs).

When a corpsmember takes a turn, he must be listened to. Of course, a corpsmember may elect to "pass." When speaking there should be no attempt by anyone to manipulate what he is offering. The corpsmember should not be probed, interrupted, interpreted, analyzed, put-down, joked-at, advised, preached to, etc. The idea is to focus on the speaker and let him know that you heard what he said. An effective way is for the facilitator to feed back, reflect, parrot, or mirror the speakers own words.

Killer Statements are devastating to the speakers. When these are allowed to occur, they inhibit free expression. Then only popular viewpoints will be expressed. Statements should be heard without comment as valid expressions of a person's point of view. Groans, rolled eyes, boo's, etc. are extremely effective in stifling free expression. If someone strongly disagrees with a statement, they must wait their turn and speak for their position without attacking (i.e., "Your idea stinks!").

When Corpsmembers have a voice in setting the rules in the camp, they are much more likely to keep them because they're their rules. At the first session you may lay down the YCC non-negotiables (drugs, alcohol). Other rules can be left to the Camp Meeting to decide. However, you as staff or director don't have to agree to anything you can't live with or which is contrary to national YCC policy. It may be useful for the staff to meet during staff training in their own circle meeting to see if there are any areas that would be negotiables at the initial meeting.

The Camp Meeting can be used for problem solving as well as rule setting. Some general guidelines for conducting the meeting are:

1. To begin, state the issue or problem, "What rules do we want for lights out?," or, "People are arriving late on the job, what can we do to solve the problem?"

2. List all solutions offered without commenting on them. Everyone that wants to, should have a say. Usually, picking a spot in the circle and going completely around the group generates the most input. A corpsmember may pass but once passed, may not speak until everyone has had a chance. It is important here to guard against killer statements, gestures, and put-downs. All ideas should be accepted without comment.

3. After all ideas have been generated, narrow down the suggestions to the best one, or as close to that as you can get. Bear in mind, you don't have to accept any solution you can't live with. State your reasons, i.e., contrary to YCC regulations, etc., and cross if off.

4. To avoid getting bogged down in long debates, hold discussion to 2 or 3 pro and con on each statement, then decide by group vote whether or not to retain the statement as a valid option. Many times you will end up with only one option. That's the one to go with. After elimination, if you're still left with 2 or 3 options, each equally valid, then the issue may be resolved by majority vote. If a solution proves to be unworkable, a camp meeting may be convened again to problem solving.

Adjust this style of government to your own camp's needs and style. Flexibility is one of this methods strong points. Another is its ability to develop self-discipline and self-responsibility with your young people. Good luck.

EFFECTIVE DISCIPLINE AND BEHAVIOR MODIFICATION

Roger Lees, Camp Director
Lakehurst Naval Air Station
Building Self-Responsibility and Self-Discipline with the Reality Therapy Method

Purpose: To develop enrollee self-responsibility for behavior.

Reality Therapy is a method of behavior management developed by Dr. William Frasser that builds self-responsibility and self-discipline, that makes the Corpsmember responsible for his/her own behavior. It is an easily learned five step process that can be readily employed by on-the-line supervisors or enrollee leaders that can bring about rapid behavior modification. One of the goals of our program is to build positive work habits, to prepare the enrollees for permanent employment where they must be self-disciplined or they won't hold the job.

Steps:

1. IDENTIFY the BEHAVIOR: "What are you doing now?" Awareness of behavior is the first step. Avoid references to the past. Emphasize behavior, not feelings.

2. VALUE JUDGMENT: Ask the Corpsmember to evaluate his own behavior. "Is what you're doing helping you?" It must be his decision to do something better than what he is doing now.

3. CONTRACT for CHANGE: Work with the corpsmember to formulate alternatives. "What can you do differently?"

4. COMMITTMENT: Seals the contract. "You told me this is what you're going to do, will you keep it?" This puts responsibility on the corpsmember.

5. FOLLOW-UP:

   A. Contract kept. Positive reinforcement. "Hey, that's really great that you're abiding by the contract.

   B. Contract not kept.

      1. NO EXCUSES: Do not ask why. "We have a contract, <u>when</u> are you going to keep your word?"

      2. NO PUNISHMENT: Punishment removes responsibility from the corpsmember. Set rules and sanctions, use natural consequences. "If you sit down on the job, you will not be paid for your time. Do you want that?"

3. RECONTRACT or RECOMMITTMENT: Corpsmember has to understand that he is responsible for himself. It takes time and consistency.

There are two prerequisites for using this method:

1. Be Personal: Use personal pronouns. "I care enough about you to be involved." Be a friend. Spend a few seconds during the day to reinforce the involvement.

2. Do not use this while either of you are angry. Wait until you are both calm. Stop the behavior however is necessary. Tell the Corpsmember to come back when he is ready to talk. This method will not work while emotions are running.

RECREATION

"There is a definite link between boredom and the abundance of electronic and mechanical appliances which have given us easy access to gustatory, visual, and aural delights. Excessive boredom is common to many in the United States."

Robert Winger
1975

YCC OLYMPICS

Don Scott, Camp Director
Gulf Islands National Seashore

YCCer's always enjoy the opportunity to demonstrate the skills they have learned over the summer. Several camps have developed skill exercises and games similar to those used by loggers at the turn of the century. In 1977, Gulf Islands National Seashore hosted two days of *"Olympics"* with several other YCC camps.

The Olympics included an ecology quiz on which several enrollees worked as a team, a volleyball game, skits, an obstacle course and several other activities. The camp which accumulated the most points overall was presented with a plaque which will move from camp to camp over the years. Not only do YCC enrollees develop pride and a sense of accomplishment through demonstration of their skills, but they get to meet other YCCer's and realize they are part of a nationwide effort.

It must be stressed however, that safety is important in these games as well as on work projects. We cannot stress accuracy and care over the summer and then stress speed in competition. We need to develop a technique for incorporating safety into the obstacle course as described below.

Obstacle Course: The course is laid out on a field in stations. The participant runs from the starting line to all stations and then to the finish line. Fastest time wins.

Course Stations:
- #1 Put on hard hat, gloves and goggles.
- #2 Hammer in and pull out 5 nails in a board.
- #3 Saw through 3 pine poles (4 to 5 inches thick).
- #4 Bury one of the poles.
- #5 Pick up 20 cans and put them in plastic bags.
- #6 Paint a plywood panel.
- #7 Take off gloves and goggles, put them in the hard hat, and place them in a tire.

There are, of course, other skills which can be included which are unique to your particular area and will make any competition more relevant to your enrollees.

Other activities to include:
- tug of war
- relay races
- log pulling contests

ALL SPORTS DAY

Objective: To promote physical fitness and a healthy, competitive nature among the enrollees.

Activities

A half-marathon is very long--too long for non-runners. The same activity though much shorter would probably encourage more active participation. The non-runners were placed along the route, from beginning to end. Some acted as traffic controllers, asking drivers to slow down and exercise caution when passing the runners. Most of the non-runners served as cheerers-on, and provided the marathoners with Gatorade as they came by.

Each person who completed the half-marathon received T-shirts commemorating the event.

A staff vs. the enrollees sports competition took place in the afternoon, with valuable prizes for each team member if they won: breakfast in bed--served by the staff, switching beds with the staff one night; playing "Staff for a Night."

About two weeks prior to "All Sports Day," three teams were formed. These teams were comprised of enrollees who had interest, and reasonably good skills, in these particular sports, with one or two of the staff acting as coaches for each of the teams. Practices were formally conducted for an hour every other day.

The kids really got excited about the competition, and all of the teams (basketball, volleyball, softball) cheered each other on. An effective way of building team spirit and group cohesiveness--as well as good, recreational fun.

WATER OLYMPICS

Judith James, Camp Director
Rice Lake YCC Camp

Objective: To encourage teamwork, healthy competition, group decision-making, and sportsmanlike conduct, while also promoting the value of physical fitness.

Divide the entire group into equal teams; in total number and sex. Post the teams and events the night before the Rodeo, and let the teams decide which members participate in the various events.

1. One-mile run: One member from each team. If a female runs, start her one minute ahead of the males.

2. Scavenger hunt: One member from each team goes to find an item, comes back with it, then the next member goes for the second item, and so on...

   Items:
   - *Acorn with cap
   - *Candy wrapper
   - *A plant you can identify
   - *One orange or purple sock
   - *A T-shirt or sweatshirt with a college name on it
   - *One fingerprint from a staff person
   - *A feather
   - *Pocket knife
   - *Discarded can
   - *Pine cone

   The first team to collect all of the items wins.

3. Canoe races: All members must participate in at least one of the following events:
   --Three-person hand paddle (paddle with hands only)
   --Two-person slalom canoe race
   --In & Out: This event is like the slalom, except that each team must evacuate their canoes and get directly back in at the sound of the whistle. The whistle is blown approximately four to six times during the race.

4. Swimming races: Select two members from your team (one for each event)
   --Front stroke (crawl) out; and back stroke back
   --Mile freestyle

5. Jeans exchange relay: All members participate. Get a T-shirt and jeans from the largest person on your team. The first person puts the shirt and pants on. At the starting signal, he or she runs/swims to buoys 25 feet from shore, runs/swims

back, exchanges shirt and pants with next person, and so on until all of the team members have done it. The first team to finish wins.

6. Egg throw: Select two members. A raw egg is tossed back and forth; after each toss, one member takes a step back. The team members that get the farthest distance away before breaking their egg win.

7. Marathon relay: This is an individually-timed event, with all members participating. The first member crab-walks backwards to designated area and tags the second member, who runs to rope climb. After completing the rope climb, that person then tags a third person who holds their own ankles and (duck-like) walks to basketball court, where the fourth person makes a free throw and runs to the lake.

NOTE: THIS EVENT IS OPEN TO ALL SORTS OF VARIATIONS; USE YOUR IMAGINATION!

8. Tug o' war: All members participate in this round robin event.

9. Greased watermelon race: Select one enrollee from your team. The watermelon is dropped off the end of the dock and each enrollee jumps in and tries to bring the watermelon to shore without the other enrollees taking it. The person that achieves this is the winner.

Scoring: Award first, second and third place point values to each event and tally up the scores at the end.

PHYSICAL CONDITIONING

Sally Wisely
New Mexico BLM YCC Coordinator

Physical fitness plays an important role in the YCC program. It is essential to safety, good work performance, and it contributes to enrollees' good feelings.

In camp, fitness activities can be fun and challenging. The growth shown over a summer can be satisfying. Participation in the program should be encouraged, but it should be voluntary.

The voluntary training program should include both muscular and aerobic (oxygen intake) fitness activities. The program should be tailored to individual needs and desires. I would suggest a before and after test so enrollees can see their improvement.

Note: Remember to warm up before any physical activity, and cool down after it.

Two excellent books for sample programs, exercises and general information:

Fitness and Work Capacity
Brian Sharkey
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
Stock No. 001-001-00426-0
$2.20

The New Aerobics
Kenneth H. Cooper
Bantam Books

ENVIRONMENTAL AWARENESS GAME

Rhode Island YCC Enrollees, 1977
John L. Curran YCC Camp

Object - to hike from the middle of the board to a given point on the edge as quickly as possible.

Materials - board: Use the game board on the next page as a model. The board should be made in such a way that the center remains stationary, while the edge on which the compass points are drawn, can spin. Suggestions: Make 2 separate discs--1 for the terrain and 1 for the compass points.

Token: Make 4 tokens of different colors. Attach to each token a 1 inch ruler:

flag of corresponding colors to mark destination.

The compass coordinates on the edge of the board move freely. At each coordinate there is a hold to place the flag.

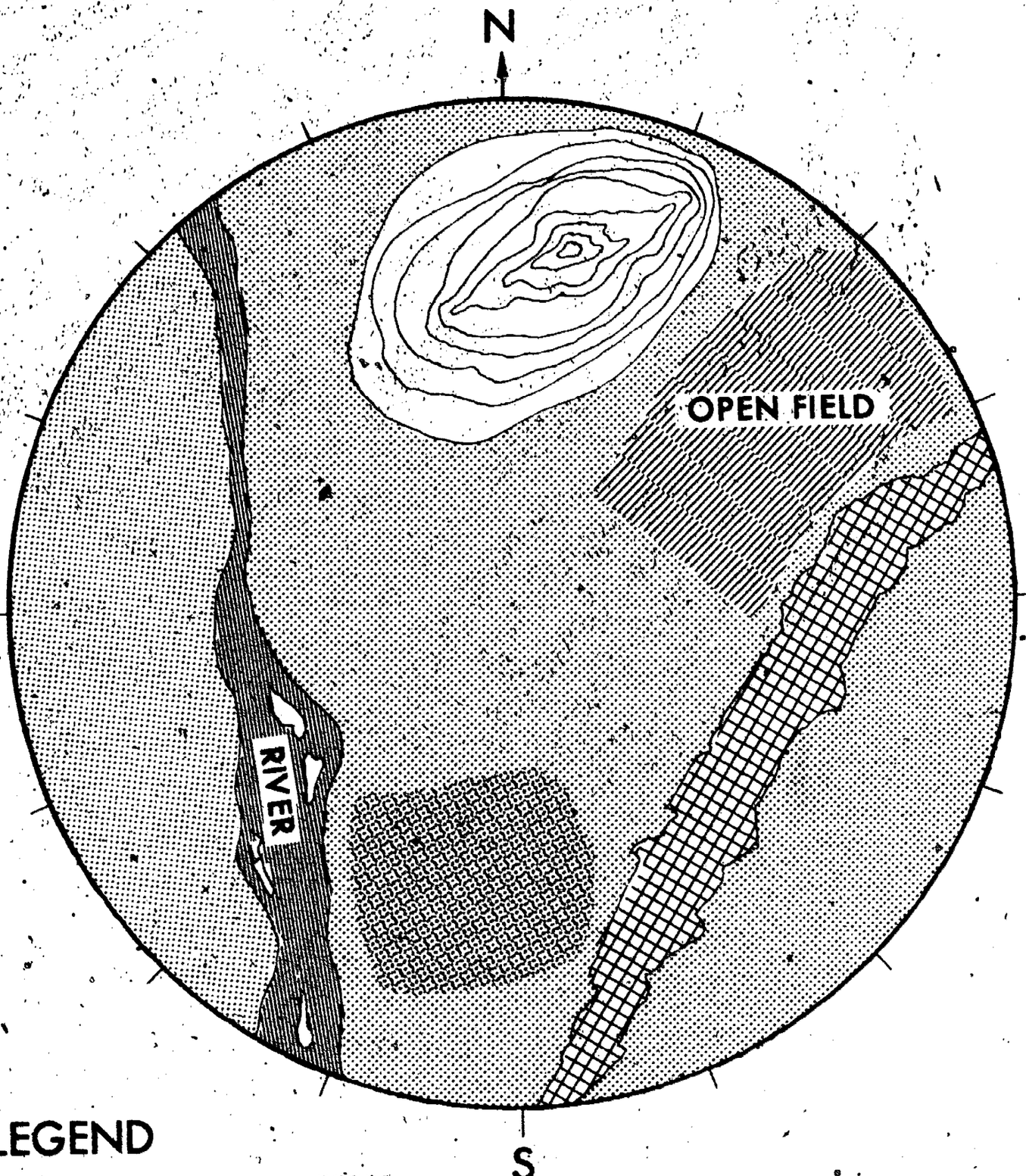
Rules - 1) Up to 4 players.
2) Each player is given a token and flag. The flags are placed anywhere on the compass.
3) The first move can be in any direction on the board. Each play moves one turn at a time.
4) Each move after the first, the players must spin the compass and move toward their flag.
5) The length of each move is determined by the terrains being crossed.

a.	Forest	-One length*
b.	Mountain	-1/2 length
c.	River	-1/4 length
d.	Canyon	-1/4 length
e.	Open Field	-2 lengths
f.	Dense forest	-0 lengths: unpenetrable

*One length is the length of the rules on token.

*This game could easily be adapted to a real outdoor game with people as tokens. Let your enrollees explore the possibilities.

ORIENTEERING GAME



LEGEND

WATER

GRASS FIELD

MOUNTAIN

DENSE FOREST

CANYON

FOREST

523

CRITTER CRAWL AND/OR HOPPER RACE

Ken Runyon, Camp Director
Boise State University YCC Camps

A "Critter Crawl" can be as simple or as elaborate as you want to make it. The primary objective is to learn about small creatures and their habitats. It is a good activity for short work breaks or on lunch hours. OBIS includes another adaption of this activity.

Procedures:

Have each enrollee spend about 5 minutes finding a creature. Insects, spiders, frogs, etc., will do, but you may want to limit them for any one race to either invertebrates or vertebrates. They should be able to tell where they found their critter, what kind of a critter it is and what they think it eats. When all critters are collected, the race begins!

The Course:

Try to select a race course with smooth, hand-packed dirt or sand in full sunlight. Draw a circle about 1 meter in diameter with a circle in its center about 10 centimeters in diameter.

Running the Race:

To run the race, place the critters in the small circle at a signal from the judge. The winner is the first critter to reach the outer circle. No prodding or touching the critters during the race is allowed. Any critter that eats another critter is automatically disqualified. After the race is over, all critters should be returned to the spot where they were found.

Variations:

Use a two-meter circle for crickets, toads and small grasshoppers, and a 3 to 4 meter circle for large frogs and grasshoppers.

After the race, have the enrollees allow their critter to find its own hiding place. Then, have them try to find a way to get their critters out of their hiding places without touching them or their hiding places. Singing, water, pounding, etc. are o.k. to try.

Encourage them to observe the behavior of their critters under various conditions, e.g., does it move faster in shade or in sunlight? When placed on a small hill, does it tend to go uphill, across the hill or downhill? How do they react to quick movements? Slow movements? Distant movements? (This works best with larger critters such as frogs and toads.)

OTHER AREAS

SENIOR CITIZEN'S SUNSHINE DAY

Judith James, Camp Director
Rice Lake YCC Camp 1978

If you're brainstorming for community project ideas, here's one that's fun for everyone involved.

Objective: To provide some local senior citizens with an enjoyable afternoon, and to learn a little bit about history and ethnic backgrounds while doing so.

1. Select a group of local senior citizens, i.e., nursing home patients, inhabitants of an independent old folks' complex) that you'd like to entertain, and make arrangements for transportation, refreshments, entertainment and P.R. (notify the local radio station and newspaper of your plans).

2. Send written invitations to each of the people in the group, announcing the date, time, place and intended activities. If time allows, have some YCC camp representatives visit each senior citizen beforehand, to get a general idea of the interest in such an event.

3. Plan some activities which elderly people would enjoy, with a good deal of time in-between so that the enrollees can visit with everyone.

   --Upon arriving at desired area, have each camper converse with one of the day's guests while the refreshments are being prepared.

   --During the "picnic," the enrollees should do a little more mingling, then choose one of the elderly people to interview.

   Sample questions:

   1) Where were you born? When?

   2) What nationality are you? When did you and/or your parents, grandparents, etc., come to the U.S. to live?

   3) What were some of the fads and fashions that you grew up with?

   4) If some people are originally from the surrounding area, find out what it was like "back then" and how it's changed since.

   5) Were/are you married? How many children do you have? Grandchildren?

   6) What is/was your occupation?

--Afterwards, the enrollee/elderly pairs can team up for a Natural Scavenger Hunt.

Find the following items:

A cattail
A raspberry or strawberry plant
Lichen
A piece of decomposing wood
A wildflower
Birch bark
Pine needles

The first team to find all of the items wins.

--Time for a little entertainment! Have someone lead the entire group in songs like "You are My Sunshine," "He's Got the Whole World in His Hands," "I've Been Working on the Railroad." Short comedy sketches make great in-between acts also.

--While the group is still gathered, have everyone sit so they can see each other. Going around the circle each person is to stand and give his or her name, age (some may refuse to reveal this), birthplace and interests. Award prizes to the oldest, youngest, the person born the farthest away and the person born closest to the vicinity.

These activities took about three hours. Remember the elderly often tire sooner than the enrollees, just ensure you have a compact day and then take the elderly people home.

Some additional ideas for activities would include horseshoes, Bingo or Name That Tune.

The Senior Citizens were very appreciative of the time that was spent with them. The enrollees were excited about it too and enjoyed sharing their interviews with each other. The activity also was a good vehicle for some local P.R.

GETTING LOST: BASIC SURVIVAL

Brad Dubbs; E.A. Coordinator
Yakima YCC Camp, 1977

Materials: Blindfolds for all (pencil/paper for writing impressions is optional)

Objective: enrollees will be able to:

1. describe immediate concerns and dangers upon "getting lost."
2. cite five (5) basic survival needs--fire, water, shelter, food, spirit.
3. acquire or discuss how to acquire above needs.
4. discuss ways to prevent "getting lost" and preparing for emergency with the "ten essentials."

Procedure: In an area the enrollees are unfamiliar with:

1. Blindfold the enrollees and lead them to a spot so that they "don't know" where they are. You may choose to tell them why they are putting on blindfolds--try to create the feeling of being lost as much as possible.
2. Tell them "we are lost--what do we do?" Have them spread out (don't get really lost) individually or in groups to ponder the situation. Ask them to think about basic survival needs, the emotional shock of being lost and the danger and challenge that confronts them. Ask them after a quiet period to make survival plans selecting a site, gathering materials for a fire (don't try to light it yet), and construct partially a shelter with wood materials.
3. Bring the group back together and relate the experience to the group. Visit survival sites. Have survivors explain their set-up and try to light their fire (caution).
4. Discuss the "ten-essentials" and how getting lost can be prevented.

Notes 1. food and edibles will be discussed in future.
2. navigation will be discussed at future date.

References: Life Support Technology Books
Outdoor Survival Skills
Backpacking One Step at a Time

Getting Lost * Info Sheet

What to do ... Stop, don't get more lost by going on. Think. Be calm. Don't separate. Treat any injuries, eat and rest. 2) If early in the day and weather good, mark the spot and make short trips to find trail* return, don't waste energy. 3) Shout or blow whistle 3 times--if you are lucky someone may hear you. 4) Prepare for night well in advance. Conserve strength and body heat. Build sheltered fire. 5) Concentrate not on finding the way but on letting rescuers find you. Stay in one place.

Five basic survival needs ...

1. SHELTER--Will it provide protection from storms, wind, floods, etc. Shelter and bed material on hand? Level ground? Water nearby? Firewood?

   If available, use natural shelters, fallen trees, caves, rocks. Protect from prevailing winds. Grass, leaves, reeds, bark, rotten wood, pine bows, even dirt can be used. Plant materials can be thatched with wood framework. Make bed of grass or pine boughs 10 inches thick for insulation and comfort. Plastic sheet makes A-Frame.

2. FIRE--Select an area where fire won't spread. Use dry timber that is burned easily dry grass, leaves, bark (cedar), wood shavings or pitch. Have all kindling and wood on hand before you light the match. Start with a small fire and add to it. Dry damp wood by the fire and plan ahead. Indians stored fire in a bundle of shavings and bark. Keep overnight by covering with logs and dirt.

3. WATER--How important is water? How long can we last without it? Are we concerned most with sweat loss or rationing water? How can we find water? How is it purified?

   Ration your sweat but not your water. Conserve water by eating less food and minimizing activity. Evaluate your movements. ~25% loss of body efficiency with loss of 1 1/2 quarts water (lost quickly when moving around). Have enough water with you always. (2-4 quarts/day)

4. FOOD--Don't eat it unless you know what it is. (More in another session)

5. Spiritual Needs--Be cool, calm, optimistic--PRAY!

Ten Essentials

Extra clothing	Map
Sunglasses	Compass
First Aid Kit	Matches
Extra food	Fire starters
Flashlight	Knife

EXANINING WINTER SURVIVAL: IT'S A MATTER OF ENERGY

Adopted from Central Wisconsin Environmental Center

Objectives: To convey the following concepts:

1. All organisms must take in at least as much energy as they give up.

2. Man is a part of the natural world. He is subject to the same natural laws that govern plants and animals.

3. The WILL TO SURVIVE is the most important factor in an emergency situation.

Equipment Needed:

Matches
Wood for a fire (Tinder materials)
Magnifying glasses

Procedure: The highest form of learning is gained from actually participating in an experience. Merely hearing something from a teacher is worth far less even if much more can be covered that way. If only one simple fact is absorbed by a student during this unit, it may mean the difference between spending a wet, cold night in the woods or being comfortable, it might even save a life. So, let this experience be an adventure, don't force facts.

1. Create a situation. Make it real. For example--"It is now winter, you were snowmobiling with a friend when the blizzard hit. There was no problem until your machine broke down. The snow has covered your trail, you're at least 15 miles into a large federal forest." Do something or freeze to death! (It's -5) "You have 15 minutes to find a way to survive the night. When I blow the whistle it's time to return and report your progress. GO!"" (Groups of 2) Nothing that wouldn't be present in a large forest may be used.

2. Evaluating who Froze. No matter how well anyone did in selecting a shelter, all could have done better. Have everybody judge each others plans for survival. Here are some factors to consider:

   A. The name of the game is energy conservation. Don't do anything that costs more energy than it can save! Crawling under a fallen tree is sometimes smarter than building an elaborate shelter.

   B. Stay out of the wind.

   C. Don't get wet.

D. Don't get in contact with the cold ground. Insulate! (with pine needles, leaves, or with something water proof over snow)

E. Take clues from animals, they wouldn't be surviving if they didn't do something to conserve energy (heat).

a. Many birds "roost-out" storms in pines.
b. Squirrels insulate with leaves.
c. Grouse and small mammals stay under the snow.
d. Can you think of more?

You can use the temperature readings as one criteria of who would be in the best shape. Draw on the group opinion also.

Then ask everyone what they'd do differently.

3. Getting Help. See how many ways everyone can come up with to get out an S.O.S. (Remember repetitions of 3 are an emergency signal. 3 fires, 3 sounds, SOS in the snow, etc.)

Saying that you would do something is often much easier than actually doing it. Have everybody really demonstrate their ideas. Then ask if it would be worth the effort!

4. Doing the Impossible. If somebody says, "I'd start a fire." Take the challenge and let them try. (Under supervision) Give them magnifying glasses, steel, etc. 99% failure is probable. Once they realize the difficulty suggest some better methods. Jumping the terminals of the snowmobile battery (You could Show them how they could scrap lint from their clothes and pockets for tinder. Or use natural materials like cattail down, thistle down, dryed fiber from mullein stocks, etc. Practice igniting these beforehand, you might find it too difficult to do under survival conditions. If so, at least demonstrate the proper way to build a fire using a match.)

Shelter, fire, water, and food are 4 main ingredients to sustaining human life. Shelter is essential in winter conditions, fire can be gotten along without. Man can go months without food but only a few days without water. Just breathing uses up your energy.

How do you convert snow and ice to water? Ask the Group. (Remember if you use your body heat to do it you're robbing yourself!) You might try Sunlight, perhaps magnifying it. If you have a fire going, you still don't have a pot so figure out another way. How did the Indians do it? (Try lining a hole in the ground, throwing in warm rocks with snow.) Maybe top a tree? (Don't do this one!) Chop a hole in ice?

5. If You're Still Alive. A real "Gung Ho" Group might want to eat. Explain some simple rules to follow. Maybe give them a list of SAFE plants and some TOXIC ONES. Which of these would be available to eat in winter.

   Then there's the fascination with traps. Once again, only in rare instances would anybody need to hunt animals. But just let the imagination loose, show some examples.

6. Recap what you've learned in a short period. Then tell a story of someone who survived by WILL alone.

   Suggest that these people survived in spite of not knowing skills. Now that you know some, all you need is DETERMINATION!

Follow-up Activities:

1. Make a solar still.

2. Make a survival kit--justify the contents.

3. Make some traps.

4. Try preparing some "known" wild plants to eat.
   (Dandilion Greens, mints, rose hips, etc.)
   Use Gibbons books, then use some good identification books.
   Don't touch mushrooms, etc!

5. Figure out some ways of determining direction. How would you walk in a straight line for miles?

APPENDICES

RESOURCE BIBLIOGRAPHY

This bibliography is included for your use in ordering materials. It is divided into subject areas and occasionally includes brief descriptions of the book or resource. A list of publishers' addresses is included at the end.

General Ecology

1. Concepts of Ecology
   Kormondy, Edward
   Prentice-Hall, Inc.

2. Desert Solitaire
   Abbey, Edward
   Good reference book for the desert and for adjusting to the desert environment

3. Ecology
   Odum, Eugene
   Holt, Rinehart and Co.
   The original easy-to-understand ecology text, very worthwhile as part of a camp library

4. Life and Death of the Salt Marsh
   Teal, John and Mildred
   Ballantine Books

5. The Natural History Guide
   Laun, H. Charles
   Alsace Books and Films

6. Voice of the Desert: A Naturalist's Interpretation
   Crutch, J.W.
   Apollo Books

7. The Web of Life
   Storer
   New American Library

Law, Citizen Action and Problem-Solving

8. Science and Survival
   Commoner, Barry
   Ballantine Books

9. Earth Day, The Beginning
   Bantam Books

10. Environmental Issues: A Courtroom Simulation
Bureau of Land Management
A free simulation game to help enrollees to develop problem-solving skills with complex problems.
Available through
Bureau of Land Management
U.S. Dept. of the Interior
Environmental Education Coordinator (220)
Washington, D.C. 20240

11. The Forest Service vs. California's Last Wilderness
California Tomorrow, Spring, Vol. 6, No. 2
Watkins, T.H. and Joan Praker. 1971
An excellent study of the conflict in environmental values between the Forest Service and various conservation groups. Presents the political rights and strategies of both sides. Explains the painful double role of the Forest Service which is required by law to protect the forests, but also to provide controlled use of the forest to lumber, mining and recreation interests.

12. How to be a Survivor
Ehrlich and Harriman
Ballantine Books

13. "Why Can't We Just Give Them Food?"
New York Times Magazine, March 22, 1970 Reprint
Sherrill, Robert
Excellent account of the politics of and emotionality of aid to the poor in this country. Covers fiscal mismanagement by states and the federal government. Also discusses the general attitude of the public toward the poor. This reprint is part of the League of Women Voters' packet and is available from them.

14. 1976: An Agenda for Tomorrow
Udall, Stewart. 1972
Harcourt, Brace and World, Inc.
"This is the book of an optimist who believes that we can identify the force which controls public thoughts and find our way thru and beyond the disordered priorities and outdated institutions that now confuse our national purpose. It is a search for an agenda for tomorrow....."

15. Since Silent Spring
Braham, Frank
Houghton-Mifflin Inc.

16. Society and Environment: The Coming Collision
Campbell, Rex R. and Jerry L. Wade. 1972
Allyn & Bacon, Inc., $5.25
A well-written book consisting of selected readings dealing with: the nature of the collision between man and his environment; water and what must be done; air and related problems; population and its implications; the social transformation that must occur for man to survive. Author states the problems and then discusses basic measures that should be taken to counteract some of the negative effects of our lifestyle.

17. The User's Guide to the Protection of the Environment
Swatek, Paul
Ballantine Books

18. Voter's Guide to Environmental Politics
Debell, Garrett
Ballantine Books

19. Wilderness Bill of Rights
Douglas, W.O.
Little, Brown, and Co.

Environmental Problems

20. Defoliation
Whiteside, Thomas
Ballantine Books

21. The Diligent Destroyers
Laycock, George
Ballantine Books

22. The Environmental Crisis
Helfrich, H., Jr.
Yale University Press

23. The Environmental Handbook
Debell, Garrett
Ballantine Books

24. The Frail Ocean
Marx, Wesley
Ballantine Books

25. "Garbage Reprocessing Nears Reality: A Systems Approach to Total Recycling"
Beverage Industry, May 5, 1972 Reprint
Beverage Industry Magazine, 1972
The technology exists today that would permit the recovery from solid waste of all materials of value--paper, glass, steel, aluminum, copper, zinc and sand, but the real key lies in the development of markets for recovered materials.

26. Haste Makes Solid Waste
Izaak Walton League of America
An informative pamphlet about recycling and cutting down on disposable solid waste

27. New World, No World
Herbert, F.
Ace Book

28. Not So Rich As You Think
Steward, George
Houghton-Mifflin Inc.

29. The Population Bomb
Ehrlich, Paul
Ballantine Books
One of the early environmental movement books which points to overpopulation as the root of many of our environmental problems

30. Population, Evolution, and Birth Control
Hardin, Garrett
Freeman and Co.

31. Silent Spring
Carson, Rachel
Houghton-Mifflin Inc.
A book many consider to be the start of the environmental movement. Carson warns of the use of pesticides.

Identification Manuals

32. Golden Field Guides
Golden Field Guides are small pocket-size identification books which can be very helpful on spike camps. There are many books in the series, i.e., Birds, Insects. They are relatively inexpensive and easily found in bookstores.

33. Petersen Field Guide Series
Houghton-Mifflin Inc.
While these basic field identification books are written by several different authors, they are all part of the Petersen Field Guide series and can be found in most bookstores. Books include field identification books on birds, mammals, reptiles and amphibians, insects, etc. Excellent resource books.

Energy

34. The Nuclear Dilemma
Bryerton, Gene
Ballantine Books

35. The Perils of the Peaceful Atom
Curtis and Hogan
Ballantine Books
A look at nuclear power and its drawbacks

36. Public Interest Report: Solutions to the Energy Crisis
Environmental Education Group, Free
All forms of potential energy are explored.

37. Solar Energy
Tamplin, Arthur R. 1973
Hackett Publishing Co., Inc., from
Environment, Vol. 15 Reprint, 35¢
Various types of solar energy collection are proposed.

38. The Solar Resource: 14 Articles on Energy from the Sun
Environmental Action Reprint Service, Free
An excellent collection of thoughts, facts, and opinions on several possible sources of energy. Thought-provoking.

E.A. Activities and Curriculum Materials

39. Confluent Education
Nadler, Reldan S.
A guidebook for outdoor education program leaders
6543 El Colegio Rd. #104
Ista Vista, CA 93017

40. The Desert Survival Situation
An excellent game that teaches group decision-making. Whether the participants "live" or "die" depends on how well the group can share its knowledge of a relatively unfamiliar problem. This activity was used in Virginia at Camp Mitchell. The group was giving one survival situation (Antarctica) at the beginning of camp and one (Desert) at the end of camp. After the second session, the enrollees learned that after 7 weeks of working together as a team, each individual contributed more to arriving at a solution to their situation than they had for their first situation.
Available through
Experimental Learning Methods
39819 Plymouth Road
Plymouth, MI 48170

41. OBIS--Outdoor Biological Instructional Strategies
Although several OBIS activities are included in this booklet, you may want to order the entire set.
Available through
Outdoor Biology Instructional Strategies
Lawrence Hall of Science
University of California
Berkeley, CA 94720

42. Interpretation
Tilden, Freeman
Teaches how to present material so that it relates to the student, nature, history, etc. Considered the bible for National Park Service interpreters.

43. The New Games Book
New Games Foundation
An excellent resource for team building games. Present a new concept in games--non-competitive and creatively dynamic change.
Available through
New Games Foundation
P.O. Box 7901
San Francisco, CA 94120

44. Opening--A Primer for Self-Actualization
Samples, Robert
Contains many ideas for activities in self-awareness
Available through
Lawrence Hall Scientific
Berkeley, CA
Free

45. Project Adventure
Contains excellent initiate exercises and group building games including the Ropes Course
Available at most bookstores or through
Project Adventure
Bay Rd.
Hamilton, MA

46. Project Learning Tree
American Forest Institute
An excellent series of learning activities geared to teach certain concepts
Order through
Boise Cascade or American Forest Institutes
1619 Massachusetts Ave., N.W.
Washington, DC 20036

47. Sunship Earth
Van Matre, Steve
A new book by the Acclimatization Institute which looks at the earth as a closed system with activities and a sensory approach
Available through
Acclimatization Experiences Institute
P.O. Box 841
Lake Geneva, WI 53147

Environmental Ethics

48. Ecology Begins at Home
Sierra Club Press. 1971
A household environmental handbook; an invitation to change lifestyles

49. The Lives of a Cell
Thomas, Lewis

50. A Sand County Almanac
Leopold, Aldo
Ballantine Books
A very sensitive look at nature through the seasons

51. The Sierra Club Wilderness Handbook
Brower, David
Ballantine Books

52. Values Clarification
Simon, Sidney B., Leland W. Howe, and Howard Kirschenbaum
Hart Publishing Co., Inc.
New York, NY 10003
This is an excellent collection of activities to help young people understand their own value systems. For example, the coat of arms included in this booklet was adapted from the personal values coat of arms.

53. Voices of the Wilderness
Schwartz, William
Ballantine Books

Natural Foods

54. The Natural Food Cookbook
Hunter

55. The New York Times Natural Food Cookbook
Hewitt

56. Soup
Castle
Great book for soup recipes which come in handy if cooks are off or on spike camp

57. The Vegetarian Epicure
Thomas

58. Where Nutrition, Politics and Culture Meet
Kate and Goodwin, $4.50
Center for Science in the Public Interest
1755 S Street, N.W.
Washington, DC 20009

59. The Zucchini Cookbook
Simmons

Urban Camps

60. Downtown: Our Challenging Urban Problems
Liston, Robert A. 1968
Delacorte Press
A searching look at metropolitan areas and at rehabilitation as a "problem of people, not of cities" that deals with such subjects as education, urban renewal, health and transportation

61. Introductory Unit to the Urban Environment
Our Man-made Environment: A Collection of Experiences, Resources, and Suggested Activities
Group for Environmental Education, Philadelphia, 1971

62. A Little About Lots
Parks Council
A good manual on how to make vest pocket parks from vacant lots, how to run them, and how to organize tree planting and neighborhood clean-ups

63. The Metropolitan Enigma
Wilson, James
Doubleday Books

64. Manual for Municipal Conservation Commission
Massachusetts Dept. of Natural Resources
Includes practical suggestions for specific projects

65. Open Space for Urban America
Strong, Ann Louise
Office of Metropolitan Development
Department of HUD
Washington, DC 20410
Good and very complete guide to all the techniques available for conserving open space; extensive appendices include model statutes and legal forms

66. Planning in the Community
Leage of Women Voters
A useful checklist of the basic elements of successful local planning efforts

67. Planning Our Town
Munzer, Martha. 1964
Knopf Inc.
Introduces students to the problems of urban planning emphasizing the fact that no community is "an island unto itself" so students will consider their town and city as part of a larger community. At the end of the text is a list of colleges that offer degrees in the planning profession and a bibliography.

68. Urban Ecology
George and McKinley
McGraw-Hill Co.

Spike Camps

69. The Complete Walker
Fletcher, Colin

70. Boy's Life Reprints
Boy Scouts of America
Titles include: Cooking
Survival
Lite-Pac Camping Equipment
Patrol Camping
Tents

71. Field Book
Boy Scouts of America
Excellent guide for all kinds of wilderness experiences

72. The Man Who Walked Through Time
Fletcher, Colin

Directory of Organization, Agency and Publisher Addresses

Abingdon Press
201 Eight Avenue
Nashville, Tennessee 37203

Ace Publishing Corp.
c/o Charter Communications, Inc.
1120 Avenue of the Americas
New York, New York 10036

Alfred A. Knopf, Inc.
(Part of) Random House, Inc.
201 East 50th Street
New York, New York 10022

Allyn & Bacon, Inc.
470 Atlantic Avenue
Boston, Massachusetts 02210

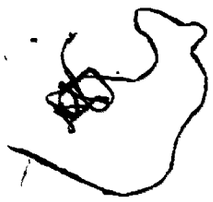
American Forestry Association
1319 Eighteenth St., NW
Washington, D.C. 20036

Ballantine Books, Inc.
101 Fifth Avenue
New York, New York 10003

Cornell University Press
124 Roberts Hall
Ithaca, New York 14850

Delacorte Press
750 Third Avenue
New York, New York 10017

Department of Agriculture
14th Street & Jefferson Drive, SW
Washington, D.C. 20250
OR
Government Printing Office
Washington, D.C. 20401
(Ask for prite lists of
agricultural publications).



Department of the Interior
C/O Office of Information
18th and C Streets, NW
Washington, D.C. 20240
(It is usually better to write the Bureau involved, e.g., Mines, Land Management, Outdoor Recreation, National Park Service, etc.).

Doubleday & Co., Inc.
501 Franklin Avenue
Garden City, New York 11531

Environmental Action
Coalition, Inc.
East 49th Street
New York, New York 10017

Environmental Action Reprint
Service
University of Colorado at Denver
1100 14 Street
Denver, Colorado 80202

Environmental Education Group
1543 North Martel
Los Angeles, California 90046

Environmental Protection Agency (EPA)
4th and M Streets, SW
Washington, D.C. 20460

ERIC Information Analysis Center
for Sciences, Mathematics &
Environmental Education
1460 West Lane Avenue
Columbus, Ohio 43221

Forest Service
C/O Director of Information &
Education
South Agricultural Building
12th and Independence, SW
Washington, D.C. 20250

Freeman, W.H. & Co.
660 Market Street
San Francisco, California 94104

Golden Press (Western Publishing Co., Inc.)
850 Third Avenue
New York, New York 10022
OR
Western Publishing Co., Inc.
1220 Mound Avenue
Racine, Wisconsin 53404

Group for Environmental Education (GEE)
1214 Arch Street
Philadelphia, Pennsylvania 19107

Hackett Publishing Co., Inc.
4047 North Penn Street
Indianapolis, Indiana 46205

Harcourt Brace Jovanovich, Inc.
757 Third Avenue
New York, New York 10017

Hart Publishing Co.
719 Broadway
New York, New York 10003

Holt, Rinehart, and Winston, Inc.
383 Madison Avenue
New York, New York 10017

Houghton Mifflin Co.
110 Tremont Street
Boston, Massachusetts 02107

Izaak Walton League of America
1326 Waukegan Road
Glenview, Illinois 60025

Knopf A.A., Inc.
Random House, Inc.
201 E. 50th Street
New York, New York 10022

League of Women Voters
1200 17th Street, NW
Washington, D.C. 20036

Little, Brown and Co., Inc.
34 Beacon Street
Boston, Massachusetts 02106

McGraw-Hill Book Co.
Princeton Road
Hightstown, New Jersey 08520
OR
330 W. 42nd Street
New York, New York 10016

National 4-H Service Committee
Chicago, Illinois 60607
(Publications under this program can be obtained at minimal cost from the Government Printing Office or the Cooperative Extension Svc. of Land Grant Universities. Another alternative is to write the Dept. of Agriculture's Extension Service at 5503 South Agriculture Building, 14th and Independence Ave., SW Washington, D.C. 20250).

Prentice-Hall, Inc.
Englewood Cliffs
New Jersey 07632

Sierra Club
1050 Mills Tower
220 Bush Street
San Francisco, California 94104

GLOSSARY

abiotic - the nonliving components of the environment.

acre - a measurement of land surface containing 43,560 sq. ft. (4,047 sq. meters). This is equal in area to a square approximately 209 feet (64 meters) on a side. Most crops are grown and most farms are managed in terms of acres of land (1 acre = .4047 hectare).

adapt - to alter or adjust to fit new conditions and uses. Animals often adapt themselves to changes in weather and climate.

aerobic decomposition - the decomposition of organic material by microorganisms that require oxygen. The major products of decomposition are carbon dioxide and water.

aesthetic - pleasant or beautiful in color, texture, or general appearance.

air pollution - the accelerated transfer of natural and synthetic substances into the air usually as a consequence of man's activities.

algae - a large group of aquatic plants including seaweeds.

anaerobic decomposition - the decomposition of organic material by bacteria in the absence of oxygen. The major product of decomposition is methane.

annual - a plant which completes its life cycle, from seedling to mature plant, in a single growing season and then dies.

aquifer - a layer of rock or soil that is permeable.

biodegradable - capable of being broken down by natural means into basic reusable components. Synonym for "soft" as in soft detergent.

biological control - the use of a pest's own predators and parasites to control its population.

biological half-time - the period required for half of an ingested material to be excreted from the body.

biological magnification - increased concentration of chemical substance, such as DDT, stored in organisms as they move through a food chain.

biomass - the total quantity of living organisms of all the species in a community at a given time.

biosphere - the portion of the earth and its atmosphere capable of supporting life.

biotic - refers to the living components of the environment.

biotic potential - the inherent maximum population growth rate that occurs under optimum conditions.

blue-green algae - a type of tiny green plant that often causes surface waters to appear like pea soup.

breeder reactor - a type of nuclear reactor that produces slightly more fissionable material than it consumes.

broad spectrum pesticide - a chemical that kills more than the target species.

calorie - a unit of energy. The amount of heat required at a pressure of one atmosphere to raise the temperature of one gram of water one degree centigrade.

carnivore - an animal that uses other animals as a food source.

carrying capacity - the maximum population that a given ecosystem can support indefinitely.

chlorinated hydrocarbons - chemical family of insecticide, including DDT, that are broad-spectrum pesticides and long-lasting.

clear cutting - a method of harvesting certain tree species in which all trees in an area are cut in one operation.

climax community - a relatively stable community that is able to maintain itself over long periods of time and to regenerate and replace itself without marked further change.

coliform bacteria - bacteria normally found in the human intestine whose presence in water in sufficient numbers is used to indicate the possibility of contamination by inadequately treated sewage.

combined sewer - sewer system where both storm water and sanitary wastes are carried by one large pipe to a treatment plant.

community - an interrelated and interdependent group of plants and animals.

competition - active demand of 2 or more organisms or 2 or more populations of organisms for some environmental resource in short supply.

compost - a mixture of largely decayed organic matter used for fertilizing and conditioning land.

condensation - the process in which water becomes a liquid vapor or a solid vapor such as rain or snow; occurs when cooling takes place.

conservation - the intelligent use of natural resources to assure their continuing availability through attention to ecological and human laws.

consumer - an organism which ingests other organisms or organic matter. In the food chain, all organisms other than green plants.

contact herbicide - an agent that destroys or inhibits plant growth at the point of contact.

contour farming - plowing in such a way that the furrows connect points of equal elevations in order to minimize erosion and runoff.

cultural eutrophication - the result of activities of man that increase the amount of plant nutrients entering surface waters, hence increasing algae and other aquatic plant populations. Widely used to denote organic pollution. See eutrophication for its definition.

decibel - a unit measure of sound energy intensity.

deciduous - a plant, including trees, which sheds all of its leaves every year at a certain season.

decomposer - a microconsumer; organisms such as bacteria, yeast, or mold that break down other organisms into simpler forms.

demography - the statistical study of (human) populations.

density - number of organisms per unit of space.

density-dependent factors - factors whose effect on the population varies with the density of the population (greater population, greater effect).

dichotomous key - a method used to identify objects by providing a choice of two identifying factors in a branching series where the factors become increasingly definitive until the object is identified.

dissolved oxygen - oxygen contained in a solution; usually water.

diversity index - the number of species divided by the number of individuals of all these species in an area.

dominance - in ecology, refers to superior strength and/or vigor of certain plants and animals.

ecology - the study of the relationships of living things to one another and their environment.

ecosystem - the community including all the component organisms together with the abiotic environment forming an interacting system.

energy - the ability to do work.

environment - the surroundings of a plant or animal including other plants and animals; climate, location, etc.

environmental inventory - a list, or survey of resources; i.e., all the plants, animals and or manmade structures in a prescribed area.

epilimnion - the warm, less dense top layer of water in a stratified lake.

erosion - the removal and movement of particles of the land surface by wind, water, ice or earth movements such as landslides and creep.

eutrophication - a natural process whereby lakes gradually become more productive (more plant producing); if the process is man-accelerated, the term "cultural eutrophication" is used. These lakes are often deficient in oxygen.

evaporation - molecular matter going from a liquid to a gaseous state.

exploitation - the use of an environmental resource by an organism. Usually connotes use which is at the expense of the environmental resource or another organism.

First Law of Thermodynamics - a law stating that although energy can be transformed from one form to another, it cannot be created or destroyed; also expressed as the conservation of energy.

food chain - a sequence of organisms, including producers, herbivores, and carnivores, through which energy and materials move within an ecosystem.

food web - a complex of interlocking food chains.

fossil fuel - the remains of once-living plants and animals that are burned to release energy. Examples are coal, oil and natural gas.

gene pool - the sum total of inherited characteristics possessed by a species.

geothermal energy - heat energy conducted from the earth's interior.

greenhouse effect - the absorption and re-radiation of terrestrial longwave energy by atmospheric water vapor, carbon dioxide, and ozone.

ground water - water that is contained in subsurface rock and soil layers.

habitat - the place where a plant or animal lives.

half-life - the amount of time required for one-half of the radioactive nucleus of an isotope to decay.

herbivore - a plant-eating animal.

humus - the dark, rich part of the soil formed by the decay of roots, stems, and leaves of plants, as well as the decay of animal litter.

hydroelectric power - electric power produced by falling water, usually by means of a waterwheel or turbine.

hydrologic cycle - the path water takes from precipitation until it evaporates and recondenses in cloud form, back to precipitation.

hypolimnion - the colder, denser bottom layer of water in stratified lake.

kinetic energy - energy an object possesses because of its motion.

lichen - algal and fungal plants growing together in a symbiotic relationship as an organized whole.

limiting factor - any component of the environment that limits the well-being of an organism.

migration - to pass periodically from one region or climate to another; a common pattern among waterfowl and some mammals.

monoculture - an agricultural endeavor that lacks diversity. Usually refers to farming one or two kinds of crops exclusively.

mulching - spreading of leaves, straw, or other loose material on the ground around plants to prevent evaporation of water from the soil, freezing of roots, etc.

multiple use - a resource management system based upon maximizing the total goods and services derived as in contrast to managing for a specific resource such as wildlife or timber.

niche - the function of an organism in the environment, its activities and relationship to the biotic and abiotic environment. Its "job."

nitrogen cycle - the pathway of nitrogen from atmosphere to soil to plant to animal and back to atmosphere.

non-renewable resource - a resource of finite supply which cannot be replaced, such as oil.

nuclear fission - the fragmenting of a nucleus resulting in the release of neutrons and the formation of two new nuclei.

nuclear fusion - an extremely high-temperature process whereby two or more nuclei are fused into one.

nuclear power - power, usually transmitted in the form of electricity, derived from nuclear fission or fusion.

ligotrophic lake - a lake with low biological productivity; usually has clear water and aesthetic appeal.

omnivore - an animal that uses both plants and other animals as food sources.

optimum - the most favorable condition as to temperature, light, moisture, food and other things necessary for growth and reproduction.

organic - referring to matter whose basic molecular structure is made up of carbon and hydrogen.

oxygen sag curve - a characteristic pattern showing the decrease in dissolved oxygen resulting from the input of organic material into a river.

parasitism - a population interaction in which one organism (the parasite) obtains needed energy and nutrients by living within or upon another organism (the host).

pH - a measure of the acidity or alkalinity of a solution.

pheromone - a chemical excretion of animals used for communication.

photosynthesis - the process by which light energy is converted by green plants to chemical energy (food energy).

pioneer species or community - plant species which initially invade unforested areas.

pollution - contamination of the environment whether of the air, water, soil, etc., usually by man.

population - groups of individuals of any one kind of organism.

potential energy - stored energy that may be converted to kinetic energy.

precipitation - water which reaches the ground from the atmosphere as a result of condensation; includes rain, sleet, snow, etc.

predation - a population interaction in which one organism (predator) kills and eats another organism (prey).

pre-emergent herbicide - applied before weeds and/or crop emerges from soil.

prescribed or controlled burning - the use of fire as a resource management tool.

preservation - one important component of conservation; usually has the connotation of setting aside or non-consumptive use.

primary air pollutants - substances introduced into the atmosphere that, unaltered, may pose a serious hazard to environmental quality.

primary consumer - a species which derives its food directly from producer species.

primary sewage treatment - physical processes used in removing only suspended materials from waste water.

producer - in the food chain green plants, the only organism capable of making food through photosynthesis.

regeneration - reestablishment of natural vegetation similar to the original one on a given site.

renewable resource - a resource in which the materials can be grown as fast as they are dispersed.

resources - biologically, everything of natural origin, living and non-living, which humans and other organisms use.

rotation - the period of time between two commercial harvests; i.e., the cutting cycle in a forest.

run-off - precipitation that moves from its point of contact with the ground to another on the surface usually as a result of the soil's inability to absorb it.

sanitary landfill - a dump in which the refuse is covered with soil periodically in order to reduce activity of rodents and insects while speeding the decomposition process.

sanitary sewer - the system of pipes that transports domestic wastes to a sewage treatment plant.

scrubbing - the removal by water spray of water-soluble pollutants from an air stream.

Second Law of Thermodynamics - a law stating that all energy transformations are less than 100 percent efficient.

secondary air pollutants - products of reactions among primary air pollutants.

secondary consumer - a carnivore which feeds upon a primary consumer (herbivore).

secondary treatment - a biological process used mainly to remove dissolved organic materials from water. Bacteria consume the organic parts of the waste.

separated sewer system - a sewer system in which two pipes are used; one transports surface runoff and the other transports sanitary wastes.

solid waste - waste which, when discarded, is in a solid form as contrasted to gaseous waste and liquid waste.

Spaceship Earth - phrase used to emphasize that the earth is essentially a closed ecosystem with limited and interrelated resources. Idea: "We've only got one earth; let's make it last."

specialization - refers to an organism, or part thereof, that is adapted to a particular kind of life or to a certain combination of environmental conditions.

storm sewage - runoff from roofs, parking lots and lawns.

succession - the gradual replacement of one community by another.

sustained yield management - the use of a renewable resource at a rate that permits regeneration for use, continuing undiminished into the future.

symbiosis - the living together of two or more organisms of different species (includes parasitism, mutualism and commensulism).

synergism - an interaction of two factors in which the total effect is greater than the sum of the effects of the two factors evaluated independently.

systemic herbicide - an agent that destroys or inhibits plant growth by being drawn into the plant's system.

tertiary treatment - an advanced waste-water treatment process used to remove more efficiently chemicals such as phosphates and nitrates.

thermal power - power, usually distributed in the form of electricity, which is derived by the combustion of fuels--usually fossil fuels such as coal, natural gas and petroleum.

thermocline - the transition zone in a stratified lake where a rapid temperature decrease occurs with increasing depth.

thermopollution - heat energy where it is not wanted, e.g., where it raises the temperature of a natural body of water to the extent that it is detrimental to the balance of the ecosystem.

trade-offs - compromises, usually due to conflicting goals and/or inadequate resources. For example, pesticides may increase crop production, but disrupt other functions within the ecosystem.

transpiration - water voided as a gas from specialized leaf cells of plants. One important component of the hydrologic cycle.

turbidity - a decrease in visibility resulting from the scattering of light of suspended particles in water.

water table - the surface forming the upper boundary of the ground-water reservoir.

watershed - a specific region or area within which all water drains to a particular river or lake.

weathering - the chemical decomposition and mechanical disintegration of rock.

wilderness - generally uncultivated and undeveloped land. Usually the connotation is that the land is in the pristine condition.

ROLES OF AGENCIES

The U.S. Department of the Interior and the U.S. Department of Agriculture are responsible for the management of most of the Federally owned land in the U.S. This land is managed by various agencies within these departments according to the location and function of the land area and the particular natural resource involved. The Federal YCC program is operated through these agencies. The state grant YCC program is operated on non-Federal land through state natural resource or conservation departments. The information provided here will help you understand the mission of your agency and other land management agencies involved in natural resource management.

U.S. Department of Agriculture (1862)

Created in 1862, the Department of Agriculture works to improve farm income, to assure consumers of an adequate food supply at reasonable prices, and to expand overseas markets for U.S. farm products.

The Department assures food quality through voluntary food grading services and inspection of food processing plants. Research covers food and nutrition, animal disease and pest control, crop production, marketing and the use of agricultural products, food safety and environmental quality.

U.S.D.A. protects the environment by helping farmers and other rural landowners conserve energy, soil, water, and forest resources. It also assists developing countries to improve their food production through technical assistance and agricultural education programs. These educational programs are available throughout the United States through the Cooperative Extension Service.

Forest Service

Created in 1905, the Forest Service is dedicated to the principles of multiple-use management, for sustained yields, of the nation's renewable forest resources. It provides services to a growing nation through management of 187 million acres of the National Forest System; cooperation with state foresters, private forest owners, wood processors, and private and public agencies; and nationwide forestry research that directly or indirectly supports all management and cooperative efforts.

Forest Service programs include timber production, outdoor recreation, habitat for fish and wildlife, watershed protection, and livestock grazing. FS programs help prevent and suppress wildfires. They are concerned with wilderness management, forest engineering, land management planning, mining and land reclamation and reforestation, the marketing and utilization of forest products, resource surveys, urban forestry, and pollution.

Soil Conservation Service

Created in 1935, the Soil Conservation Service has responsibility for developing and carrying out a national soil and water conservation program in cooperation with private land owners and operators, other land users and developers, with community planning agencies, resource groups and other Federal, state and local agencies.

The soil and water conservation program is carried on in all states plus Puerto Rico and the Virgin Islands through technical help provided to over 3,000 locally organized and operated conservation districts covering 2 billion acres.

U.S. Department of the Interior

Created by Act of Congress in 1849, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

Bureau of Indian Affairs

The Secretary of the Interior, acting through the Commissioner of Indian Affairs, exercises the nation's trust responsibility for approximately 543,000 Indians who reside on or near more than 50 million acres of reservation lands.

Created in 1824, the Bureau of Indian Affairs is required to protect the rights of Indian tribes and, together with the tribes, see that tribal resources are prudently developed to enhance their value. Any form of transaction affecting Indian trust assets--buying, selling, exchanging, mortgaging, leasing, investing--must be approved by the Secretary of the Interior or his delegate, the Commissioner of Indian Affairs.

A second major Bureau role is to provide services and programs--of the kind normally provided by a local government--on reservations, including social services, road maintenance, housing, education, business enterprises, and law enforcement.

Geological Survey

Established in 1879, the U.S. Geological Survey is the nation's principal source of information about the configuration of the land surface, the composition and structure of the rocks at and beneath the surface, the distribution and character of its energy, mineral, and water

resources, and the nature of geologic processes. Data gathered by the Survey are used by Federal, state and local governments, industry, and other scientific and technical organizations in making decisions concerning the wisest possible use of the nation's natural resources.

The Geological Survey serves as the "scientific arm" of the Interior Department and provides:

1. Accurate topographic maps
2. Information on the composition and structure of rocks
3. Data on surface and ground water
4. Knowledge of earth history and natural processes
5. Appraisal of the nation's potential energy and mineral resources
6. Classification of Federal lands for mineral and water power potential
7. Supervision of oil, gas, and mineral lease operations on Federal and Indian lands and on the Outer Continental Shelf

Bureau of Reclamation

Established as the Reclamation Service in 1902, the Bureau of Reclamation operates programs designed to stabilize and to promote the growth of local and regional economies through optimum development of water and related land resources in the 17 contiguous Western States. Reclamation irrigation projects provide homes and livelihoods for about 146,000 farm families. Facilities have been constructed to provide irrigat on water for nearly 11 million acres.

An added function of the Bureau of Reclamation is the marketing of hydroelectricity. It is operating 49 powerplants with a capacity of 7 3/4 million kilowatts, most of which is sold to nearby communities and businesses. Increasingly, too, Reclamation projects are providing water supplies to cities throughout the West.

National Park Service

The National Park Service was established in 1916, and presently administers over 280 areas of natural, historic, recreational or cultural significance for the use and enjoyment of the American people.

The fundamental objective of the Service, as stated in the Act establishing it, is to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This is done through an

extensive system of National Parks, National Monuments, National Recreation Areas, National Historic Sites, National Military Parks, National Battlefield, National Scenic Riverways, National Seashores, and National Lakeshores.

Bureau of Land Management

Established in 1946, with the consolidation of the General Land Office (1812) and the Grazing Service (1934), the Bureau of Land Management classifies, manages and disposes of Federal public lands, not included within the National Park, Forest or Refuge systems, and their related resources according to the principles of multiple use management. These lands, over 450 million acres, are a substantial source of income--from oil and gas leases, grazing rights and the sale of timber, minerals, and other raw materials.

The Bureau also administers the mineral resources connected with acquired lands and the submerged lands of the Outer Continental Shelf. With all its varied activities, it is the largest land management agency and a major producer of government revenue.

U.S. Fish and Wildlife Service

Organized in 1956, the U.S. Fish and Wildlife Service is responsible for the conservation, use, understanding and enjoyment of fish and wildlife resources of the nation. The Service keeps a constant check on the effect of adverse environmental conditions on fish and wildlife. It works to preserve wetlands and identifies and endeavors to save endangered species.

The Service manages 30 million acres of land in 329 refuges and 90 fish hatcheries. Their Federal facilities provide a nationwide system of refuges for migratory wildlife and endangered species; management areas for the scientific study of fish and wildlife populations, fish restocking, and research stations. Their programs are operated in close cooperation with state and private organizations.

Heritage Conservation and Recreation Service

The Heritage Conservation and Recreation Service (HCRS) was formed in January, 1978. The HCRS combines the functions of the Bureau of Outdoor Recreation and the programs of the Office of Archeology and Historic Preservation and the National Natural Landmarks program in the National Park Service. Its primary function is to administer the Land and Water Conservation Fund which provides funds for the acquisition and development of recreational areas to serve major metropolitan and other city areas. Development includes picnic facilities, campgrounds, fishing access, golf courses, playgrounds and beaches.

The HCRS is also responsible for the restoration and preservation of many of our historic landmarks.

U.S. Department of Defense

The Defense Department is the government's third largest land management agency. Most of this land constitutes military bases around the U.S. operated by the Air Force, the Army, the Navy, and the Coast Guard. YCC programs are operated on ___ of these bases in cooperation with the Department of the Interior.

U.S. Army Corps of Engineers

Created in 1824, the Army Corps of Engineers provides development of water resources including construction of major dams, reservoirs, levees, harbors, waterways; locks and flood and navigation control structures.

Environmental Protection Agency

Established in 1970, the Environmental Protection Agency provides a coordinated governmental action to assume the systematic abatement and control of pollution through a variety of research, monitoring, standard setting and enforcement activities.

The EPA conducts programs with Federal, state, local and private organizations dealing with air and water; pesticides, solid waste and radiation. The EPA enforces Federal regulations regarding environmental quality standards and reviews Federal agency programs regarding their impact on environmental quality through the review of environmental impact statements.

Council on Environmental Quality

The Council on Environmental Quality advises the President on environmental issues and prepares an annual report to Congress on environmental quality. It develops guidelines for implementation of environmental impact statement law; provides information on environmental affairs; assesses the impact of non-nuclear energy research and development on the environment; and provides information on the environmental impact of Outer Continental Shelf development, pollution abatement costs, and land use impact.

National Oceanic and Atmospheric Administration

A part of the Commerce Department, the NOAA is responsible for the development and proper use of marine recreational and commercial fisheries. It conducts research for environmental upgrading, oceanographic exploration, and marine resource development. It also provides satellite observations of the environment by establishing and operating a national environmental satellite system.

State Agencies

Each state operates YCC camps on non-Federal land. The governor of each state is directly responsible for the program and delegates the responsibility for its operation to a state agency. If you are employed in a state-run YCC camp, you must give your enrollees an understanding of the function of your agency. Identify your sponsoring agency and acquire information about its mission. State agencies usually involved in the YCC program are:

Departments of Natural Resources
Departments of Education
Departments of Manpower Services
Departments of Human Resources
State Parks and Recreation
State Forestry
State Fish and Wildlife
Commissions on Youth
Commissions on Environmental Protection
Departments of Environmental Conservation

Private Organizations

There are many private organizations involved in natural resource or other conservation areas which may be able to provide information to you. This is only a partial list of these organizations.

Organization	Types of Information Available
American Forestry Association 919 Seventeenth Street Washington, DC 20006	Membership & subscription to the monthly "American Forests" magazine--$8.50
Common Cause 2100 Main Street, N.W. Washington, DC 20037	Membership dues--$15.00 Political influence for making the government responsive to people
Conservation Education Association University of Wisconsin, Green Bay Green Bay, WI 54301	Excellent bibliography--$2.50 Supplement--$1.00
Ducks Unlimited, Inc. National Headquarters P.O. Box 66300 Chicago, IL 60666	Dues--$10-$20 Organization of sportsmen to control and improve wetland breeding areas for ducks on public and private lands

Organization	Types of Information Available
ENVIRONMENT Magazine 438 North Skinker St. Louis, MO 63130	Monthly publication dealing with effects of technology on the environment, published by the Committee for Environmental Information General subscription--$12.50 Government or library--$17.50
Environmental Action Room 731 1346 Connecticut Avenue, N.W. Washington, DC 20036	Subscription to biweekly newsletter--$15.00. Deals with all types of problems of the environment thru legislative and community action--covers such topics as transportation, water pollution, corporate responsibility, and environmental legislation
Environmental Defense Fund 162 Old Town Road East Setauket, NY 11733	A group of citizens, scientists, and lawyers, dedicated to the protection of environmental quality thru legal action. Newsletter and membership: Student--$10.00 Basic--$15.00
Friends of the Earth 30 East 42nd Street New York, NY 10017	Concentrating efforts on fighting supersonic transport development, and other environmentally damaging technology. Student--$10.00 Basic--$20.00
Glass Containers Manufacturing Institute 330 Madison Avenue New York, NY 10017	Pamphlets on glass, recycling, etc.
International Oceanographic Foundation 10 Rickenbacker Causeway Virginia Key Miami, FL 33149	Membership--$15.00. Includes subscription to "Sea Frontiers" and "Sea Secrets"
League of Women Voters 1730 M Street Washington, DC 20036	"Planning a Community," a useful checklist of the basic elements of successful local planning efforts

Organization	Types of Information Available
National Audubon Society 1130 Fifth Avenue New York, NY 10028	Membership--$15.00 Family--$18.00 Magazine subscription--$13.00. Good wildlife conservation coverage
National Education Association 1201 Sixteenth Street, N.W. Washington, DC 20036	"Man and His Environment"-- $1.75
National Parks and Conservation Association. 1701 Eighteenth Street Washington, DC 20009	National Parks and Conservation magazine, "The Environment Journal" with $12.00 associate membership
Nature Conservancy 1522 K Street, N.W. Washington, DC 20005	Subscribing membership--$10.00 Family--$15.00 Student--$5.00 Buys land and holds it in trust until it can be purchased by the government
National Wildlife Federation 1412 Sixteenth Street, N.W. Washington, DC 20036	Associate membership--$7.50 includes "National Wildlife" magazine. A $7.00 youth membership includes "Ranger Rick's Nature Magazine"
Population Reference Bureau 1755 Massachusetts Avenue, N.W. Washington, DC 20036	Good bibliography, source list, and film guide on population Membership: Student or teacher--$5.00 Basic--$8.00
Sierra Club 1050 Mills Tower San Francisco, CA 94104	List of publications, pollution and population information, protection of scenic areas. Membership: Student--$10.00 Basic--$17.00
Wilderness Society 729 Fifteenth Street, N.W. Washington, DC 20005	Reports, pamphlets, and reprints on preservation and use of wilderness. Membership includes "Living Wilderness Magazine" and "Wilderness Reports" Student--$5.00 Basic--$10.00