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ABSTRACT

This guide is intended for Youth Conservation Corps (YCC) unit managers and staff. It provides philosophies, concepts, methods, and techniques for integrating environmental awareness in YCC camp programs. Also discussed are urban youth and the YCC, and the roles of Federal and State agencies. (SB)

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YOUTH CONSERVATION CORPS
SOURCE BOOK FOR
ENVIRONMENTAL AWARENESS

PEOPLE AND NATURAL RESOURCES

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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U.S. DEPARTMENT OF INTERIOR
U.S. DEPARTMENT OF AGRICULTURE

UNITED STATES YOUTH CONSERVATION CORPS

YOUTH CONSERVATION CORPS

SOURCE BOOK OF ENVIRONMENTAL AWARENESS

- PEOPLE AND NATURAL RESOURCES -

DEPARTMENT OF INTERIOR - DEPARTMENT OF AGRICULTURE

SUMMER 1975

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INTRODUCTION

This Source Book is to be used as a guide to developing a quality environmental awareness program in balance with the whole YCC program including projects, group living, interpersonal relations, and recreation.

It has been developed for use by:

Unit managers such as District Rangers, Park Superintendents, etc. who evaluate projects for the YCC program in terms of environmental awareness of natural resources and work that needs to be accomplished in managing the environment.

YCC Staffs including camp director, project coordinator, environmental education people, crew leaders, and night counselors, so that they can plan and involve the YCCer's in a totally integrated environmental awareness/YCC program.

And as the summer of YCC starts and moves on, the YCCer's themselves should become involved in the planning of the total program and may find this publication useful.

This publication is the beginning of revisions combining philosophy's, concepts, methods, and techniques developed by YCC camps administered the last four years by agencies and bureaus of the U.S. Department of Interior and the Forest Service, U.S. Department of Agriculture. This year will be a rough draft with lots of room for improvement, and additions as a result of this summer of 1975 program. State YCC programs will be active this summer and their input is encouraged.

A companion publication YCC - Environmental Awareness Pocketbook that should help you implement the YCC/Environmental Awareness Program will be available later this spring. This too is in rough draft form and additions or revisions for next summer are enthuiastically received.

A joint working group from both agencies plans to meet in the fall and improve both the Source Book and the Pocketbook.

Your contributions, criticisms, etc. are greatly needed to help develop a quality environmental awareness/YCC program. They can be sent to either of the following addresses.

Interior-Agriculture
Youth Conservation Corps
Washington, D. C.
January; 1975

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Washington, D. C. 20240

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or

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Developed jointly for the Departments of Interior and Agriculture (with the help or input from previous years YCC Camps) by:

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CHAPTER I - ENVIRONMENTAL PERSPECTIVES

I. Definition of Environmental Education:

Environmental education is defined by the Environmental Education Act of 1970 (Public Law 91-516) to be "THE EDUCATIONAL PROCESS DEALING WITH MAN'S RELATIONSHIP WITH HIS NATURAL AND MAN-MADE SURROUNDINGS AND INCLUDES THE RELATION OF POPULATION, POLLUTION, RESOURCE ALLOCATION AND DEPLETION, CONSERVATION, TRANSPORTATION, TECHNOLOGY, AND URBAN AND RURAL PLANNING TO THE TOTAL HUMAN ENVIRONMENT."

II. Objectives of the YCC Program:

A. Purpose. To accomplish the purpose of the Law, we will stress three equally important objectives:

(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 natural environment and heritage.

These objectives will be accomplished in a manner that will provide the youth with an opportunity to acquire increased self-dignity and self-discipline, better work with and relate with peers and supervisors, and build lasting cultural bridges between youth from various social, ethnic, racial, and economic backgrounds.

We will seek the best way(s) to accomplish these objectives by directing or coordinating the program so that available resources, including human, natural, and physical are maximized and restraints are minimized.

B. General Environmental Education Objectives.

1. Knowledge. The cognitive objectives concern the domains of knowledge, factual information, and basic skills and are considered to be:

a. The student to have increased awareness about natural laws and ecological principles that govern the natural environment.

b. The student to better understand the extent of the present degree of environmental deterioration.

c. To offer possible solutions to existing and potential environmental problems on both a universal and a personal level.

d. To help develop an environmental ethic in each member of the Youth Conservation Corps, enrollees, staff members, Bureau personnel, parents, and others.

2. Attitudes. This second set of objectives concern the affective domain of attitude change and behavior modification of those participating in the Youth Conservation Corps program and represent a primary goal of the educational program. The objective is not to develop extreme positions on the involved issues. Rather, they should be viewed as spectra for each extreme. The focus then becomes the moving of an attitude in one direction or the other.

a. Production solely of nonbiodegradable waste vs. production of solely biodegradable waste.

b. Consumption solely of nonrenewable resources vs. consumption solely of renewable resources.

c. Concern solely for the present vs. concern solely for the future.

d. Solely consumptive resource use vs. solely nonconsumptive resource use.

e. Concern solely for man vs. concern solely for things other than man.

f. Consumption due solely to wants vs. consumption due solely to needs.

g. Consideration solely of economic criteria vs. consideration solely of ecological criteria.

C. Specific Environmental Education Objectives for YCC Environmental Education and Work Goals. Upon completing the program, the enrollee will have an increased awareness about natural laws and ecological principles that govern the natural environment. By the end of the YCC experience he should be able to:

1. Identify the basic elements of the ecosystem within his geographic area.

a. Demonstrate a basic understanding of the biological elements inherent in that ecosystem.

(1) Plants

(2) Animals (including man).

b. Demonstrate a basic understanding of the physical elements inherent in that ecosystem.

(1) Minerals (soil, etc.)

(2) Water

(3) Air

2. Describe the intergelationships of the basic elements in this:

a. Food chain

b. Water cycle

c. Energy cycle

d. Carrying capacity

e. Biotic succession

f. Plant-animal cooperation

g. Plant and animal competition

h. Limiting factors

3. Discuss natural phenomena occurring in the ecosystem.

a. Fire

b. Flood

c. Weather disaster

d. Earthquake

4. Describe man's economic, social, cultural, and physical dependence and resulting impact upon the natural environment.

a. Historical

(1) Primitive to beginning of modern technology.

b. Present through the future.

(1) Satisfaction of basic needs.

(2) Higher population concentrations and pressures.

(3) Higher demands upon renewable and nonrenewable resources

(4) Rapid changes in modern technology.

5. Explain man's capabilities to manage and change an environment.

a. Manage resources wisely to meet basic needs.

b. Use resources wisely to satisfy his cultural and social needs.

c. Accept trade-offs and priorities to prevent shortages and exhaustion of resources (recycling, aesthetic vs. commercial, etc.)

d. Understand the functions and philosophies of land and natural resource management agencies (Federal, State, local, and private).

6. Construct a plan of action for the following:

a. Identify, analyze, and propose at least two alternate plans of management for a predetermined area of land based on the summer work experience.

b. Identify a local environmental issue or concern and prescribe at least two alternate ways to affect that issue or concern:

7. Describe at least three ways in which these work experiences will help him better understand the community in which he lives.

8. Analyze his own life style with reference to those activities which contribute to the stability, integrity, and/or beauty of the ecosystem and those which do not.

9. Apply the concepts of an environmental impact statement to specific programs and land areas with which he is familiar.

YCC as an Environmental Awareness Laboratory:

With objectives such as these the YCC could become a major influence on the ecosystems which comprise the United States. The YCC could produce a nucleus of youth with the concern, motivation, and knowhow which will be required if the environment is to be preserved and enhanced.

Other benefits that could be gained from the YCC program are numerous. An environmental curriculum could be developed for use in the YCC program but also by thousands of high schools across the country which are presently in need of various techniques for teaching environmental studies. The YCC could also provide a place for the training of prospective teachers on an apprenticeship or internship basis giving practical experience as part of their professional training.

A Comprehensive Environmental Awareness Program:

A premise here is that the program will have more significant and enduring effects if it pervades the entire YCC experience and is not restricted solely to a scheduled time period each day or week. To be more specific, the recreational programs, the camp layout and procedures, the work experiences, the meals, and the free time activities should all be considered to have great potential for achieving environmental education objectives in both the cognitive and affective domains.

CHAPTER 2
PLANNING A QUALITY ENVIRONMENTAL AWARENESS - YCC PROGRAM

Good planning and continuous planning throughout the summer session is important for an integrated environmental awareness program including projects, field trips, group living, interpersonal relations and recreation.

RECREATION

Environmental awareness can and should be extended to recreation. For example, camp outs can be to areas with different biotic communities. Comparisons of differences and similarities both in resource management and ecological and environmental principles can be observed, inventoried, and discussed by the crew leaders and the YCCer's at the camp outs. Soil compaction, soil type, slope, and possibly additional inventory for an environmental impact statement can be the basis for choosing the site for a ball field or continuing to use an already established site. Crafts can be from natural materials of the area. Choices of types of recreation like sailing, canoeing, versus a motor boat can be considered in light of environmental impacts, including noise, consumption of energy, etc.

CAMP LIVING

Camp living can be influenced by environmental awareness activities such as developing a compost pile, developing a concern for use of water, avoiding use of non-biodegradeable materials and disposable items such as styrafoam cups, the camp plan and serving eco-meal, then relating all of these activities to their living situation back home in their own communities.

FIELD TRIPS

Field trips can reinforce environmental awareness of resource management and environmental concepts. They can introduce, reinforce, or correlate projects the YCCer's are or will be working on. They can expand the awareness of the YCCer's to the activities of different agencies and groups in the area.

The field trips should be timely, fitting into the sequence of the summer activities as much as possible. Not all YCCer's need to go on all field trips. The sharing of such experiences at camp can be a valuable learning experience. The preplanning of the field trip by the camp staff is important. The behavioral objectives, as well as attitudes, feelings, and awareness expected to be accomplished by the trip should be identified and discussed by the staff and the trip hosts. Group sizes can make a world of difference. Dividing the

group into small groups of 5-6, 8-10, depending on the situation will give the YCCer's the opportunity to ask questions, and discuss points of interest. Crew leaders, counselors, environmental specialists should have several questions in mind to get a good discussion going, if things lag.

Good planning includes transportation, travel time, lunch, breaks, etc.

WORK PROJECTS

Since the largest percentage of time is spent on projects, they should be chosen with potential for environmental activities reinforcing ecological principles as well as the importance of resource management.

The following should be helpful in developing an integrated environmental awareness work program:

Some Approaches for Developing a Correlated Environmental Awareness Work Experience Program for Y.C.C.*

The Y.C.C. Awareness and Work Experience Program can and should compliment each other.

For people to develop an understanding about the workings in our natural and man-made environment; then they need to become involved in some meaningful educational experiences that utilize the processes of environmental inventory and problem-solving. This is the basis for understanding concepts of environmental management.

In order to develop and implement certain plans of environmental management and work projects, they need to develop the skills and appreciation of meaningful work accomplishment and the motivation to apply those skills. Therefore, the environmental awareness program and the work experience program must be developed together to best meet the needs of the Y.C.C. enrollees and the environment in which they are working.

An important motivation to work accomplishment is understanding:

1. Why certain projects are important to the management of the environment.

2. How they fit into the environmental management plans.

3. What skills, tools and supplies are needed to do the job.

* Developed by: Alice Cook, U.S. Forest Service, Region 10, Alaska; Jerry and Martha Neyland, Environmental Education Consultants, and Y.C.C. Directors; Charline McDonald, Environmental Education Consultant, Portland, Oregon; and Jim Unterwegner and Ernie McDonald, U.S. Forest Service, Region 6, Portland, Oregon.

If the environmental awareness and project plans are developed and correlated so that participants and employees can develop these understandings and establish their own work priorities--then the work accomplishment can be at a much higher quality level than just shoving crews into a project.

Here are three approaches that have been used in the development of a correlated environmental education--work experience program.

If the following approaches are used, the Y.C.C. enrollees can grow in abilities of:

1. Decision-making
2. Team Work
3. Having pride and satisfaction in work accomplishment
4. Looking at resource management as an important tool in our society.
5. Recognizing problems and impact that man causes and has on the environment
6. Recognizing cause and effect relationship in the environment
7. Recognizing that land management agencies and organizations have a responsibility to manage our environment to meet the needs of people

Approach 1 - Planning and Decision-Making Model

This approach leaves much of the planning and decision-making of what projects to do, when to do them, and what information and data is needed, up to the enrollees.

1. Project List Developed in Winter

Agency staff generate a list of projects that Y.C.C. enrollees can accomplish. These projects should include:

a. Projects that can be started and finished within the summer such as stream improvement, campground rehabilitation, trail maintenance.

b. Projects that cannot be finished during the summer but relate to a much larger resource management project, such as watershed rehabilitation, planting deer browse, recreation use and survey inventory.

c. The staff, in identifying the list of projects, should also identify the aspects of resource management and ecological environmental concepts each work project can accomplish. The resource management concepts can be identified from the land management plan. The ecological and environmental concepts can be found in Chapter 4 of this Sourcebook.

d. Assess project list to see if they provide a well-balanced combination of concepts of ecology and resource management.

Use the following sheets for planning and evaluating:

1. Y.C.C. Project Inventory and Feasibility Work Sheet. (Sample page 15)

2. Environmental Awareness--Work Experience Planning Chart. (Sample page 16)

3. Individual Project Lesson Plan. (Sample page 17)

NOTE: A combination of short and long range projects provides the satisfaction of starting and completing a project as well as working on a larger project that can't be finished in one season that still contributed to the management of the resource.

2. Enrollees Orientation to the Educational-Work Projects (1st Week)

a. Agency staff and Y.C.C. staff show and discuss the unit land management plan during the orientation to the educational-work experience. Have projects located on the map and discuss how each project fits into the management of the area.

b. Take all enrollees to visit each proposed project (as near as possible) and discuss what needs to be done and again how it fits into the program of work. Have a unit map there so they can relate location of project to rest of the units land uses and allocation.

c. Now--have enrollees discuss projects and let THEM determine in what priority they want to do the projects (e.g., Do we do T.S.I. project early in season before it gets hot and do stream improvement in August after it gets hot, do recreation use survey before or after people use develops, etc.). Discuss and decide what information or data they need to plan and accomplish the work project such as doing stream inventory prior to locating stream channel work.

NOTE: It is important to let them decide on priorities, safety precautions and training, tools and supplies needed, etc. The staff may have to discuss and point out factors that might affect their decisions such as available transportation, mosquitos, fire danger, weather, supplies and materials, etc. Also, the agencies priorities should be considered.

3. Doing the Work Projects

Once a priority list of projects has been established and crews selected based on ability, resource interest, etc., it is important to develop the on-the-ground criteria needed to layout and do the project.

a. If it's doing a tree thinning project it might be using an increment borer to test the growth in a realigned stand to see what the work project will accomplish.

b. If it's constructing a fence around a water hole, it might be finding out how far a cow can reach for water and how strong the fence should be.

c. If it's erosion ditching, it might be testing the soil to see how it holds water or what its slippage factor is.

Whatever the project is the quality and quantity of the work accomplishment can improve if the crews find out the how and why's of the thing they're doing.

EXAMPLE OF CORRELATION BETWEEN PROJECTS AND ENVIRONMENTAL AWARENESS

4. Crew Evaluation After Each Project

After each work project or job is finished, have a crew and staff discuss such things as:

a. Cause and effect of accomplished project to resource and people using it.

b. Difficulties in doing the project; for example, if they built a trail across steep ground, swamp and flat ground--were they able to adapt to the different work situations? It isn't easy to manage resources--you must stay flexible.

c. How did the crew work as a team? What could we do to improve?

Approach II - Environmental Education Field Workshop

The enrollees can be given a one week orientation in process of environmental investigation using the field activities from Investigating Your Environment in the Handbook as a basis for the involvement.

Suggested one week E.E. Workshop Schedule:

M	T	W	TH	F
Process and Team Building	Mapping Skills	Water Inventory	Animal Inventory	Identifying Other Inventory Techniques for Work Projects
Simulation Land Use Game	Soil Inventory	Forest Inventory	Other--Range land Inventory, Maritime Inventory, etc.	Analyzing Work Projects--Safety Tools, etc.

Additional training and inventory techniques can be given throughout the summer as the need arose.

The one week orientation allows the enrollees to do some building activities and to develop the skills and processes of environmental problem-solving. The remaining seven weeks of field-work experience projects draws upon the experiences shared in this training session, and further strengthens the field investigations from the Pocketbook.

For example: Measuring water quality criteria gives the enrollees the skills to use the Hach Water Testing Kit and make inferences about O_2, CO_2 temperature of water from collecting and identifying aquatic insects during the inventory of a stream to determine pool-ripple ratio.

The cardboard box plane table and instant mapper from measuring the environment lesson plan gives the enrollees the skills and tools to plan, layout and construct a small campground. Constant reference and application of the first skills are made.

Another variation of the workshop approach is to spread the first week workshop out over the session. If you are going to do a soils project, for example, you would spend time involving the crew in the tasks from Soils Investigation for Land Use Planning activities in order to develop a broader interpretation of soil properties and limitations.

Almost any procedure that resource managers do to inventory a resource can be developed into an environmental investigation for lay people, teachers, or students (range transects, timber inventory, recreation use inventories, water quality indicators, fire weather indicators, etc.).

Approach III - Land Use Simulation Technique

This approach starts out by using a couple of land use simulation games to develop an understanding of the complexities of planning for and managing a piece of land.

Step I - a. Play land use simulation game for center place city (see lesson plan for a Simulation Game).

b. Do the Cispus land management activity. (this type can be used to transfer the planning process of center place city to an actual piece of land to start the enrollees thinking about land management guidelines.

Step II - Now using parts of Approach I, have enrollees use the unit management plan as a real simulation game correlating the work projects to actual land management decisions and land use allocations.

Constant Evaluation - Discuss these planning concepts with the enrollees as they are actually doing the projects. Do field investigations as outlined in Approach II as needed to give enrollees additional skills of environmental inventory.

Miscellaneous

By now you can see that each plan is a variation of the other. The important thing is that the environmental education experience is related to and builds upon the importance and accomplishment of the work experience.

Field Trips: The use of field trips to view or study another environment can be an invaluable experience. After inventorying and investigating the environment in which they are working, a visit to an entirely different place can provide an opportunity to view different management techniques, different ecological, economic and social influences and patterns. Environmental investigations as outlined in Approach II can be conducted and comparisons about the data collected can be made.

Examples of comparisons of environmental field trips:

Forest to desert
Rangeland to wetland
Urban to marine
Alpine to coastal shore
Urban to rural
Lake and pond vegetation at different elevations

EXAMPLE OF CORRELATION BETWEEN WORK PROJECTS AND ENVIRONMENTAL AWARENESS

EXAMPLES OF PROJECTS	"WHAT IT CAN TEACH ABOUT RESOURCE MANAGEMENT	SPECIFIC ENVIRONMENTAL EDUCATION OBJECTIVE FOR Y C C E E WORK GOALS
Recreation		
Clean-up	Clean up behind people	4,5
Construct	Need facilities to protect resources	4, 5, 2
Campground Maintenance	Need for keeping facilities useable	4, 5
Site Planning	Evaluate recreation sites and potential use criteria-need for solitude-recreation	2, 4, 5
Wilderness Mgt	Clean up behind people	4, 5, 6
Trail Construction or Maintenance	Keep trails open for access	5
Sign Painting & Maintenance	Need for directional signs	5
Stream		
Stream Channel Survey	Inventory to plan for water and wildlife	1, 2, 3, 4
Gabbion Const (pool)	Bank stabilization--increase pool-- riffle ratio for fish	2, 5
Trash Removal	Prevent stream bank washing	5
Bank Stabilization	Prevent soil erosion-protect roads	5

Timber		
Thinning	How a tree grows--increase tree growth (wood fiber) How a tree grows	2, 4, 5
Tree planting	Start new forests	2, 4, 5
Timber Sanitation Projects	Keep potential insect & disease attacks down--Increase quality of lumber	2, 4, 5
Pruning Save-Snags-Wildlife Trees	Need for animal habitats	2, 4, 5
Insect & Disease Control	Need to maintain productivity of timber lands	1, 2, 5
Timber Sale Layout	Need for logical way to manage timber for substantial yield	4, 5
Forage		
Fix water holes	Livestock need water	4, 5
Maintain fences	Management method to prevent over grazing	5
Forage survey	Determine carrying capacity of land	1, 2, 4
Wildlife		
Plant bitterbrush	Increase carrying capacity	4, 5
Browsing Survey	Inventory amount of food	1, 2, 4
Build deer enclosure	Set up experiment	2, 5
Build guzzler	Provide water for small game	2, 5
Inventory Habitats	Examine carrying capacity	1, 2, 3, 4
Soils		
Contain ditching	Water storage prevent run off	1, 2, 4, 5
Bank Stabilization (mulching)	Prevent soil erosion	1, 2, 4, 5
Soil Mapping	Determining best uses of land--Determining soil characteristics	1, 2, 5
Fire		
Fire line building	Protection of resources for fire	2, 3, 5
Lookout and guard	Fire detection and suppression	5
Station Maintenance		
Fire weather and dangers Reporting	Evaluation of factors affecting fire danger	1, 2, 3
Other		
Land line surveying		5
Land Use Agt. Planning Sessions	See resource plans in existence--Pedate YCC projects to land mgt. plan--Explore land use conflicts and pressures--Develop land use mgt. objectives and guidelines at their level of understanding--Develop decision-making skills--Develop communication skills	6

PROJECT INVENTORY AND FEASIBILITY WORK SHEET

Project	How it Fits into Management for District	Short-Long Range--How Much Can Be Finished This Season	Information or Data Needed to Plan and Accomplish Project (Check if special consideration, such as Transportation, Weather, Fire, Safety Precautions, Training Needs, Tools and Supplies)	Benefit as Learning Experience About Management	Benefit as a Work Experience--Skills it Teaches	Benefit as a Group Interaction Experience, Leadership and/or Group Interaction

ENVIRONMENTAL AWARENESS - WORK EXPERIENCE CORRELATION PLANNING CHART

Work Project	What it Teaches About Management From Feasibility Work Chart	What it Can Teach About Ecology	Environmental Education Objectives it Helps Accomplish (See Page -)	Coordinated Environmental Investigations	Other Reference Materials
Stream channel work-gabbion installation	Inventory of stream need for pool-riffle ratio for fish, etc.	Adaptation, change, interrelationship	C-2 & 5 Food chain, carrying capacity, construct plan of management	Insect correlation to O_2 pH-water quality inventory	
Tree thinning	Spacing affects growth rates of trees. Certain trees have better growth characteristics than others	Competition, interrelationship, change	C-2, 5	Tree competition, investigation with increment borer	

Example #1 of an Individual Work Project Lesson Plan

Project: Tree Thinning

Objectives: At the end of this project the participants will have:

1. Named at least five factors associated with the elite or superior trees in a stand.

2. Identified the superior trees in a stand using the above factors.

3. Visiting a thinned stand and the work project area, do #4, #5, #6.

4. Demonstrated the use of an increment borer by taking core samples from trees in a thinned and unthinned stand.

5. Described the differences in the cores above and stated their reasons as to the differences noted.

6. Applying a given rule for tree spacing of (10 x 10). Tagged the superior or crop trees to be left on a one acre piece of ground to be thinned.

7. Thinned the stand in the work project area leaving the tagged trees.

8. Described the reasons behind the tree thinning project and the contributions to the overall management of the timber resource.

9. Described this projects affect on economic, social and ecological aspects.

A sequence of activities and discussions to accomplish the correlated E.E.-work experience objectives for this project:

A. Looking at the stand of trees to be thinned: Ask which trees look the best and strongest for growing wood. Have groups identify trees and name reasons why they think those trees are best. Discuss the elite or superior tree concept relating their terms (straight, tall, small limbs, no disease, etc.) to the management terms. Discuss what factors might make trees grow faster and better. Discuss why they think we want to thin this stand.

B. Comparing a thinned and the unthinned stand of trees: Visit a thinned tree stand and discuss the trees there. Use the increment borer and take cores in both stands, comparing the cores (See Investigating a Forest Environment Lesson Plan - Task C - Forest Service) and discuss differences in the cores from crowded and uncrowded trees.

C. Tagging the leave or crop trees: Based on the activities and discussion in A and B above, have crew tag the trees not to be cut (see project objectives 1 to 6).

D. Doing the work project: Do the actual work project.

E. Describing the benefits: After the project have group discuss why the project was important, how it fit into the overall resource management plan and the projects affect on economics, social and ecological aspects.

NOTE: The sequence of activities is designed to set the stage for the project by involving the crew in identifying, naming and demonstrating a variety of procedures, methods, skills and tools the resource manager uses in making field decisions and then summarizing its part in resource management.

Such things as safety training, some tool selection, etc., have been left out because this sample dealt only with the correlated E.E. work experience.

This project can help accomplish specific environmental education objectives. C-2, 4, 5.

Example #2 of an Individual Work Project Lesson Plan

Project: Stream improvement (gabbion construction for increasing the pool-riffle ratio).

Objectives: At the end of this project participants will have:

1. Named and identified in a stream at least six factors that affect the life in a stream habitat.

2. Demonstrated the ability to inventory a section of stream using an acceptable stream inventory and survey form.

3. Stated and applied a rule for establishing an adequate pool to riffle ratio for best fish habitat in a stream.

4. identified the appropriate location and constructed gabbions in a stream to accomplish #3 above.

5. Described how this project contributed to the management of the fishing resource in this stream and to the recreation, economic, social and ecological aspects.

A sequence of activities and discussions to accomplish the correlated E.E. work experience objectives for this project.

A. Inventorying the stream: Look over stream, have group discuss what factors might affect life in a stream. Have them point out the

the factors in a stream. Discuss purpose and establish criteria for the location of more pools. Train group to use an existing stream inventory survey chart, or modify an existing one to meet your needs. Have crew inventory stream, identifying places where to construct pools to increase pool-riffle ratio.

B. Locating the pool sites: Have crew select and mark on-the-ground the final pool locations depending on the % of pool-riffle ratio, best site locations, time allotments, materials available, etc.

C. Constructing the gabbions: Complete the work project.

D. Destribing the benefits: After the project have the group discuss why the project was important, how it fit into the overall resource management plan and the projects affect on economics, recreation, social and ecological aspects.

Relate discussion and learnings back to environmental awareness concepts identified in the correlation Planning Chart.

This project can help accomplish environmental awareness objectives C-1, 2, 3, 4, 5.

CHAPTER 3 ACTIVITIES TO STRENGTHEN TEAM WORK IN THE YCC PROGRAM

The success of the whole YCC program is the team effort of the staff and YCCer's. This chapter is designed to first help the staff develop a team effort and then with the skills and awarenesses they have learned develop a team effort with the YCCer's. The staff and YCCer's will probably begin working toward a team effort while dealing with things such as establishing a priority project list for the summer, how to get the materials, etc., integration of environmental awareness with the projects and the whole camp, as well as the interpersonal relations of group living.

This chapter should improve the team effort by developing the skills of solving problems through group interaction, awareness of roles people play in a group problem solving situation, the skills of developing and leading a group (eig. crew) in discussions of work priorities and environmental awareness activities. The chapter will also look at the stages of team or group growth and finally concepts of leadership, shared leadership, and dealing with group conflict. This is targeted toward all staff and youth leaders. It is suggested these problem solving skills and activities be used first with YCC staff and then with the crews where they apply.

1. SOLVING A PROBLEM THROUGH GROUP INTERACTION - From: Dr. Mike Giammatteo (Most effectively used with a camp staff at first meeting as an ice breaker and to establish group problem solving)

We are concerned with techniques and processes of involving people in problem solving activities. The success of these activities will be measured by the application of group interaction and problem-solving skill to the environmental investigations that we do later.

Questions and Discussion:

1. Have audience arrange themselves in groups of six, or have chairs grouped that way ahead of time.

2. Pass out the "6 bits of information" problem, one bit of information to each person (located at back of book).

3. Tell audience 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.

4. As the problem solving session progresses:

   a. 5-8 minutes into problem write on the board - Trust
   b. 8-12 minutes into problem write - Visual Display
   c. 12-15 minutes into problem write - Matrix.

TASK A: Identify and solve the problem in the "6 bits" activity.

Questions and Discussion (after all groups have finished).

1. What kept you from solving the problem to begin with?
2. What helped you to solve the problem later?
3. What were some characteristics of this problem-solving exercise? (List comments from group and discuss)

4. The people who developed the problem-solving exercise feel that it contains elements of involvement that most 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 each item listed.)

a. TRUST (will develop). Must trust that the instructor gave you a solvable problem. Must trust each other.

b. RITUALISTIC LISTENING (will take place).

This is a kind of polite listening--really without caring too much, because the data offered has no relevance at that time.

c. REAL LISTENING (will take place).

When statements become more meaningful. (Date means something.) When people interrupt and say, "Say that again!"

Question: When in your group did you change from ritualistic listening to real listening?

When real listening occurs, two things will change:

Vision - Participants will begin to vision the listening by..really looking at other people..constructing a Visual Display (writing data in a common place).
helps make inferences
don't have to listen to everything

Space - Space factors will change
People will usually move closer together
People will sometimes change places, or move around the table.

5. 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's 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 PREPRESENTED THE INFORMATION AND SKILLS THAT EACH OF YOU BROUGHT TO THE GROUP.

6. We will be concerned in this workshop with providing ways for each person 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.

7. NONE OF US IS AS SMART AS ALL OF US. (My printing this on the board during the problem solving exercise.)

II. IDENTIFYING FACTORS THAT AFFECT LEARNING AND COMMUNICATION - From: Dr. Mike Giammatteo (These activities could be used with the camp staff and YCC crews to help them become aware of different backgrounds, both culturally, and environmentally, and those factors that can affect learning and communication).

A. Environmental Ball and Colored Glasses Activity (Trip Glasses and Colored Rubber Ball)

- (Ask someone to come up front)
- Say, "See this red ball, do you think you can catch it?"
- OK. (Toss it to person so he can catch it.)
- "Good - throw it back."
- "Here catch it again, fine, throw it back."
- "Now put on these glasses." (Turn to show audience)
- "What do you see?"
- "Now I want you to catch this red ball again - do you think you can?"
- "Here it comes nice and easy, just as before."
- "Oops you missed. What's the matter? It's the same red ball."
- "OK - thank you - you can take off the glasses now."
- (Turn to audience) What happened? Why didn't he catch the ball with the glasses on?. (Wait for responses from group)

- As long as we came from the same background, with similar set of experiences, I was able to send him the environmental ball, or the environmental message and he was able to receive or catch it.
- But as soon as we changed his set of experiences or how he saw things (the glasses distorted his sight vision - it slowed down his tempo or ability to react fast enough to understand the sender) e.g. -same way - common set of experience differenct - couldn't catch ball. - important to have common experience and to build an understanding together in order to communicate.
- Glasses can represent many things:
  - glasses are symbolic. A person looks at world differently than the world looks at it.
  - different set of experiences.
  - distortion is greater if person comes from different social, racial, or economic background.

B. Tempo Activity

(Ask person in back of room) - How many seconds will it take for you to get here? 4 seconds. OK try it. (Count 1, 2, 3, 4, etc., until person gets to you.)

(Ask another person the same question, and have him come up.)

(Put glasses on person #1, and ask #2) - How long will it take you to take person #1 back to his (her) seat? (Ask #1 to remove glasses. How did you feel going back to your seat?) (Discuss how person #1 felt.)

e.g., Safe because of touch of other person.
Safe because of his talking in soft tones.
Scared because person #2 walked too fast.
Scared because person #1 hit a chair, etc.

TASK B: Working in pairs - discuss and write some examples where you miscommunicated with someone because your tempo or background was different than theirs.

III. IDENTIFYING ROLES PLAYED IN GROUPS - From: Dr. Mike Giammatteo

Roles played by people in the group affect learning as well as work. In order to more effectively work with groups such as crews, or the camp staff it is important to recognize some of the roles people assume in groups. Some are productive and some are non-productive. MANY TIMES PEOPLE ARE NOT AWARE THAT THEY PLAY CERTAIN ROLES. (This activity would probably be most effective with the camp staff.)

TASK D: 5 minutes (Role playing slips located in back of book)

1. Get into groups of four. (When in groups of four, do Step 2)

2. Each of you is being given a slip of paper with the role you are to assume--play it as convincingly as you can. (Cut up copies of the sheet with the roles on it.)

3. The problem -
   it is 90° outside--your group wants to go on a picnic--it is 2:30 p.m. One person in your group is to start the plans for the picnic.

Questions and Discussion:

There are many roles, let's look at the four that you just played.

Placator--always soothes over the discussion.
"Everything in due time"
"The sun will shine tomorrow"

Attacker--always attacks ideas presented or will be negative.
"You know the administration will never go along with that"
"People don't care, our group would never do that without pay"

Irrelevant--ideas given that do not relate to the topic (evador).
"Did you see the movie last night?
"Who's bringing the coffee for the next meeting"

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"

1. Some roles might be easier to play than others.
   Which were easiest to play? Which were easiest to identify?

2. Discuss with your group some instances where you have seen these behaviors in:
   Others Yourself

3. Turn to sheet "Other Roles Played in Groups" and discuss the categories and roles quickly.

4. Take five minutes in each group and discuss and list some ways to deal with the non-productive behaviors just mentioned. (Task F)

A. Other Roles Played in Groups:

Productive Roles--which people assume to share in solving a problem or making a decision.

1. Initiator--suggests an idea, proposes a solution, says "let's do this."

2. Energizer--prods the group to decision and/or action, stimulates the group, reminds them of the purpose of the group or meeting.

3. Information Seeker--asks for facts, for background information, for clarification, helps group see need for sufficient information for decision making.

4. 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?).

5. 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)

6. 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.

7. 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?"

8. 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."

B. Non-Productive Roles--which people assume to stop action. Roles that attempt to satisfy individual needs first.

9. Dominator--tries to get his own way without regard for others; uses flattery, authoritative behavior, sarcasm, etc. Downgrades others' contributions.

C. Non-Productive Roles--which people assume to stop action. Roles that attempt to satisfy individual needs first.

10. Blocker--tries to prevent something from happening, argues, openly rejects ideas, deals in personalities. Interferes with progress by going on tangents, personal experiences on unrelated things, argues unnecessarily on a point, rejects ideas without all facts, may weaken

an issue.

11. 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.

12. 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?"

TASK E

Each group take five minutes and discuss and list some ways to deal with the non-productive roles above.

a.
b.
c.
d.
e.

IV. PROCESS AND PROBLEM SOLVING APPROACH TO LEARNING - by Ernie and Char McDonald (This activity is important to transfer some of the problem solving approaches from "6 Bits" to another activity, including the processes involved. It is suggested using tools or samples of materials in a camp staff and or YCC orientation. But also as camp progresses using it with tree, brush or grass samples, animal skulls or pellts, etc. in other environmental awareness investigations.)

Questions and Discussion:

1. Look at your own leaf specimen for 1-2 minutes and look for its observable characteristics.

2. Now each person share what they observed about the characteristics of their sample with other members of the group.

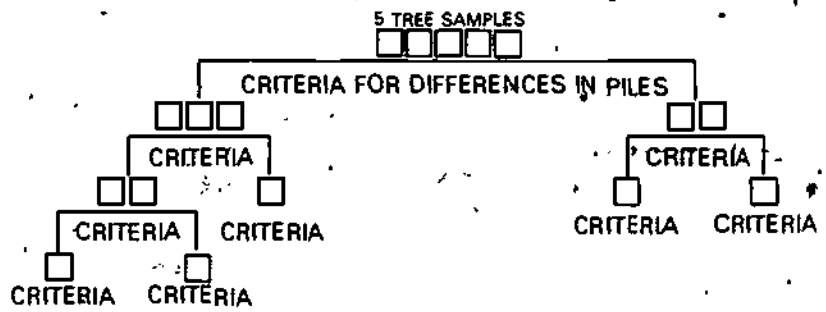
3. Each group put all of the leaf specimens into 2 piles based on the major likenesses and differences of their leaf characteristics. Write down the criteria or reason you used to do it.

4. Ask each group to tell the reasons used as you list 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 felt pen. Tell each group to construct their key so everyone can see it.)

TASK B: Construct a dichotomous key using your own criteria or starting point for putting the samples into 2 piles. Divide each pile into 2 more 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 C: 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 all have finished constructing their key.)

1. Have each group read their description; and have 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, e.g.:

a. Demonstrate ability to use the key by adding a new tree sample. See if it fits into your key. Yes - no - why.

b. Describe the difference between your key and another one. (Change keys with the group next to you. See if you can match up the samples and then compare the 2 keys - yours and theirs.)

c. Take the key outside and use it to find trees where they are growing. (This is security for teacher and student - the student builds a tool and skill in the classroom and gets to use that tool and skill in the outdoor classroom; the teacher doesn't need to know the names of trees to provide a meaningful learning experience for the student.)

4. Do you know more about the specimens now than when we started? We haven't even talked about names of these trees yet. Names may not be important to begin with. This classification problem allows us to become familiar with observable characteristics of the specimens. Now we are ready to use another written or picture tree key to associate our descriptions with others and to find a name that society has labeled the tree. (Use books like Trees to Know in Oregon or Washington.)

TASK F: (15 minutes) Mark the processes used in this activity and give an example of how they were used. (Discuss in small group)

Process	Example of How Used
observing	
classifying	
measuring	
predicting	
inferring	
communicating	
formulating hypothesis	
experimenting	
interpreting data	

(Task F continued on next page)

Observing Using all of the senses: hearing, seeing, tasting, smelling, and feeling.

Classifying Identifying objects or ideas and classifying them into groups according to similarities and differences. Students are encouraged to invent their own systems.

Measuring Using both standard units of measurements or invented units, students should have experience in measuring quantities (length, weight, volume, time, temperature, etc.)

Predicting Many students guess with little difficulty. Prediction, however, requires a higher level of thinking. Predictions are also based on some known data or evidence. Simple graphs and charts are helpful for students to use as a basis for prediction

Inferring The ability to infer is basic to the formulation of hypotheses Students can learn to infer when they can distinguish between an observation itself and an inference about an observation

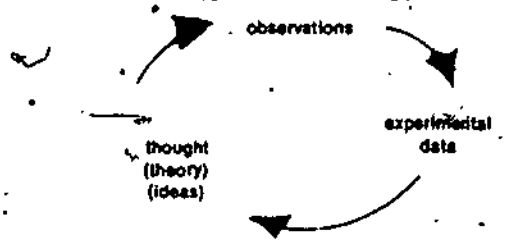
Communicating Clear and precise communication is essential in science There should be many opportunities to communicate orally, with graphs, with pictures, and, when able, in their writings

Other processes are more complex and are dependant on the foregoing processes.

Formulating Hypotheses Answers to many inquiries are simple. Many questions may be answered by asking an authority or by referring to the proper book or reference material. Answers to other inquiries require much further scrutiny. The student's initial general observations and informal manipulations may result in an attempt to investigate further or to experiment. A hypothesis based on his preliminary experience and his inferences is necessary to establish the direction of his efforts. Formulating intelligent hypotheses takes practice.

Experimenting Experimenting, as opposed to verifying, indicates a quest for an understanding of an uncertain phenomenon or an answer to an unsolved problem. The organization of this task is usually complex and takes many forms. One important aspect of such activity is the setting up of controls with which experimental results may be compared.

Interpreting Data Through observation and measurement, students will collect data. Can they organize and interpret these findings? True inquiry may begin with theory, observations, or experimental data, but the logical investigator always goes "full circle" regardless of his starting point.



1. What were some processes of group interaction used in this activity?

2. Give an example of how you could adapt this activity and use it in your YCC situation.

Summary Questions:

1. What did we find out about problem solving techniques in this session?

2. How can we summarize our discussions and investigations?

V. TEACHING PROCESS SKILLS - SURVIVAL VALUES OF LEARNING (Best done with the camp staff following IV - Process and Problem Sovling Approach to Learning)

A major goal of teaching process skills is to develop the ability within each individual learner to function autonomously at the inquiry and proff level; i.e., the ability to obtain, organize, translate, interpret and apply bodies of knowledge, and to present proof of the validity of the process.

Have group do TASK A--Survival Values in Learning Chart

1. In groups of 3-4 discuss the chart and answer the 2 questions at the bottom.

2. Have groups share their ideas about the implication of the chart.

Some Implications about the Chart: Survival Values in Learning

This chart relates to what you learn, not in comparison to how you learn it.

The lasting or survival value of learning some things may not be a very productive use or our time. According to the chart we only remember about 35% of the facts and 50% of the conceptual schemes shoved at us after only 3 months.

We retain the ability to manipulate and operate things (machines, tie shoes, write, etc.) up to 70% of the learning experience. If the learning experience were designed for us to develop thinking skills and processes (gather, sort, analyzing, interpret and provide alternate solutions about problems) we could retain those skills at the 80% level of usefulness.

Therefore, we might assume that a person who has developed the ability to think for himself can collect and analyze factual data, develop a line of reasoning or contribute to the interpretation or solution of a problem or decision. Many times the learning experience deals only with memorizing facts and other information or concepts with no chance for putting that knowledge to work for us.

Before planning environmental awareness activities, ask yourself--

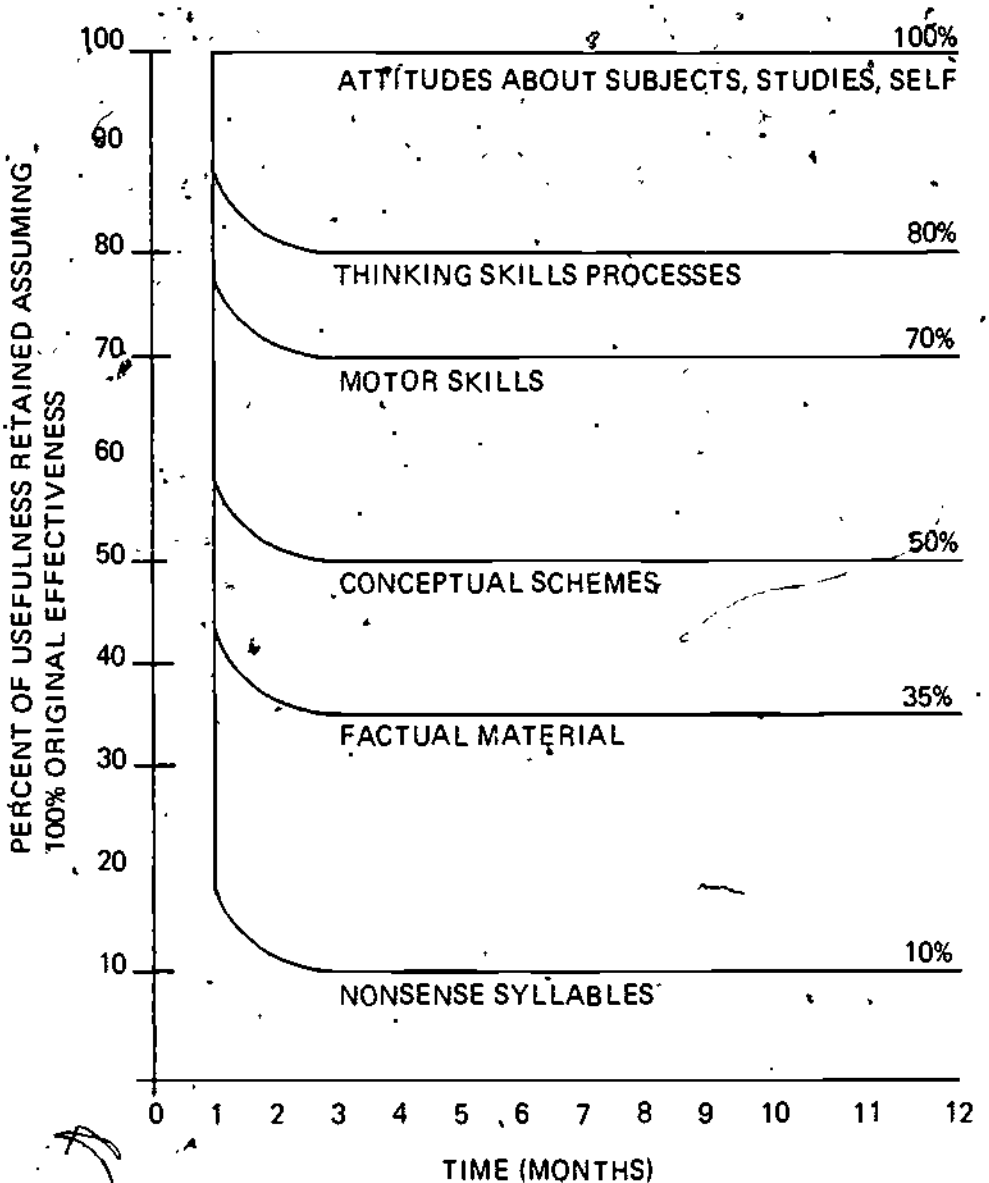
1. What am I doing this for? To help people memorize facts, learn concepts or to think for themselves?

2. How can I structure learning experiences to insure participation and the development of thinking processes along with the use of factual data, etc.?

We are now recognizing that if we develop thinking skills and processes of investigation, we may begin to change behaviors. Only by actually involving people in environmental learning experiences can they begin to think about their role in environmental management. We must be concerned with developing environmentally literate persons who can think for themselves.

Survival Values in Learning

Used in the Higher Level Thinking Ability Course - Northwest Educational Research Labratory - as an interpretation from *Educational Psychology* - Cronbach Harcourt Brace & World 1963.



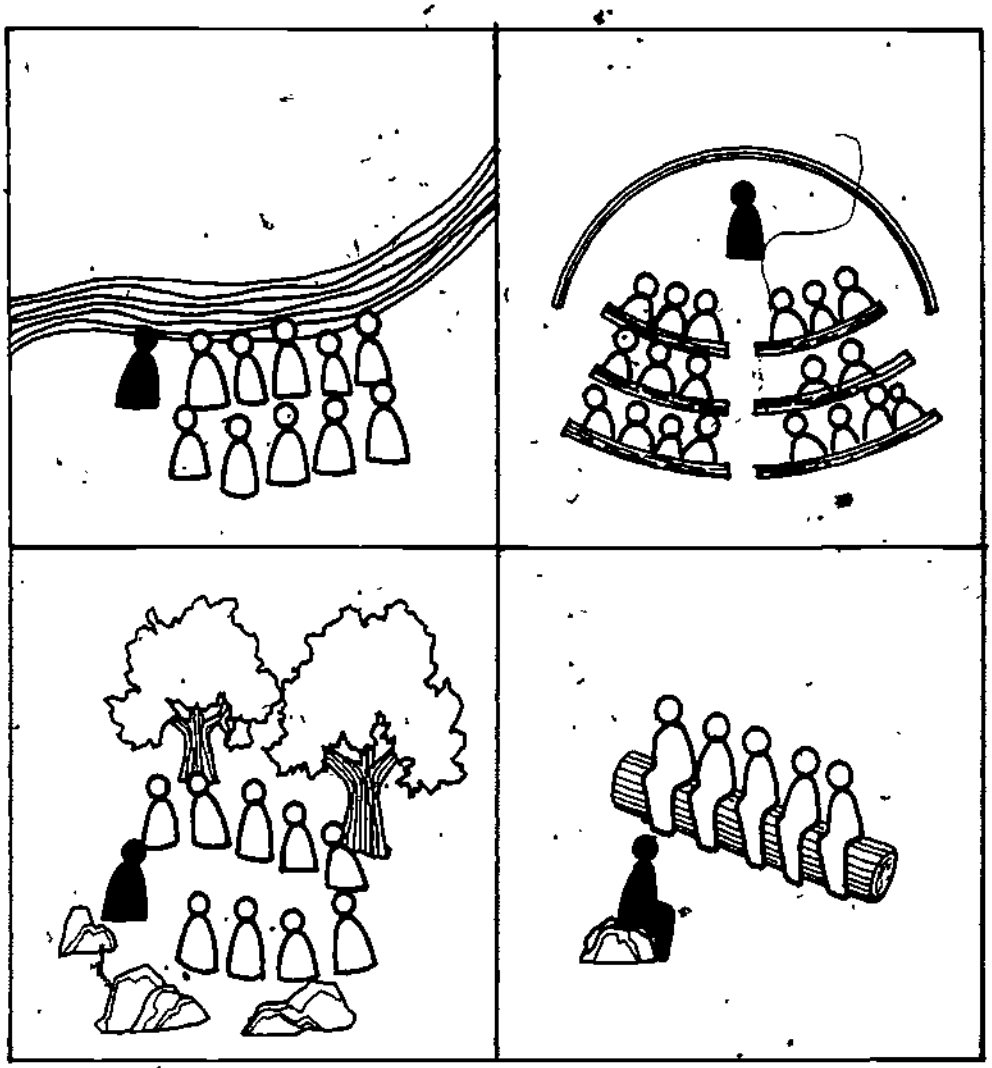
This chart shows the retention rate of different categories of learning. In small groups discuss and answer the following questions.

What does this chart say about the retention of learning?

What are the implications of this chart to the way we plan learning experiences?

VIII PLANNING GROUP ARRANGEMENTS

Task f - Answer the questions below:



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

What does this tell us about group arrangements?

IX. STAGES OF GROUP GROWTH - From: Dr. Mike Giammatteo (Good for the camp staff to look at several times throughout the summer, especially crew leaders.)

Every group has to spend time and energy learning how to work together. Usually some feelings develop between members while they are learning.

It takes time for group members, each different, 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 at each other.

It helps to know that these are natural "growing pains" of democratic groups, that these feelings between 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 finding 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".

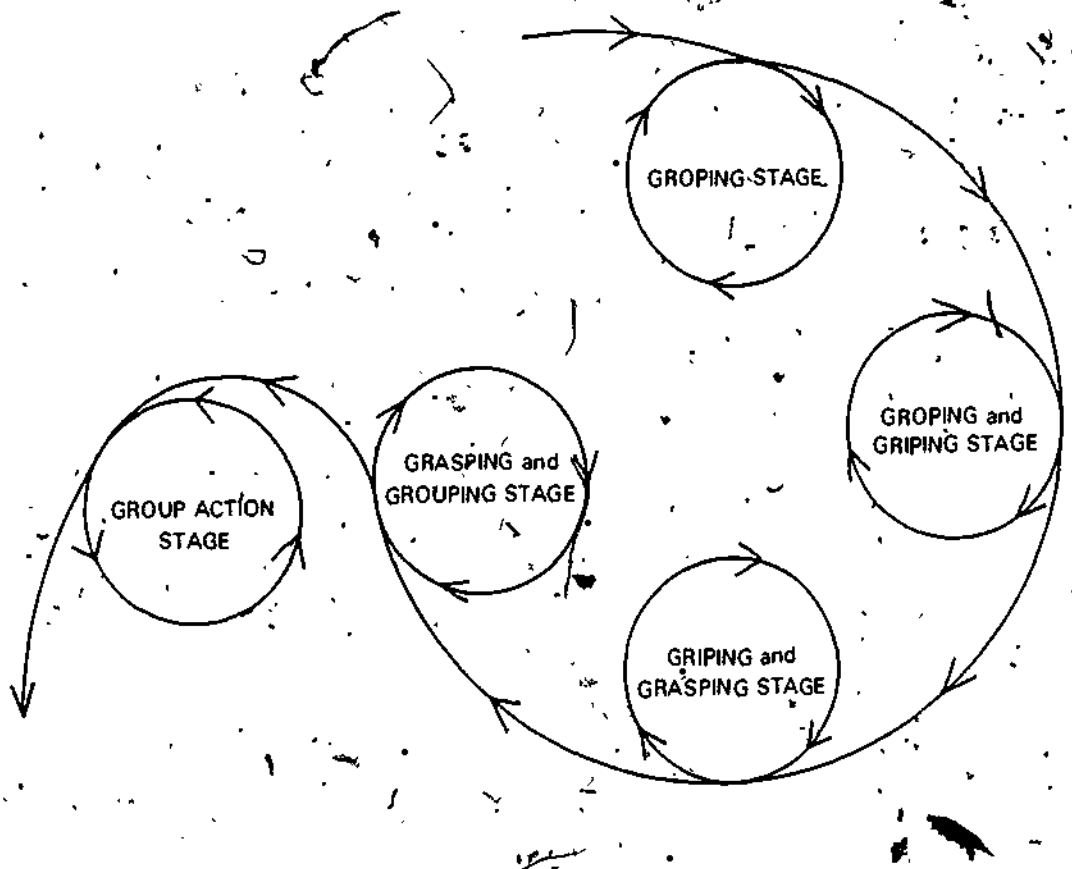
2. "Griping": The group gets discouraged when they can't seem to work together, when there isn't much progress, and their attempts are frustrated. They say wrong things to others, play negative roles and block group action because they are uncomfortable. This is the place for more "self-other" understanding, 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. "Groping": 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 how they feel about others in the group, to know that these feelings are natural whenever they really tackle important jobs, to realize that the group can move ahead toward better feeling relations between members. As they get to know each other better, this group gradually becomes their group because they have shared plans and work, and have tried to practice ways of behaving which are cooperative, considerate, friendly--democratic.

TASK K In small groups of 3, list examples of the different stages of group growth we have experienced during this week.

List the factors that might affect different stages of group growth.

CHAPTER 4 - ECOLOGICAL PRINCIPLES AND ENVIRONMENTAL CONCEPTS

By Paul Yambert and Jerry Gaffaney

BIOTIC SUCCESSION

The various developmental stages of soil formation from bare rock or water are characterized by changing biotic communities. Each community promotes the process of soil formation by exerting various physical and chemical effects which lead to more rapid decomposition of parent materials. Lichens and mosses first invade the surface of a bare rock. As the rock begins to decompose and organic materials build-up, annual grasses and forbs replace the initial invaders. This process of material build-up and plant replacement tends to continue until a deep rich soil has been formed and a permanent plant community established.

The role of plants in soil formation illustrates another process fundamental in any ecosystem and basic to much work in conservation. This is the process known as biotic succession. The way in which lichens and mosses are replaced by grasses and forbs and these by shrubs and trees as soils are being formed is an example of biotic succession. Along with the replacement and change in types of plants goes replacement and change in the animals dependent upon such types of plants. Biotic succession can be defined as the sequence of biotic communities which tend to succeed and replace one another in a given area over a period of time. 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.

Pioneer Community (Initial Invaders) ⟶ Intermediate Communities ⟶ Climax Community

Throughout the earth, wherever life can be supported, biotic succession goes on. Plants invade and colonize bare areas and are replaced in time by other groups of plants. Succession takes place on bare rock, sand, exposed alluvium in river bottoms, and in water. Citing various successional stages in one of those given areas may help you understand this process of change.

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

Successional stages on a given area may take hundreds of years to go 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 on a given area. Still, the process of biotic succession is ever present in our ecosystem through the continuous relocation of biotic communities.

The following is a sample sheet from YCC-Environmental Awareness Handbook that should be helpful in integrating these ecological concepts into the projects.

PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION
(By Ernie and Char McDonald)

Possible Projects
- Tree eradication from a meadow
- Gabbians for stream erosion (formation of alluvial fan)
- Rehabilitation work after a burn
- Insect or parasite such as mistletoe infestation
- Fuel modification for fire protection
- Range improvement
- Not tied to a project, but used at a campout

Materials and Needs for Investigation

1. Pencils
2. This investigation sheet from handbook
3. CHOOSE AN AREA FOR THIS INVESTIGATION WHERE AT LEAST TWO PLANT COMMUNITIES OF THE BIOTIC SUCCESSION CAN BE SEEN.

Time: 30 minutes to 1 hour including discussion

1. Use as introduction to project if biotic succession is the major ecological principle e.g. tree eradication from a meadow.
2. Activity during the project as comparison with another community or project or strengthen environmental awareness.

Behavorial Objectives

Identify pioneer, intermediate, and climax communities of the area of the project, including present stage.

Identify physical/biological and (sociological) factors which have caused the change and importance.

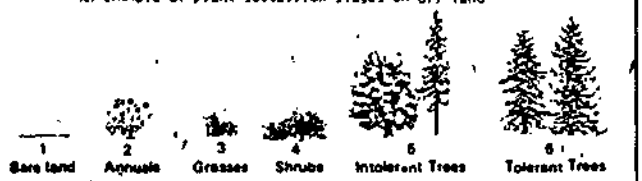
Determine effects of work on succession.

Compare the succession of this plant community with a different plant community in the area of YCC activities.

PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION

An Inventory of Biotic Succession

An example of plant succession stages on dry land



Pioneer Community Intermediate Community Climax Community

TASK - Observe a plant community in your area and record observations about the different stages of plant succession that you notice

Stage	Plants	Animals
No (Name)		
No (Name)		
No (Name)		

Discussion From your observations what changes have taken place in the area?

1 One person could list these on a small chalk board, or a full-size sheet of paper on a clip board for the group

2 Focus on 2 or 3 items for discussion Why did you say What could account for What are some things that could account for

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PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION

What changes are taking place now? (Could use same format as above)

What changes do you predict will take place in the future?

How (Has or will) your work in the area affect the change?

Compare the succession of this plant community with the succession of a different plant community in the area of your YCC activities?

Compare the biotic succession here to succession that occurs in your communities at home

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FOOD CHAINS

Our American community is not a typical human community. One-fourth of the people in it are able to produce most of the food for the other three-fourths and these latter earn their living in some way which is not related to food production. Moreover, the food we eat comes not from the particular habitat in which each of us lives, but from every kind of climatic zone and from all parts of the world.

We can only comprehend the meaning of our "atypical human community" when we understand the basic relationships inherent to a biotic community. "A biotic community is an interdependent group of plants and animals living in a particular habitat or in a restricted area." The individuals within a community rely solely upon each other for survival. The major activity of all the individuals within a community is the securing of food for sustaining life. Our human community then becomes atypical.

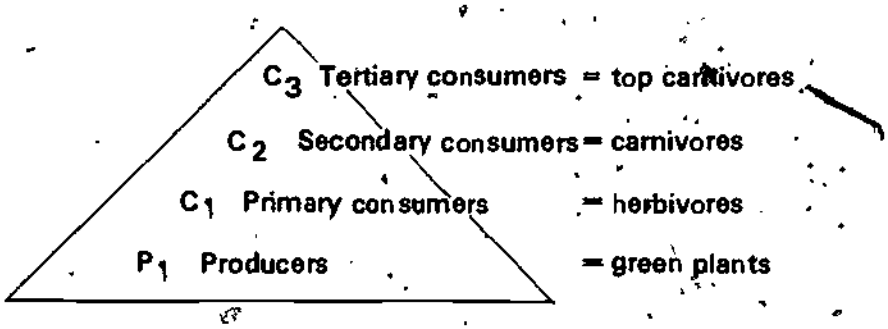
All members of a community are linked together by their eating-eaten relationships, so we can make a good start at understanding the community by following out these linkages which we call food chains.

Generally food chains follow a general pattern:

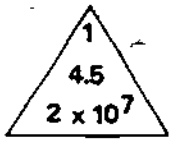
GREEN PLANTS HERBIVORES CARNIVORES STILL LARGER CARNIVORES

and so on until we come to a "top carnivore" that has no larger predators.

These relationships within a community are often illustrated in diagrammatic ways such as the biotic pyramid.



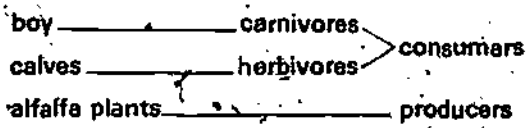
The number of individuals within a community is determined by the amount of energy available in green plants and by the efficiency of individuals within the community to convert this to a form useful for maintenance, growth, and reproduction. In the biotic pyramid the greatest numbers of organisms, the greatest mass, and the greatest amount of food energy are to be found in the lowest layers of organisms, the green plants.



Pyramid of Numbers

Pyramid of Biomass

Pyramid of Energy



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

human tissue produced 8.3×10^3 cal.
beef produced 1.49×10^7 cal.
alfalfa produced 1.49×10^7 cal.
sunlight received 6.3×10^{10} cal.

As we move up the pyramid energy is lost to the carrying out of necessary life processes. Food consumption, digestion, and utilization are all processes which consume available energy within a food chain.

Thus far we have cited examples of food chains only within the human community. But the basic principles of the food chain apply to all living communities, the only variations being the individuals concerned and the number of possible links within the chain. The sequence in an aquatic environment could be:

algae → protozoan → small aquatic insect →

large aquatic insect → black bass → pickerel

In a meadow, with small herbivores, there might be five links:

grass → cricket → frog → snake → hawk

One of the most basic relationships within the biotic community is the food chain. Each individual within a chain relies upon another individual for its necessary food. Every link in the chain becomes important for the survival of the entire biotic community.

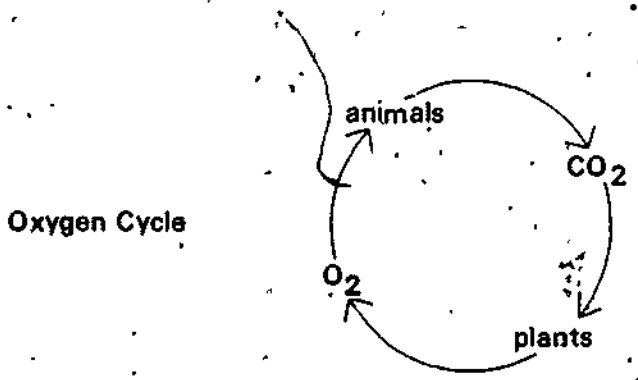
Food chains are emphasized as a means of beginning to understand the more complex interrelationships within the ecosystem. Food chains are parts of food webs: food webs help us understand energy and nutrient cycles: these cycles, in turn give us insight into the functioning of the entire ecosystem.

BIOCHEMICAL CYCLES (OXYGEN, NITROGEN, AND CARBON)

All living things, plants and animals, are constructed from certain basic chemical elements such as carbon, hydrogen, oxygen, nitrogen, and phosphorus. There is only a limited supply of these elements in the world. For life to continue these elements must be recycled in our environment, to be used over and over again in the formation of life. Every organism--every tree, shrub, insect, bird, and mammal found in our environment today is thus made from the elements that once were parts of other living things. Your own body contains "second-hand materials," atoms of which were once those of a giant dinosaur that may have roamed through pre-historic swamps.

OXYGEN CYCLE

How then do these elements recycle? Let us, first of all, look at the most basic element essential to life--oxygen. 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), 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 oversimplified form, may be sketched like this:



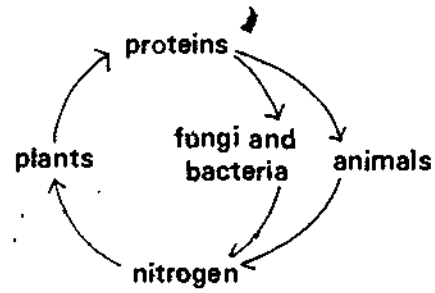
Oxygen Cycle

Green plants are, therefore, the foundation upon which the rest of life is built for they are the source of all the food we eat and they release the oxygen we breathe.

NITROGEN CYCLE

One of these essential nutrients which is required in large quantities by plants is nitrogen. The plant utilizes the nitrogen in its growth processes and stores it in the plant in the form of protein. A 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 which has been carried throughout the cycle is broken down by bacteria and fungi into useful form of nitrogen. The nitrogen cycle may be sketched in this manner:

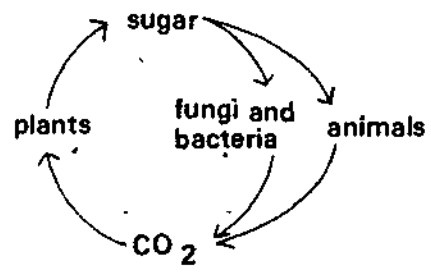
Nitrogen Cycle



CARBON CYCLE

The carbon cycle is also related to plant and animal relationships. Plants remove from the air the carbon dioxide expired by animals. The carbon follows a path similar to the oxygen in forming glucose. The carbon is then contained within the plant body to serve as a food for animals, or to be returned to the soil when the plant dies and begins to decay. Respiration by animals returns carbon dioxide to the air, and the process repeats itself. The carbon cycle may be sketched like this:

Carbon Cycle



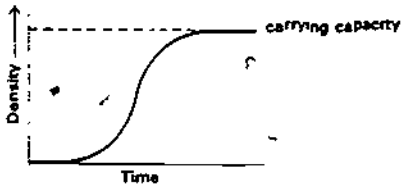
Under natural conditions there is a constant turnover of nutrients in any natural area. Minerals go from soil to plants to animals and are eventually liberated for re-use by the process of decomposition.

CARRYING CAPACITY

Any environment has a limited amount of resources including energy and can therefore support 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, then, determines how many organisms can be maintained and in what condition.

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 campaign 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.

BIOMASS

Energy and resources are converted through food chains to biomass (living weight). A 160-pound man has a biomass of 160. A deer may have a biomass of 75.

Given an environment with its limited resources, a fixed amount of biomass can be produced, and no more. Ten acres of farm land can supply 17,850 pounds of alfalfa, or 2,250 pounds of beef, or 105 pounds of boy. If grasshoppers move in and eat the alfalfa, converting it to their biomass, the beef or the boy will receive less energy and consequently, their biomass will soon be reduced.

LIMITING FACTORS

Activity within the biotic community is ceaseless as energy and materials flow through food chains. Change is also ceaseless, being represented by the growth and death of individuals and populations by the process of biotic succession, or the slower process of species evolution.

In the environment, life may be distinguished by reproduction, growth, and the ability to move about. All species that exist tend to increase in numbers, move to more suitable environments, and there again to reproduce and spread farther. Growth in individual size or in numbers continues until some external factor of the environment causes it to cease. A tree will cease to grow when essential soil nutrient is no longer available in required quantity. Particular tree species within a forest will cease to reproduce when forest floor conditions become undesirable for seed germination. Animals too will be affected when minimal availability of food, water, and shelter ceases. Whatever factor limits the reproduction of a population or the growth of an individual is known as a limiting factor. The ecological principle of limiting factors may be stated as follows: "The presence and success of an organism or a group of organisms depends upon a complex of conditions. Any condition which approaches or exceeds the limits of tolerance is said to be a limiting condition or a limiting factor". The limiting factor may be considered as an ecological "bottleneck" which sets a limit upon the productivity of a species: consequently upon the productivity of an entire ecosystem. One important facet of resource management deals with compensating for limiting factors in a given habitat.

Limiting factors can be divided into two categories: physical and biological. Physical factors which might limit population growth would include factors of climate and weather, the lack or the overabundance of water and minerals, the suitability of terrain, plus many other factors. Biological factors include competition, predation, parasitism, disease, and other interactions within or between species that are limiting to growth or increases in numbers.

The concept of limiting factors combined with the knowledge that the earth is limited in size and in its supplies of energy and materials leads to the obvious conclusion that growth and expansion must eventually have an end. No species, including man, can expand its population indefinitely. Absolute limits to growth are set by the density-dependent factors, the factors which determine the number of individuals that can be supported by an area. In crowded human populations in many parts of the world we see such density-dependent factors in operation. This knowledge can help us to understand and avoid such problems as starvation, pollution, and disease associated with population densities exceeding the carrying capacity.

INTERSPECIFIC AND INTRASPECIFIC COMPETITION

All living organisms interact within their environment. Plants and animals interact within the biotic community, as do human beings within the human community. Colleges and universities throughout the nation represent separate communities with a particular group of individuals interacting through campus activities. An example of such an activity might be an Intramural Athletic Program. Literally translated, intramural means "within the walls." Therefore, a specific species of students; e.g., Southern Illinois University students, compete in some form of athletic competition.

In contrast, these separate communities may interact with one another. To cite athletics again, the program of competitive sports would be termed Intercollegiate Athletics; in other words, competition between various "species" of students.

The distinction of competition within a species or between species is also present in the biotic community. Plants make their own food through the process of photosynthesis, but this does not mean that plants can make their own energy. For a plant to carry out its foodmaking process it must utilize sunlight as its source of energy. Among plants, then, the struggle for energy is chiefly competition for a place in the sun. Competition between plant species for energy is called interspecific competition. If we were to consider only one species; e.g., white oak trees, competition within this species for a place in the sun would be termed intraspecific competition.

Competition occurs among all living organisms for space, food, water, and other necessary life supplies. On our earth we have only a limited supply of these necessities. As a population of individuals increases in numbers competition becomes greater.

ENVIRONMENTAL CONCEPTS - Paul Yambert and Jerry Gaffaney

Pollution and consumption of natural resources are inexorably interrelated to each other and to our environmental crisis. The two chief factors contributing to resource consumption and consequent pollution are the number of people and the consumption per capita. Any effective environmental education program must deal with consumption and pollution as interrelated, not independent, factors.

With these generalizations in mind we can formulate the following environmental corollaries:

A. We should find ways and means of reducing our consumption of resources:

1. through more efficient resource use;

2. through non-consumptive resource use;

3. through non-use and/or non-consumptive use of resources.

B. We should find ways and means of reducing the ecological impact of our necessary consumption of resources:

1. By substituting renewable for non-renewable resources where feasible.

2. By avoiding consumption patterns which result in non-biodegradable waste;

3. By insuring recycling and reutilization of waste.

In this context we have a frame of reference conducive to changing both attitudes toward the knowledge of the environment and man's place in it.

Examples in the YCC Program:

Assuming acceptance of the value system outlined above we can visualize a spectrum of activities ranging from the relatively undesirable, through the neutral, to the relatively desirable.

Projects

Building a snowmobile trail implies acceptance of non-essential consumption of non-renewable resources in a manner which is potentially destructive to the ecosystem, especially the atmosphere. On the other hand, the snowmobile trail may reduce destruction to other parts of the environment and preserve its overall diversity. Such trade-offs must be considered.

Building a hiking trail implies encouragement of a form of resource use which is non-consumptive and non-polluting to a very large extent. The trade-off choice will be affected by such factors as littering, unauthorized chopping of wood, careless use of fires, and disturbance of wildlife.

Dining Hall

Using disposable plastic plates, cups, and flatware implies acceptance of the use of non-renewable resources in a highly consumptive manner which is likely also to result in large amounts of air pollution.

Using plates, cups, and flatware which are reused after cleaning with biodegradable detergent and sterilizing with hot water from an efficient and properly insulated heating unit implies concern for minimizing negative impact on the environment in general and upon non-renewable resources in particular.

Recreation

In choosing whether to make a trip by canoe or motorboat, some of the considerations which should be taken into account are:

1. Which will cause less air pollution?

2. Which will cause less water pollution?

3. Which will cause less noise pollution?

4. In what ways will the trip by motorboat provide more satisfaction?

5. In what ways will the trip by canoe provide more satisfaction?

In this, as in any form of trade-off analysis, it is important to consider ramifications over time. For example, making an aluminum canoe results in considerable environmental impact, but using it over an extended period of time may reduce the average impact per hour of recreation to a very acceptable level. The underlying concept is one of amortizing environmental impact over time.

ENVIRONMENTAL DESIGN AND ACTIVITY CHECKLIST- Paul Yambert and Jerry Gaffaney

Generally the kinds of work projects attempted by the YCC can serve as major segments of the educational program. It is difficult at times, however, for the work supervisor or educational specialist to incorporate the work experience into the educational program. It is virtually impossible to develop a lesson for every kind of work project. For this reason, a generalized checklist has been produced to facilitate the transition from work project to environmental education.

The following checklist is based on the educational objectives of the YCC program and affords the enrollee the opportunity to make an environmental evaluation of any work project to which he may be assigned. The checklist may be used before, during, or after the actual work performed. If it is used prior to the work project, it could possibly allow the enrollee to rate the work projects and set up a priority list with regard to ecological soundness. The checklist is also designed to stimulate thought and discussion about the projects.

Some examples which will illustrate the use of the checklist: assume that one of the work projects assigned is the construction of a drag strip along the edge of a pine woods. The enrollees, before starting the work, would evaluate the drag strip project by using the spectra and placing a plus or minus sign in the box next to the statement which they feel is most closely associated with the drag strip project. If they are unable to evaluate any particular spectra, a zero is placed in the 0 column.

This particular project would likely receive several minus signs because it: decreases diversity, increases consumption of resources (rubber, gasoline, metal), produces non-biodegradable wastes, is consumption largely for wants, tends to consume (more) resources sooner. Assume that the enrollees rated this project as follows: 7 minuses, 4 zeros, and 4 pluses. This project would be rated -3 on the checklist (and the pluses and minuses, disregarding the zero scores). It often will develop an interesting discussion if the students relate to the other members of the group their reasons behind the scores given to the project.

An example of a project that would be likely to receive more plus scores than minus would be the restoration of an abandoned air strip to native vegetation. Assume this project was scored a plus 5 on the checklist. Hopefully, the enrollees would place higher priority on this project.

Once the students become familiar with using the checklist, they can use it to evaluate any of their camp activities and again set an activity priority system. For example, at your camp the students have the choice of soilboating or water skiing. It is likely that sailboating would receive more plus scores than water skiing and, again hopefully, as the summer progresses the students would opt more often to sail.

The checklist can also be used to evaluate the various aspects of the camp operation such as: mess hall, living facilities, transportation, etc.

There is the possibility with this kind of evaluation system that the enrollees may become reluctant to work on projects they feel are not environmentally sound. For example, take the drag strip project. The environmental education specialist must make sure

that the enrollees understand the concept of trade-offs which pervades much decision-making in our society. It is possible that other criteria were used to decide to construct the drag strip; e.g., if the drag strip were not constructed and this activity localized, dragsters would be racing all around and through the pine forest. In this light the drag strip project could be re-evaluated and possibly receive a plus score.

Sample Environmental Design and Activity Checklist

	+	0	-	
Increases environmental diversity				Decreases environmental diversity
Increases beauty of the environment				Decreases environmental beauty
Increases stability of the environment				Decreases stability of the environment
Decreases consumption of resources				Increases consumption of resources
Production of biodegradable wastes				Production of non-biodegradable wastes
Stresses consumption of renewable resources				Stresses consumption of non-renewable resources
Concern for things other than man				Concern primarily for man
Consumption solely to meet needs				Consumption largely for wants
Consideration primarily of ecologic criteria				Consideration primarily of economic criteria
Concern for the future				Concern for the present
Promotes land stewardship				Promotes land exploitation
Promotes recycling of resources				Promotes non-recovery of resources
Tends to postpone consumption of resources				Tends to consume (more) resources sooner
Encourages harvest well within the yield which can be sustained				Encourages harvest greater than that which can be sustained

CHAPTER 5 - ROLES OF FEDERAL AGENCIES.

Department of Agriculture (USDA - 1862)

Forest Service (USFS)

Created in 1905, the Forest Service has the Federal responsibility for national leadership in forestry. The Forest Service manages 115 National Forests and 19 National Grasslands comprising 187 million acres including 10.7 million acres of wilderness in 41 States and Puerto Rico, under the principles of multiple use and sustained yield. National wood and paper needs are balanced with other renewable resources and the benefits of recreation natural beauty, wildlife habitats, livestock forage and water supply.

Soil Conservation Service

Created in 1935, the Soil Conservation Services responsibility for developing and carrying out a national soil and water conservation program in cooperation with private land owners and operators and other land users and developers, with community planning agencies, resource groups and other agencies - Federal, State and local.

The soil and water conservation program is carried on in all states plus Puerto Rico and the Virgin Islands though technical help provided to over 3,000 locally organized and operated conservation districts covering 2 billion acres.

Department of the Interior (USDI - 1849)

Bureau of Sport Fisheries & Wildlife

Organized in 1956, the Bureau of Sport Fisheries & Wildlife is responsible for the perpetuation, use, understanding and enjoyment by the people of Sport Fisheries & Wildlife resources of the Nation.

The Bureau manages 30 million acres of land in 329 refuges and nearly 100 fish hatcheries. Their Federal facilities provide a nationwide system of refuges for migratory wildlife and endangered species; management areas for scientific study of fish and wildlife populations, and fish restocking and research stations. Their programs are operated in close cooperation with State and private organizations.

National Park Service (NPS)

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 Service protects and preserves the natural environment of this extensive system of National Parks, National Monuments, historic sites, battlefields, National Recreation Areas, rivers, lakes and seashores.

Geological Survey (USGS)

The Geological Survey was established in 1879, as the national agency to perform surveys, investigations, and research covering topography, geology, mineral and water resources of the United States.

The survey also clarifies land as to mineral character, water and power resources; and enforces federal regulations regarding oil, gas and other mining leases, permits, licenses, development contracts, gas storage contracts, and publishing information regarding these areas.

Bureau of Indian Affairs (BIA)

Created in 1824, the Bureau of Indian Affairs actively encourages and trains Indians and Alaskan Native people to manage their own affairs under the trust relationship to the Federal Government. The Bureaus facilitates the full development of their human and natural resource potentials and to utilize the skill and capabilities of the Indian and Alaskan Native people in the direction and management of educational, health/welfare and other programs for their benefit.

Bureau of Land Management (BLM)

Established in 1946, with the consolation 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 the related resources according to the principles of multiple use management.

The Bureau administres the mineral resources connected with acquired lands and the submerged lands of the Outer Continental Shelf.

Bureau of Outdoor Recreation

Created in 1963, the Bureau of Outdoor Recreation is responsible for promoting coordination and development of effective programs related to outdoor recreation.

Under the Land and Water Conservation Act of 1965, the Bureau administers a program of financial assistance grants to states for comprehensive planning, land acquisition and facility development. The fund also finances acquisition of Federal land and water areas for recreational purposes.

Bureau of Reclamation (WBR)

Established as the Reclamation Service in 1902, the Bureau of Reclamation conducts programs designed to stablize 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 projects include the concurrent purposes of irrigation, municipal and industrial water supply; hydroelectric power generation and transmission; flood and river regulations and control; recreational and other public uses. Projects beneficiaries, through the Bureau, make repayment of reimbursable costs to the Government for construction and operation.

Environmental Protection Agency (EPA)

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 and 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. EPA enforces federal regulations regarding environmental quality standards and reviews Federal agency programs regarding their impact on environmental quality though the review of Environmental Impact Statements.

U.S. Army Corps of Engineers (COE)

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 structure.

The Corps is a function of the Civil Works Program, U.S. Department of the Army, Department of Defense.

SOURCE LIST

The following is a list of organization where resource materials can be obtained at minimal or no cost.

Organization	Type of Information Available
*American Association of University Women 2401 Virginia Avenue, N.W. Washington, D. C. 20036	Resource directory on pollution control. 75¢ Anti-pollution pamphlets and study guide. 75¢ (excellent material)
American Forestry Association, The 919 Seventeenth Street Washington, D. C. 20006	Membership and subscriptions to monthly "American Forests" $6.00
Citizens Advisory Committee on Environmental Quality 1700 Pennsylvania Avenue, N.W. Washington, D. C. 20006	Booklet--Community Action for Environmental Quality. 50¢
Clean Water Publications Federal Water Pollution Control Washington, D. C. 20242	Suggestions about what communities can do to combat water pollution. Free
Common Cause 2100 Main Street, N. W. Washington, D. C. 20037	Political influence- make government responsive to people. $15.00
Conservation Education Association University of Wisconsin, Green Bay Green Bay, WI 54301	Variety of publications, excellent bibliography. Low-cost material.
Conservation Foundation, The 1250 Connecticut Avenue, N.W. Washington, D. C. 20036	Variety of pamphlets and articles dealing with the many aspects of ecology.
*Ducks Unlimited, Inc. National Headquarters P.O. Box 66300 Chicago, Illinois 60666	$10.00-$20.00 dues. Organization of sportsmen to control and improve wetland breeding areas for ducks on public and private lands.
ENVIRONMENT Magazine 438 North Skinker St. Louis, Missouri 63130	Monthly publication dealing with effects of technology on the environment, published by Committee for Environmental Information. Students- $5.00 per year.

ENVIRONMENTAL ACTION Room 731 1346 Connecticut Avenue, N.W. Washington, D.C. 20036	$10.00 - Subscription to biweekly newsletter and Earth Tool Kit. Deals with all problems of environment through 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, New York 11733	Incorporated in 1967--group of scientists, lawyers, citizens dedicated to the protection of environmental qualith through legal action. Published a newsletter. Endorsed by S. Udall. Student membership $5.00. Basic Membership - $10.00
Friends of the Earth 30 East 42nd Street New York, New York 10017	Concentrating efforts on fighting supersonic transport development. $5.00 - Student $15.00 - Regular
Glass Containers Manufacturing Institute 330 Madison Avenue New York, New York 10017	Pamphlets
International Oceanographic Foundation 10 Rickenbacker Causeway Virginia Key Miami, Florida 33149	Publish "Sea Frontiers" and "Sea Secrets" Membership: $7.50 per year
*League of Women Voters 1730 M Street, N. W. Washington, D. C. 20036	Currently working for clean water
*National Audubon Society 1130 Fifth Avenue New York, New York 10028	$10.00 magazine - good wildlife-conservation coverage. Illinois Audubon - $5.00
National Education Association 1201 Sixteenth Street, N.W. Washington, D. C. 20036	"Man and His Environment" $1.75
National Parks and Conservation Association 1701 Eighteenth Street, N.W. Washington, D.C. 20009	National Parks and Conservation Magazine, "The Environment Journal" with $8.00 Associate Membership. International charter trips available to members.
*Nature Conservancy, The 1522 K Street, N.W. Washington, D.C. 20005	Regular membership $5.00

*National Wildlife Federation 1412 Sixteenth Street, N.W. Washington, D. C. 20036	"National Wildlife" magazine comes with $5.00 associate membership and ten issues of "Ranger Rick's Nature Magazine" in addition with a $6.00 membership.
Population Reference Bureau 1755 Massachusetts Avenue, N.W. Washington, D.C. 20036	Good bibliography, source list, and film guide on population $5.00 Student or Teacher $8.00 regular
Project Man's Environment National Education Association 1201 Sixteenth Street, N.W. Washington, D.C. 20036	Information on curricula (K thru 12) in environmental study areas.
Public Affairs Pamphlets 381 Park Avenue South New York, New York 10016	Pamphlet #421 - "An Environment Fit for People" 25¢ Pamphlet #403 - "The Battle for Clean [illegible]" 25¢
*Sierra Club 1050 Mills Tower San Francisco, California 94104	List of publications, pollution population information, protection of scenic areas. $10.00 - Junior; $17.00 - Regular
The Wilderness Society 729 Fifteenth Street, N.W. Washington, D.C. 20005	Reports, pamphlets, reprints on preservation and use of our natural heritage.

NOTE: Most States, Counties, and Cities have Departments of Environmental Quality - Contact the information offices of each for information.

GOVERNMENT AND OTHER INFORMATION OFFICES - Contact National office for location of State or local unit nearest you.

*Bureau of Sport Fisheries and Wildlife
U.S. Department of the Interior
Washington, D.C. 20240

*U.S.D.A. Forest Service
South Building
Twelfth & Independence Ave., S.W.
Washington, D.C. 20250

*Information Center
U.S. Department of Health, Education, and Welfare
330 Independence Avenue, S.W.
Washington, D.C. 20202

*Bureau of Land Management
Division of Management Research
Department of the Interior
Washington, D.C. 20240

*Information Office
Department of Agriculture
Fourteenth Street & Independence Avenue, S.W.
Washington, D.C. 20250

*Bureau of Outdoor Recreation
Interior Building
Washington, D.C. 20240

*Commissioner
Federal Water Pollution Control Administration
633 Indiana Avenue, N.W.
Washington, D.C. 20242

*Air Pollution Control Administration
801 North Randolph Street
Arlington, Virginia 22200

*Council for Urban Affairs
Executive Secretary
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

U.S. Department of Commerce
Springfield
Virginia 22151

*Soil Conservation Society of America
7515 Northeast Ankeny Road
Ankeny, Iowa 50021

The following publications may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402:

"No Laughing Matter" - book of syndicated cartoons on air and water pollution - 70¢

"Primer on Waste Water Treatment" current and possible future methods of treating sewage and industrial wastes. 55¢

"Showdown" - picture pamphlet discussing "showdown" for water quality - 55¢.

"From Sea to Shining Sea" - presentation of environment situation of U.S. with bibliography, film list, and resource guide - $2.50. Highly recommended.

SELECTED BIBLIOGRAPHY FOR YCC/ENVIRONMENTAL LIBRARY

Suggest obtaining from school library for summer use.

	Approximate Cost (Retail)
ACE BOOKS	
New World No World; Herbert, F.	$ 0.95
APOLLO BOOKS	
Voice of the Desert; A Naturalist's Interpretation; Krutch, J.W.	1.75
BANTAM BOOKS	
Earth Day, The Beginning	1.25
BALLANTINE BOOKS	
The Population Bomb; Ehrlich, Paul	0.95
The Environmental Handbook; Debell, Garrett	0.95
The Frail Ocean; Wesley, Marx	0.95
Perils of the Peaceful Atom; Curtis and Hogan	1.25
Defoliation; Whiteside, Thomas	0.95
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GLOSSARY

abiotic - refers to the nonliving components of the environment.

acre - a measurement of land surface containing 43,560 sq. ft. This is equal in area to a square approximately 209 feet on a side. Most crops are grown and most farms are managed in terms of acres of land.

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 - something which is pleasant or beautiful in color, texture, or general appearance.

air pollution - the accelerated transfer of natural and synthetic substances into the atmospheric reservoir, usually as a consequence of man's activities.

algae - primitive green plants; many are microscopic.

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.

ASPECT - relating slope of hillside to compass direction e.g. north facing slope would have north aspect.

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 you move up through a food chain.

biological oxygen demand (BOD) - the amount of oxygen required to decompose the organic material in a given volume of water.

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.

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 insecticides, including DDT, that are broad-spectrum pesticides and long-lasting.

CLEAR CUTTING - the felling of all merchantable trees in an area in one operation.

CLIMAX COMMUNITY - the kind of community capable of perpetuation under the prevailing climatic conditions.

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 - all the plants and animals in a particular habitat that are bound together by food chains and other interactions that are self-perpetuating.

COMPACTION OF SOIL - compressing soils by means of pressure, e.g. from cows' hooves or hikers feet, so that the available space within the soil for air and water is reduced.

competition - an interaction between members of the same population or two populations resulting from a greater demand than supply for a mutually required resource.

COMPOST - a fertilizer composed of the organic fraction of refuse.

CONDENSATION - changing water from the vapor to the liquid form; an important part of the hydrologic cycle.

CONSERVATION - the intelligent use of natural resources to assure their continuing availability.

CONSUMER - an organism which ingests other organisms or organic matter.

contact herbicide - where the physiological reaction is 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. See eutrophication for its definition.

DECIBEL - a unit measure of sound energy intensity.

deciduous - a plant, including the trees, which sheds all of its leaves every year at a certain season.

decomposer - microconsumers; e.g., bacteria and fungi.

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).

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 interrelationships of organisms to one another and to the environment.

ecosystem - the community including all the component organisms together with the abiotic environment forming an interacting system.

energy - the ability to perform work.

environment - all the external conditions surrounding a living thing.

environmental resistance - the sum total of all factors in the environment that limit population growth.

epilimnion - the warm, less dense top layer 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; if the process is man-accelerated, the term "cultural eutrophication" is used.

EVAPORATION - molecular matter going from a liquid or solid to a gaseous state.

EXPLOITATION - the use by an organism of an environmental resource.

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 chain accumulation - the increase in concentration of certain chemicals in food chains.

FOOD WEB - a complex of interlocking food chains.

FOSSIL FUELS - 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 characteristics possessed by a species.

geothermal energy - heat energy conducted from the earth's interior.

greenhouse effect - the absorption and reradiation of terrestial 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 an organism lives.

half-life - the amount of time required for one-half of the radioactive nuclei of an isotope to decay.

herbivore - an animal that uses plants as a food source.

HUMUS - the dark rich part of the earth formed by the decay of roots, stems, and leaves of plants, as well as the decay of animal matter.

HYDROELECTRIC POWER - electric power produced by falling water usually by means of a waterwheel of turbine.

hydrologic cycle - path water takes from precipitation until it evaporates and recondenses in cloud form back to precipitation.

hypolimnion - the colder, denser bottom layer in a stratified lake.

Irradicant - a fungicide which destroys the pathogen.

kinetic energy - energy an object possesses because of its motion.

LD_{50} - the amount of toxin required to kill 50 percent of a population of test animals expressed in p.p.m. or mg./kg. of body weight.

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.

lipid - animal fat.

locus of action - area of metabolic reaction.

MIGRATION - to pass periodically from one region or climate to another; a common pattern among waterfowl and some mammals.

mode of action - metabolic pathway by which substance affects the organism.

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 objective 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 role of an organism in the environment, its activities and relationship to the biotic and abiotic environment.

NITROGEN CYCLE - The pathway of N from atmosphere to soil to plant to animal and back to atmosphere.

NON-RENEWABLE RESOURCE - a resource of finite supply which cannot be replaced.

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.

oligotrophic lake - a lake with low biological productivity; usually has clear water and aesthetic appeal.

omnivore - an animal that can use 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 wastes 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.

phenoxy compound - a group of herbicides derived from phenoxy acids, usually acetic, propionic, or butyric.

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 - Tree species which initially invade unforested areas.

pollution - a change from the normal transfer rate of materials or energy between any two reservoirs.

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).

preremergent herbicide - applied before weeds and/or crop emerges from soil.

PRESCRIBED OR CONTROLLED BURNING - the use of fire as a resource management tool, e.g. to create improved game habitat.

PRESERVATION - one important component of conservation; usually has the connotation of setting aside, non-use, 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 suspended materials from waste water.

PRODUCER - organism capable of carrying out photosysthesis.

RECHARGE - related to H_2O cycle.

RECYCLING - the recovery and reuse of resources.

REDUCER - see decomposer.

REGENERATION - used by foresters to mean reestablishment of a stand similar to the original one on a given site.

RENEWABLE RESOURCE - a resource in which the materials as well as organisms are "reassembled" as fast as they are dispersed.

resources - biologically, everything of natural origin, living and non-living, which humans use and enjoy.

ROTATION - the period of time between two commercial (forest) harvests; i.e. the cutting cycle.

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 sewer - the system of pipes that transports domestic wastes to a sewage treatment plant.

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.

scrubbing - the removal by water spray of water-soluble pollutants from an effluent 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 waste waters.

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 including sewage.

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 - run-off 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 - translocated from point of contact.

teratogenic - causing malformation of fetus.

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.

tilth - the general physical condition of soil, which determines how it holds together, absorbs, retains moisture and air, and lends itself to cultivation. Conservation practices, especially of grasses and legumes, tend to improve the tilth, thereby producing a more favorable environment for plant growth.

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 visability resulting from the scattering of light by suspended particles in water.

water table - the surface forming the upper boundary of the ground-water reservoir.

WATERSHED - all the area draining into a stream (water drainage and its problems can generally be solved best by working with all the people in a watershed).

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.

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6 BITS OF INFORMATION PROBLEM
by Dr. Michael Giammatteo

$B_2 1$

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

The Dinosaurs had Tom for a teacher during the third period.

Dick and Belinda did not get along well and so they did not work together.

During the first period the Team Leader taught the group that Harry liked best.

$B_2 2$

Although you may tell your group what is on this slip, you may not pass it around for others to real.

Information:

All teachers taught at the same time and exchanged groups at the end of each period.

Each teacher liked a different group best. During the second period each teacher taught the group he liked best.

Each teacher taught every group during one of the first four periods of the day.

$B_2 3$

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

The Freznel Elementary School Intermediate Unit had two teacher's aides, four teachers, and four instructional groups of students.

Each instructional group had chosen its own name.

Sybil was the Team Leader for the Intermediate Unit.

$B_2 4$

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

Your group members have all the information needed to find the answer to the following question. Only one answer is correct. You can prove it.

IN WHAT SEQUENCE DID THE APES HAVE THE VARIOUS TEACHERS DURING THE FIRST FOUR PERIODS?

Some of the information your group has is irrelevant and will not help solve the problem.

$B_2 5$

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

Belinda and Ralph disagreed about how it would be best to handle the Bombers who always had trouble settling down to work.

Dick preferred to work with the Champs over all other groups.

Although the Team Leader had been at Freznel School for five years, this was a shorter period of time than for the other team members.

$B_2 6$

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

The Team Leader taught the Dinosaurs the second period.

Harry worked with the Bombers in the third period.

Sybil had been at Freznel School a shorter period of time than any of the other teachers in the Intermediate Unit.

PLACATOR

°You are to play the placator role in solving the following problem:

°The Problem:
It is 90° outside - your group has to decide whether or not to go on a picnic - it is 2:30 p.m.

°Examples of Placator--always soothes over a discussion "Everything in due time" "The sun will shine tomorrow"

ATTACKER

°You are to play the attacker role in solving the following problem:

°The Problem:
It is 90° outside - your group has to decide whether or not to go on a picnic - it is 2:30 p.m.

°Examples of Attacker--always attacks ideas presented or will be negative. "You know the administration will never go along with that" "People don't care, our group would never do that without pay"

IRRELEVANT

°You are to play the irrelevant role in solving the following problem:

°The Problem:
It is 90° outside - your group has to decide whether or not to go on a picnic - it is 2:30 p.m.

°Examples of irrelevant--ideas given that do not relate to the topic (evader). "Did you see the movie last night?" "Who's bringing the coffee for the next meeting?"

SENSIBLE (YOU ARE TO START THE DISCUSSION)

°You are to play the sensible role in solving the following problem:

°The Problem:
It is 90° outside - your group has to decide whether or not to go on a picnic - it is 2:30 p.m.

°Examples of 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?"

NOTE: Page 23 for Identifying Roles Played in Groups

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