People & Natural Resources

Pocketbook for Environmental Awareness

U.S. Youth Conservation Corps

Forest Service
U.S. Dept. of Agriculture
U.S. Department of Interior

INTRODUCTION

This Handbook is designed for Youth Conservation Corps for environmental awareness activities in the field situation, such that environmental awareness can be integrated with the projects, and other camp activities.

It has been developed to be used by YCCer's, crew leaders, and environmental specialists with the philosophy that NONE OF US IS AS SMART AS ALL OF US. In these field investigations, the role of the crew leader is changed from a dispenser of facts and information to that of a facilitator, motivator, and learner along with the YCCer's. These field investigations provide for a maximum of YCCer's response and summary because of the discussion and question sections. Chapter 3 "Activities to Strengthen Team Work in the YCC Program" in YCC-Sourcebook for Environmental Awareness page 20-34 contains activities that should help crew leaders, and environmental specialists develop team effort in the processes of both data collecting and group problem solving. This chapter (Chapter 3, Sourcebook) develops 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 crew in discussions of the field investigations and how they relate to their work projects and the management of the environment.

These field investigations use the processes of collecting observable data, making inferences, setting up investigations to check out inferences, and communicating feelings and awareness. The processes of both data collecting and group problem solving are the first step toward understanding important generalizations and big ideas about the environment.

Implementing the Field Investigations

The guidelines listed below are designed to help you involve YCCer's in environmental investigations. They are in no way "sure fire". You may have to change some of them to adapt to your situation and you may want to add to or delete from the list.

Make sure you have all your materials and equipment ready, that

INTRODUCTION

you have visited the parts of the environment you will investigate, and that you have planned how to integrate the field investigation into your work project and the whole YCC environmental awareness program.

Some Guidelines:

1. Go over quickly with the YCCer's what will take place during the field investigation so they will know what to expect.
2. Use the field investigation as a guide involving questioning strategies and self-directed investigations. Revise as necessary to fit your situation.
3. Minimize leader talk and/or lecture (refer to and use question and discussion sections of outline - these work in eliciting responses).
4. Plan and pace your session so that what you do is done thoroughly and well. For example, it is okay to give them data to solve a problem, instead of letting the crew gather it, if time is a problem. Don't have your lesson so rushed that you have to give out data all the time. If you have a time restriction, make sure you decide ahead of time which TASK's you are going to eliminate.
5. The summarizing question and discussion area of how this relates to man and the management of the environment is so important that you should plan to start the summarizing and discussion area of the session at least 1/2 hour before completion.
6. Conclude the session with the summarizing questions or equivalent at the end of the lesson plan. (This is one of the most important parts of the activity.) This will give you an evaluation tool to see what generalizations or concepts students can generate.
7. Have crew discuss and list in small groups ways in which the study activities can help change attitudes. Groups may share ideas.
8. Assign one or two YCCer's to be accountable for equipment at the beginning of each session. (Have the same people be responsible for cleaning up the equipment at the end of each session).
9. When your session is finished, jot down strengths and weaknesses so you can revise your lesson so it will be better next time.

Materials, Equipment, and Books for Field Investigations:

Materials for the field investigations are listed at the beginning of each. A total list of materials, approximate cost and availability can be found on page 129.

Books suggested as priority (**) for field information are listed on page 56-58 YCC-Sourcebook for Environmental Awareness.

Environmental Education Objectives:

The environmental education objectives that each field investigation could achieve, are listed on the introductory page of each section (e.g. Wildlife, Water, etc.) of this publication. The specific environmental education objectives are listed on pages 4, 5, and 6 of YCC-Sourcebook for Environmental Awareness.

This publication has been developed for YCC and a field working situation. We appreciate the contributions from the camps who have shared their experiences for this publication. We realize there are many gaps and we would appreciate any comments and especially investigations that worked in your camp.

Interior - Agriculture
Youth Conservation Corps
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Developed for the Departments of Interior and Agriculture by
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INTRODUCTION

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LAND-USE PLANNING - INTRODUCTION

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- TIMBER MANAGEMENT
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  - Timber Harvesting
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  - Revegetation
- ENGINEERING AND CONSTRUCTION
  - Trail Construction
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- FIRE CONTROL
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  - Fuel Modification
- VISITOR SERVICES
  - Nature Trail

LAND-USE PLANNING - INTRODUCTION

Some Ideas:

1. Materials needed for these environmental awareness activities are listed at the beginning of each activity (note the page numbers in the table of contents) Page _____ lists where the materials can be obtained and the approximate cost.

Since soil is a basic component of the "natural environment" and an important component of land-use whether in the "natural environment" or "man-influenced environment" these activities can be used effectively with a wide range of projects as listed.

Collecting soil data and analyzing it is important before undertaking projects that deal specifically with land-use such as building campgrounds, and trails, or use of land in nearby communities.

The soil data can be collected in a variety of vegetative types (e.g. forest, range, brush) or zonal changes in vegetation such as altitude and compared.

Field Investigation, LAND-USE PLANNING - DESCRIBING, OBSERVING AND RECORDING THINGS IN THE SOIL from "Investigating Your Environment Series" - U.S. Forest Service

Objective: Describe ways in which living organisms in the top part of the soil affect the soil.

Materials: Pencil

Time: 30-40 minutes.

Notes: A good introduction to any project relating to the soil, e.g. campground development, trails, soil erosion, work, timber stand improvement, etc. Could be used several times in different plant communities for comparisons.

DESCRIBING SOIL

Have the crews sit down and do Task A.

TASK A: (5 minutes) Work by yourself.

Describe in writing your own description of soil. Keep this description for your own reference later.

OBSERVING AND RECORDING THINGS IN THE SOIL

TASK B: (15 min.) Work in small groups.

1. Predict what things you will find in the top few inches of this plant community floor. List your predictions:

2. Stake out an area 2 or 3 feet square on the plant community floor and sift through the top 3 inches of the soil, recording the evidence of plant and animals you observe. Use chart on next page.

TASK B (Continued)

Name or Description of Item in the Soil	Quality	Possible Effect on Soil

3. The following three terms are used to describe organic matter at the top of the soil - litter, duff, humus. From your study above, complete the following chart:

Term and Definition	Describe the Feel	List the Identifiable parts of plants and animals you found.
Litter (Identifable dead things on surface)		
Duff (partially decomposed organic matter-compacted)		
Humus (almost completely decomposed non-identifiable organic matter)		

Questions and discussion:

1. What did you find?
2. When would you expect to find more organisms? different organisms?
3. How do the organisms you found benefit the soil?
4. What are some reasons for odors in the soil?

Field Investigation, LAND-USE PLANNING - DEVELOPING SKILLS TO COLLECT SOIL DATA, CONSTRUCTING A SOIL MICROMONOLITH from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Construct a soil micromonolith of a soil profile, or soil pit in the area where working on the project.
2. Determine and record texture, structure, pH, temperature, and color of each layer.

Materials:

1 soil pH kit per 3 YCCer's
1 soil thermometer per 3 YCCer's
1 sewing tape per 3 YCCer's
3 Jelly Cups & lids per YCCer
1 micromonolith card per YCCer
Hand lenses

Time: Approximately 1 hour

Notes:

1. Again, a good introduction to any project.
2. Could be used several times in different plant communities for comparision by saving the data and soil micromonolith cards.
3. Don't stop with collecting soil data. Using the data collected to determine land-use is the "meat" of the activities and the basis of all land-use planning and problems in cities as well as "woods". (See Analyzing Data and Determining Some Land Uses, page 9-17).

DEVELOPING THE SKILL TO COLLECT SOIL DATA

Questions and discussion:

1. Move group around to the soil profile or soil pit.
2. What can we see as we look at this crossection or profile of soil?

3. What are some things that would be important to find out about it? (accept all comments)

The observable characteristics of color, texture, structure, temperature and the acidity or alkalinity (pH) of a soil are indications of some soil conditions important in land use planning.

Questions and discussion: (Continued)
We are going to collect and record some of this information. For the next few minutes, we will stay together as a group to develop skills in collecting soil data. After that, you will be working on your own.

Note to facilitator: Quickly (10 min.) go over the techniques for collecting the data with the participants. This instructional session is extremely important. The participants will use the skills they develop in this session when they collect data for the micromonolith.

Examples: (not necessary to discuss in this order)

1. Soil layers (Horizons) - Mark where the soil changes color and looks. Many soils have 3 major layers or horizons, i.e. top soil, subsoil and parent material; because soil formation has many variables you may find more or less. (Measure and record the depth of each major layer).
2. Color - Describe and record the texture of each major layer. (Have participants pick their own description of color.)
3. Texture (How the Soil Feels)- Determine and record the texture of each major layer.

   Texture is determined by feel (push and rub moistened sample between thumb and forefinger. Spit on sample to moisten.)
   If it feels gritty .....sand
   If it feels smooth and slick, not very sticky....silt
   If it feels smooth, plastic, very sticky.....clay

   Note: Have samples of sand, silt, clay in cans. Have participants practice with these samples to find out what the textures feel like before determining textures of the soil profile.
4. Structure (How the soil is put together) - Determine the structure of each major layer. Carefully break apart a shovelful of soil from each layer and match its characteristics with one of the structure words on the lab sheet.
5. Temperature - Determine and record the temperature of each layer. Plant's growth depends upon soil temperatures during the growing season. Find out your growing season before lesson.

6. pH (acidity or alkalinity) - Determine and record the pH of each major layer. Plants need many soil nutrients to grow well. The degree of pH affects how plants grow.

   Note to facilitator: Demonstrate how to use pH kit in front of whole group. Use some foreign material like cigar ashes. Mention not to compact the sample in the porcelain dish, just use enough pH reagent to saturate soil sample, match color at the edge of the soil sample and porcelain dish with pH color chart.

CONSTRUCTING A SOIL MICROMONOLITH

We are going to use the skills we just developed to construct a soil micromonolith. (Explain: a micromonolith is a small cross section of this profile. You can make one by just sketching the layers of the profile sketch in Task C, or putting samples of each layer in a baby food jar, etc.

Notice there is a place to check or record the data you collect, and a place to sketch what the soil looks like.

TASK C: (20-30 minutes) Work in small groups or by yourself.

Using the skills you have just developed, and the available equipment, construct a soil micromonolith of this soil profile. Record your observations on the soil micromonolith lab sheet. You may want to make a micromonolith using the cards and jelly cups; if so, ask your instructor.

When finished with this task, report to the instructor to receive Task D.

Air temperature 3 ft. above soil surface _____
Air temperature just above soil surface _____

Sketch your soil profile, label the layers or horizons and record the data.

SOIL DATA - MICROMONOLITH

TASK C: (Continued)

DATA

PROFILE SKETCH

Contents of material above soil:

_____

_____

_____

Depth _____" to _____"

A-Horizon (Topsoil) Color: _____

Depth: _____" to _____"

Texture: Sand ___, Silt ___, Clay___.

Structure: Columns ____,

Blocky _____, Granules ___,

Platey _____.

pH: _____ Temp: _____°F

Plant roots visible: _____

Record below, the same information as above for the rest of the layers or horizons.

Describe type of rock in the bedrock (if present) _____

_____

_____

_____

ANALYZING SOIL DATA

Questions and discussion:

1. Ask for a short summary of the soil data collected from each of the groups, and have group discuss.

Field Investigation, LAND-USE PLANNING - ANALYZING YOUR SOIL DATA, DETERMINING SOME LAND USES from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Demonstrate the ability to determine the best uses of the land in this area, using the data from your soil micromonolith and the land capability charts.
2. Describe 3 things that man does to determine the proper management of the soil resource.

Materials:

Soil data and soil micromonolith card from Constructing a Soil Micromonolith, page 7-8.
Pencil
100, 50, or 25" stick and jar of colored water

Time: 1 - 1 1/2 hours.

ANALYZING YOUR SOIL DATA

TASK D: (20-30 minutes) Work in small groups or by yourself.

Use the soil data you collected and the following tables. Answer the following questions:

The potential of the soil for water storage and plant growth is: excellant _____ good _____ poor _____
Why? _____

EFFECT OF SOIL DEPTH ON PLANT GROWTH AND WATER STORAGE	
Deep Soil (over 42")	Excellent water storage and plant growth
Mod. Deep Soil (20"-42")	Good water storage and plant growth
Shallow Soil (20" & Under)	Poor water storage and plant growth

TASK D: (Continued)

What can you say about the following, based on the color of the top soil, or A horizon? _____

_____

Amount of organic material _____

Erosion factor _____

Fertility _____

What can you say about the drainage in the B horizon, based on color? _____

_____

SOME RELATIONSHIP OF COLOR TO SOIL CONDITIONS

Top Soil Condition	Dark (dark, grey, brown to black)	Moderately Dark (dark brown to yellow-brown	Light (Pale brown to yellow)
Amount of organic material	Excellent	Good	Low
Erosion Factor	Low	Medium	High
Aeration	Excellent	Good	Low
Available Nitrogen	Excellent	Good	Low
Fertility	Excellent	Good	Low

Subsurface Soil Color (B Horizon)	Condition
Dull Grey (If in low rainfall soils)	Water-logged soils, poor aeration
Yellow, red-brown, black (if in forest soils)	Well drained soils
Mottled grey (if in humid soils)	Somewhat poorly to poorly drained soils

	Soil Texture	Soil water-holding capacity	Looseness
Topsoil (A)			
Subsoil (B)			

(Table on next page)

TASK D: (Continued)

EFFECTS OF TEXTURE ON SOIL CONDITIONS		
Type	Water holding capacity	Loosness of Soil
Sand	Poor	Good
Silt	Good to excellent	Good
Clay	High (plants can't use it in clay)	Poor

Using the structures you recorded, and the chart, "Effects of Structure," what can you say about the drainage properties of the soil for:

Topsoil (A) _____

Subsoil (B) _____

EFFECTS OF STRUCTURE ON SOIL CONDITIONS			
Type	Penetration of Water	Drainage	Aeration
Columns	Good	Good Vertical	Good
Blocky	Good	Moderate	Moderate
Granular	Good	Best	Best
Platey (low rainfall soils) (like stack of plates)		Moderate	Moderate

Using the pH ranges you recorded and the table, "Examples of plants in pH Range", complete the following chart:

Some plants That Could Grow Here Based on the pH and Chart	Some Plants Actually Observed Growing Here

TASK D: (Continued)

pH RANGE OF PLANTS		
pH 1 4.5	6.5 7	8.5 14
(1 to 4.5 is too acid for most plants	(Most plants do best here)	(8.5 to 14 is too alkaline for most plants)

EXAMPLE OF PLANTS IN pH RANGE:

pH 4.0 - 5.0:	rhododendrons, camellias, azaleas, blueberries, fern, spruce
pH 5.0 - 6.0:	pines, firs, holly, daphne, spruce, oaks, birch, willow, rhododendron
pH 6.0 - 7.0:	maple, mountain ash, pansy, asters, peaches, carrots, lettuce, pines, firs
pH 7.0 - 8.0:	beech, mock orange, asparagus, sagebrush

Did your inferences about the soil pH-plant relationships check out? Yes _____ No _____ Explain: _____

_____

Is pH the only factor affecting where plants grow? Yes ___ No _____ Explain: _____

_____

Describe in a short paragraph how you would set up an experiment to collect data and construct your own soil pH-plant relationship chart.

SOIL TEMPERATURE

Soil Temperature	Conditions during growing season
Less than 40°F	No growth, soil bacteria and fungi not very active
40°F to 65°F	Some growth
65°F to 70°F	Fastest growth
70°F to 85°F	Some growth
Above 85°F	No growth

TASK D: (Continued)

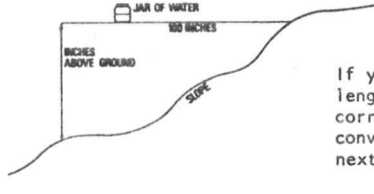
The growing season for my area is _____
What does the soil temperature chart tell you? _____

_____

In the space below, convert the soil temperature table to a line graph. (5-10 minutes) Work by yourself.

TASK E: Determining the Slope of the Land

1. Select a place that represents the average slope of the land being studied or take several measurements and average them.
2. Place one end of a 100" stick on the slope you want to measure. Hold outright to be about level.
3. Place a level or jar with some liquid in it on the outright stick. Raise or lower the stick until level.
4. Measure the number of inches the free end of the stick is off the ground.
5. The number of inches is the slope of the land in percent.



If you use a different length stick, then correct by using the conversion table on next page.

(Conversion Table Next Page)

TASK E: (Continued)

Conversion Table

Length Stick Used	No. inches the end of the stick is above the ground		Multiply by conversion factor		% Land
100"	_____	X	1	=	
50"	_____	X	2	=	
25"	_____	X	4	=	

LAND USE CHART

This is a chart for soils in one kind of land, climate and plants. Other areas may require a different set of criteria

Agriculture Uses	Slope	Erosion Hazard	Soil Depth	Drainage	Texture
Farm crops - cultivation good soil mngmt. practices	0-3	None	Deep	Well Drained	Loam or Silty loam
Farm crops - few to several special cultivation practices	3-20	Slight to Moderate	Mod. Deep	Somewhat poorly	Sandy loam or silty clay
Occasional cultivation many special practices	20-30	Severe	Shallow	Poor	Sand or Clay
Pasture-Woodland cultivation, no machinery can be used	0-2	None to Slight	Deep	Well to Poor	Stoney
Pasture, timber growing, woodland, wildlife, no cultivation machinery	30-90	Very Severe	Deep to Shallow	Well to Poor	Sandy, silty claying or rocky
Wildlife, recreation	all	None to Extreme	Deep to Shallow	Excessive to Poor	Rockland river wash, sand dunes

Land Use Chart (Continued)

The most limiting soil factor will determine the best agricultural use of the land.

Occupancy land uses by man--Man's valued uses of land has demanded criteria, in addition to agricultural uses, to determine proper management practices for living on the land. Examples of others include: prescriptions for aesthetic management, soil site indexes for growing timber, criteria for greenbelts, etc.)

Some Uses & Factors Affecting That Use	Slight Limitation	Moderate Limitation	Severe Limitation
Roads and Streets			
Slopes	0-12%	12-30%	Over 30%
Depth	Over 40"	20-40"	Less than 20"
Watertable	Over 20"	10-20"	Less than 10"
Building Sites			
Slopes	0-12%	12-20%	Over 20%
Depth	Over 40"	20-40"	Less than 20"
Watertable	Over 30"	20-30"	Less than 20"
Septic Tank Filter Fields			
Slope	0-7%	7-12%	Over 12%
Depth	Over 6'	4-6'	Less than 4'
Watertable depth below trench	Over 4'	2-4'	Less than 2'
Picnic and Camp Areas			
Slope	0-7%	7-15%	Over 15%
Stones	0-20%	20-50%	Over 50%
Watertable during season of Use	Over 30"	20-30"	Less than 20'

TASK F: (20 minutes) Work in small groups

Using the data from Task D, Task E, and the LAND USE CHART, answer the following questions.

According to the agriculture and occupancy land use charts, this land could be used for:

Agriculture use:
(list & explain why)

Occupancy: (yes or no and with what limitations)

Roads and streets

Building sites

Septic tank filter fields

Picnic and camp areas

I feel the best uses of this land would be: (Justify your answer)

Questions and discussion:

1. How have you classified this land?
2. Based on your observations and the data you collected, do you feel this land is being properly used?
3. In your estimation, have man's activities affected the classification of this land?
4. Could man improve the capability of this area? How?
5. How could man reduce the capability of this area?

TASK G: (10 minutes) Work by yourself.

Using the words from the data you collected and recorded on the soil micromonolith card, write a description of the soil study. Compare this description with the one you wrote in Observing and Recording things in the Soil, page 3 .

Questions and discussion:

1. What are some factors that contribute to soil formation?
2. What evidences of geological changes have you noticed in this area?
3. What other factors might affect uses of the land? (climate, growing season, needs of community, economic, past history of uses, etc.)

Field Investigation, LAND-USE PLANNING - COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT SOIL from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Describe how you feel about man's effect on this soil environment.
2. Describe how you feel about man's effect on the soil environment where you live.
3. Describe what you can do to improve the use of soil:
   In your YCC activities:

   In Your backyard:

   In your community:

Materials: Pencil

Time: 30-40 minutes including discussion.

Notes:

After completing these field investigations in Land-Use Planning: Use the Simulation Game of Centerplace, page 19, to help identify land-use problems through role-playing.

Identify a local land use problem, take the data or processes of collecting data and develop a simulation game using "Developing Your Own Simulation Game" page 98-103 as a guide.

COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT SOIL

TASK H: (10 minutes)

Describe what you can do to improve the use of the soil:
In your YCC activities.
In Your backyard.
In your community.

Ask for individual descriptions and have group discuss. Relate back to comments to questions after TASK F, page 16.

What types of community action can we take to identify and help solve soil and land management problems in our community? How do these relate to zoning laws, planning commissions, local and state political discussion-making?

Summary Questions:

1. What did we find out about the environment in our study?
2. How are soil characteristics important in environmental management?
3. How can we summarize our discussions and investigations?
4. What processes and methods did we use in our investigations?
5. Let's review the objectives for these field investigations (beginning page 3) to see if we achieved our objectives. (Read list and have group comment.)

COMMUNICATING FEELINGS, AWARENESS & VALUES - SUMMARY

SIMULATION GAME - CENTERPLACE CITY

Field Investigation, SIMULATION GAME, LAND-USE PLANNING - CENTERPLACE CITY from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Analyze cause and effect relationships of land-use planning.
2. Suggest alternative solutions to environmental concerns through a role-playing situation.
3. Evaluate the consequences of decisions before carried out in reality.
4. Interact with each other in the decision-making process.

Materials:

Chart paper for presentations or butcher paper
Magic Markers - assorted colors
Masking Tape

Time:: 1 1/2 - 2 hours.

Notes:

1. It is suggested the whole YCC group participate in this simulation game at one time.
2. "Some Information About Simulation Games" page 99 can be used to set the stage for Centerplace.

Introduction:

The kind of techniques used for simulation games combine elements of simulations, games, and role-playing, where students assume the role of decision-makers in a simulated environment and compete for certain objectives according to specified procedures or rules.

We are going to participate in a hypothetical simulation game, analyze what we've done and give you some ideas to develop your own simulation game based on local environmental issues or concerns.

I. INFERRING, RECORDING AND CLASSIFYING POSSIBLE USES OF LAND.

A. Distribute TASK A, Centerplace City Land Use Problem.

B. The problem to be decided is what are some possible uses for the one-square mile (640 acres) of county farm land, *four miles northeast of the city. It is now* available for the city's use.

Questions and Discussion:

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

1. "WHAT ARE SOME POSSIBLE USES FOR THE UNDEVELOPED LAND?"

   (As people respond, write all comments on board, just as they say them. Don't paraphrase for them unless they are too wordy, in which case, ask: "How shall I write that on the chart?" If they give major categories right away, like Recreation, or Industry, say, "Can you give me an example of that?")

   (Number the items as you go along--they can refer to them by number later.)

   (When you get 15 or 20 items, STOP.)

2. "WHICH OF THESE USES ARE SIMILAR?" (Designate similar uses by letters--A by all of one group, B the next, etc.)

   When most are designated with a letter, or they seem to run out of thoughts, STOP. (It's okay to change the groups if they change their mind along the way in the above.)

3. "WHAT LABEL COULD WE GIVE TO ALL THE ITEMS IN A?"

   (It's okay if they suggest more than one label for Group A; write them both down.)

   "WHAT LABEL COULD WE GIVE TO GROUP B?", ETC.
   e.g., Recreation, Industrial, Utilities, Housing, Commercial.

TASK A: (10 minutes) Work by yourself.

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

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

Background Information Sheet: Centerplace City

The population is 250,000 and rapidly increasing.

The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.

The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.

The power for industrial uses, adequate public transportation, and a skilled labor force are available.

The city is located near forests, which are to the north.

The land to the east is devoted mainly to farming.

The Pipe River is unpolluted and is the source of irrigation water as well as the municipal water supply.

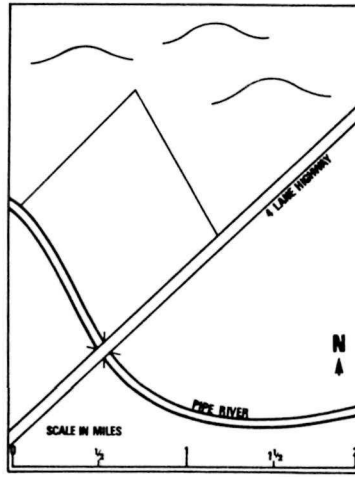
The river is too small for freight transportation, but logs could be floated on it.

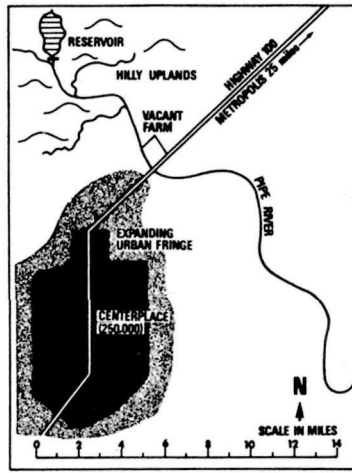
The gravel bed of the river is appropriate raw material for concrete manufacture.

The present sewage treatment plant and garbage disposal area are at maximum capacity. The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.

The County Board of Control is the authority for land zoning, and many citizens' groups are developing to influence zoning decisions.

List possible uses of the land below:





SIMULATION GAME - CENTERPLACE CITY

II. DEVELOPING AND GIVING PRESENTATIONS.

1. Divide the class or group into the number of categories decided on in #3. (shouldn't be more than 6-10 in each group), and assign each group to one of the use categories. Counting off is a way to get a random selection of people in each category.

2. Each group is to represent the special user group assigned.

3. Pass out TASK B--you have 10 minutes to list and analyze possible uses for the vacant land in your assigned category. You may consider those listed on the board plus any other possible uses you can think of for your category.

TASK B: (5-10 minutes) Group #____ Assigned Category of Land Use _____

Your task is to analyze and list possible consequences of different land uses within your assigned land use category.

Use	Advantages to land/people	Disadvantages to land/people

4. At end of 5-10 minutes go on to #1 below.

TELL GROUP

1. Now go on to TASK C-- you have 20 minutes to plan a strategy and develop a 3-minute presentation to be made to the Board of County Commissioners.

   a. This presentation will be a proposal for developing the undeveloped farmland.
   b. You must have a visual display such as a land use map drawing as a part of your presentation.

c. More than one person in your group must help in making the presentation.

TASK C: (20 minutes)

Develop a strategy and presentation for presenting your plan of development to the County Board of Control.

Questions and Discussion:

1. (If possible, have a staff person assigned to each group to make written observations about how the group was able to work together to solve the problem.)

2. 10 minutes into Task C, go around and select one person from each group to meet together as the County Board of Commissioners. Another way to select the County Board is for each group to elect a person to serve on the Board. A staff person takes the Board into another room and tells them they will be responsible to hear the presentations and decide upon the best one. Their job in the next 10 minutes is to:

   a. Develop the criteria they will use in evaluating the proposals, including some kind of matrix they each can use while the presentations are being given. Example below:

Presentation	Criteria	

   b. Elect a chairman of the Board to call on groups.

   c. Decide if the Board wants to ask questions or have rebuttal time after presentations. (2-minutes per presentation has proven adequate.)

3. Twelve minutes after groups start planning TASK C, remind them they have 8 minutes left to have their verbal and visual presentation ready. Let groups have 5 more minutes to finish if needed.

4. Have Board of County Commissioners enter room and sit up front. Appoint a timekeeper to cut all presentations off at 3 minutes (give 2-minute warning). Chairman of Board announces amount of time allowed for presentations, questions, and rebuttal.

5. After #4 is finished, the Board retires for 5-10 minutes to select the best proposal.

6. While Board is meeting, each group is to develop a list of criteria they think should be used in the decision.

7. County Board of Commissioners announces their decision and gives reasons why.

8. County Board of Commissioners reads their criteria aloud.

9. What additional data would you have liked to have had for your groups? List on board, e.g.: topography, vegetation, economy of area, railroad, shopping center, adjacent land, climate, soil survey, historical information, flood plain, wildlife, interest of board of control, money available, educational needs, reg. by State, existing zoning, political climate, population (age, needs, race, jobs). What groups might support each interest, etc.

   (NOTE: This is one of the most important parts of the activity because it emphasizes that we need a variety of information and data before we can intelligently make a land management or environmental decision to best meet the needs of people and their environment. This list has all the elements that need to be considered in studying a local environmental issue or concern.

If you wish to develop group problem solving processes, the following questions can be used.

10. Did new leadership emerge during this session? What factors enabled this to happen? (Call on staff observers if used.)

11. Did your group work as a team? What did your group do to insure participation by all members of group?

12. What happened in the groups? How did you feel as a person? What about the criteria used? How did each observer see the interaction in the groups?

NOTES

NOTES

WILDLIFE - INTRODUCTION

*Notes projects that can be accomplished by YCCer's who would like to work on their own.

WILDLIFE - INTRODUCTION

Possible Projects:

WILDLIFE

- Wildlife Habitat Improvement
- Wildlife Surveys and Study
- Wildlife populations or Control Projects.

FIRE CONTROL

- Fuel Modification Projects

RANGE MANAGEMENT

- Revegetation
- Spring Development
- Pond or Catchment Basin Construction or Maintenance

RECREATION

- Vegetation Control
- Campground Construction and Maintenance or Picnic Facility

VISITOR SERVICES

- Nature Trail

ENGINEERING

- Trail Construction Maintenance, and Improvement (trails sometimes go through a variety of habitats)

Some Ideas:

1. These investigations can be used with a variety of projects Some projects may not be directly tied to wildlife e.g. trail and campground construction can be in a variety of vegetative types, thus variation of habitats.
2. Keeping a record of the data collected can be used in comparing the variety of habitats.
3. Many of these field investigations and activities can be part of spike camp and campout activities, and need not always be part of a project.
4. Materials needed are listed at the beginning of each activity (note the page numbers in the table of contents) Page _____ lists where the materials can be obtained and the approximate cost.

Field Investigation, WILDLIFE-OBSERVING AND MEASURING ANIMAL SIGHTINGS AND EVIDENCES from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Investigate environmental habitats, looking for evidence of animals and characteristics of different habitats.
2. Record and compare numbers of animals and evidences seen in different habitats.

Materials: Pencil

Time: Approximately 1 1/2 hours, including discussions.

Notes:

1. In using the first time, chose an area that has an open area such as a meadow, or field, as well as brush or "woods"; thus three distinct major habitats: e.g. meadow, woods, edge of the two.
2. After the initial discussion, that sets the stage, the crew could divide up and inventory the area they chose: meadow, "wood", or edge, and complete both Task A and B in an hour.

Questions and Discussion (10 minutes):

1. What animals would we expect to find living in this area? (vertebrate, invertebrate?)
2. What are the needs of these animals?
3. What are some names of the place where animals live?
4. Where would you look for animals around here?

TASK A: (30 minutes) Work in small groups.

1. Explore the _____ habitat you chose. Record animals that you see or any evidence of animals. As you inventory the animals or their evidences, figure out some way of recording amounts of evidences & animals seen.
2. Look for and list evidence (signs) of animals (partly consumed foods, excrement, homes, bird nests, etc.)
3. Observe and list additional different habitats for wildlife in area (Grass, cultivated field, hedges, swamp, etc)
4. Observe and list animal foods in area:

OBSERVING & MEASURING ANIMAL SIGHTINGS & EVIDENCES AND FOOD PYRAMID

TASK B: (30 minutes) Work in small groups.

In inventorying _____ habitat, list the numbers of animal organisms and characteristics of the habitat.

Questions and Discussion:

1. What animals did you find in each habitat?
2. Which habitat had the most animals? Why?
3. What were the characteristics of each habitat?
4. What could account for the differences and similarities of the habitats?
5. What factors made one habitat more desirable than another?

Note:

1. Discuss how the inventory ties in the project e.g. spring development, habitat improvement, fuel modification, revegetation.
2. BE SURE TO KEEP THE DATA COLLECTED FOR THE FOLLOWING INVESTIGATIONS.

Field Investigation, WILDLIFE-DETERMINING THE FOOD PYRAMID, NUTRIENT CYCLE, FOOD CHAINS, AND WEBS OF ANIMAL HABITATS OBSERVED ON SITE from "Investigating Your Environment Series" U.S. Forest Service

Objectives:

1. Construct a nutrient cycle, including food pyramid, food chains, and food webs, using the animals and animal evidences seen at the site.
2. Describe cause, and effect relationships of the role of decomposer, herbivores, carnivores, etc. in the nutrient cycle.
3. Relate the above concepts to the environment man has created in the YCC situation (projects, camp living, etc.) and home communities of YCCers.

Materials:

Pencil
Large Paper (chart paper, or field black board
magic markers

Time: About 1 1/2 hours.

Note:
1. Use data collected in Task A and B of OBSERVING AND MEASURING ANIMAL SIGHTINGS AND EVIDENCES.
2. Pages 54-62 of YCC Sourcebook for Environmental Awareness, Man and Natural Resources, maybe helpful background information.

TASK C: (15 minutes)

Build a food pyramid showing the comparative amounts of animal and animal evidences seen.

Questions and Discussion: (15 minutes)
1. What did you find?
2. How many habitats did you investigate?
3. Which animals around here have the largest habitat, the smallest?
4. What was the largest group of animals found?
5. What do you think their main function in the environment might be?

Discuss terminology and definitions of herbivores, carnivores, omnivores, decomposers.

Note: Giant Food Pyramid, page 35 can be used to develop the above further, and relate it to the YCCer's life style, at camp and at home.

Use again, the data collected in Task A and B of OBSERVING AND MEASURING ANIMAL SIGHTINGS AND EVIDENCES pages 29-30 .

TASK D: (10 minutes)

List the animals you have seen or their evidences in the appropriate places in this diagram. Put in arrows. What other words and ways can you think of to illustrate a similar cycle? (Diagram on next page)

TASK D: (Cont'd.)

Light

Plants _____
_____
_____
_____

Nutrients

Herbivores (plant eaters)
_____
_____
_____
_____

Decomposers (bacteria-fungus)
_____
_____
_____
_____

Carnivores (meat eaters)
_____
_____
_____
_____

Death

What would happen if one group were eliminated?
If _____ group was eliminated, I think the following would happen: _____
_____
_____

Question and Discussion: (5 minutes)

1. What is the function of each part of the cycle?
2. What would happen if the decomposers, herbivores, etc. were removed from this ecosystem?
3. How does the cycle relate to a food chain?
4. What is a food chain? (Who eats who?)

TASK E: (10 minutes)

Construct a 5-stage food chain using specific animals seen so far.

Questions and Discussion: (10 minutes)

1. How did your food chain relate to the energy cycle in Task D?
2. What is difference between food chain and food web?
3. Look at your food chain and see if you can construct a web out of it.

Note:

1. Large paper may be usefull in drawing the relationships of the chains and webs of animals and evidences seen on site.
2. Additional activities, pages 42-45 can be used to develop further food webs, chains, etc. for YCC camp living, life styles, in camp and at home. Some of these activities could be individual projects for YCCer's to do on their own and then give a short summary to the group.

Field Investigation, WILDLIFE-DESCRIBING CHANGES IN ANIMAL HABITATS AND COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT THE ENVIRONMENT from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Describe how you feel about man's effect on one animal habitat observed at the site.
2. Describe things that you can do in your everyday life to make the energy cycle more efficient and cause the least amount of harm to the ecosystem where you live and in your consumer habitats.

Materials: Pencil

Time: Approximately 1 hour.

TASK F: (20 minutes)

Describe in writing, 3 influences that you observed that have changed the habitats in this area, and the cause and effect relationships that occurred. Consider:

a. Evidence of change, influence that made it.
b. What area probably looked like before change occurred and animals that lived then.

(Task continued on next page)

TASK F: (Cont'd.)

c. What area looks like now and animals that live here.
d. How the change affected the habitat and animal species that did and do live there.

Questions and Discussion: (10 minutes)

1. Have individuals read their descriptions, and compare different descriptions.
2. What evidences did you find that show man's influence in this area?
3. How does the project you are working on effect this area?

TASK G: (10 minutes)

Describe how you feel about man's effect on one animal habitat you observed.

Questions and Discussin:

1. Discuss results of #G with group.
2. What are some things that man has done to effect the efficiency of the energy cycle?

TASK H: (15 minutes)

Describe in writing 3 things you can do in your everyday life to make the energy cycle more efficient and cause the least amount of harm to the ecosystem.

Select the one you think would be your best contribution. Describe the benefits of this action:

a. Where you live---
b. In your consumer habits---

Discuss results of Task H.

Summary Questions:

1. What did we find out about animals in our field study session today?
2. Why are animals important in the ecosystem?
3. How can we summarize our investigations today?
4. What processes and methods did we use to find these things out?
5. What is the effect of our project on the animals and the ecosystem?

Giant Food Pyramid - Dr. Paul Yambert, Southern Illinois University, Carbondale

Objective: Explore the basic concepts of nutritional or tropic levels by having YCCer's actually stand at various points within the pyramid which correspond to the niches of producers, primary consumers, and secondary consumers.

Setting-up Pyramid:

1. Drive three pegs in the ground so that they form an isosceles triangle approximately 15 feet high and 10 feet across the base.
2. Use four more pegs so that each of the two sides of the triangle is subdivided into three equal parts.
3. Use binders' twine to connect the pegs.
4. Have corpsmen step into the triangle at a level corresponding to the niche they prefer; i.e., meat eater or plant eater.
5. Encourage interchange of ideas regarding questions such as those suggested below.

Questions:

1. Why can the earth support more herbivores than carnivores?
2. Is there a relationship between my attitude toward population levels and the type of diet that I prefer?
3. If man eliminates herbivores and functions as a primary consumer, what ecological results might be expected?
4. Why is a triangular form used instead of a rectangular form?

* WILDLIFE & TERRITORY

*Wildlife Inventory:

Materials:
Pencil
Notepad and YCC Handbook

Activity: Go to several different vegetation types and find as many animal signs as possible. Those that can be collected without harm to the environment should be brought back for further identification. For any sign found, careful notes should be taken describing the sign and its location. Accurate notes give future value to your present observations. The following things should be easily found:

Owl pellets	burrows	antlers
animal runways	browsed trees	crayfish mounds
tracks	kills	scats
nests	bones	

Notes:
1. Do you think that biologists always rely on actual sightings of animals to determine whether they are present in an area?
2. A difficulty in censusing animals is being able to see all of them. Postulate possible censusing methods not based on visual sightings.
3. Can animals be positively identified by the signs they leave?
4. What can be determined from animal scats?
5. Deny or defend the theory: not much can be learned from animals' signs without actually seeing the animal.
6. When an animal sign is found, what question does a biologist immediately ask himself?

*Territory - Dr. Paul Yambert and Dr. Jerry Gaffaney, Southern Illinois University, Carbondale

Activity 1:

Materials:
Binoculars, Paper, Pencil, Clipboard
Tape recorder and recording of male song bird
Stuffed bird of same species as above
Stuffed hawk or hawk's call

Determine the territory of a particular bird by observing a singing male's reaction to (1) a tape recording of a singing male of the same species; (2) a stuffed bird of the same species placed in an obvious place.

When the bird stops reacting aggressively to the stimuli, the edge of its territory has been reached.

Repeat the operation five times, each time from a different direction to get an idea of the size and shape of the territory.' Test the bird's reaction to a stuffed hawk or a hawk call.

Notes:

1. Briefly describe the habitat of the territory and draw a map of it, using map and compass page 104-115.
2. What might happen in regard to the bird's territory if all the birds of that species in the area except one pair were killed?
3. Explain the bird's reaction to the hawk.
4. Give several examples of territorial behavior in man.

*Activity 2:

Materials:

binoculars, paper, pencil, clipboard
Field Guide for Birds

By field observation of no less than two hours observe a pair of nesting birds of any species. Draw a rough map of the area indicating vegetational types, the nest site of birds you are studying, water, nests of other birds, and singing trees, if any. The time allotment for this activity is too short to make a detailed study of any particular species, but it should give you a rough idea of this ecological concept. Indicate size of range.

Notes:

1. What species of birds did you observe?
2. What stage in nesting are your study species in? (i.e., breeding, nest building, incubation, etc.)
3. How many of your study species were in study area? Males? Females?

(Notes continued on next page)

Notes (Continued):

4. What other species of birds were present?
5. Did you note any instances of interspecific strife or territorial defense? Intraspecific strife? Other?
6. What habitat preference did you note?
7. How does territoriality regulate the population of any particular species?

Animal Adaptation Activity - Ernest C. McDonald, U.S. Forest Service, Portland, Oregon

Put the following parts of animals into five piles:

a. 5-6 skulls (including carnivores, omnivores, rodent skulls)
b. 5-6 mammal specimens (weasel, skunk, mole, chipmunk)
c. 5-6 pelts (bobcat, coyote, fox, otter, raccoon)
d. 5-6 bird specimens (woodpecker, grosbeak, flicker, blue-jay, hummingbird)

Part 1: (15 minutes)

Tell participants to list any types of adaptations that they can observe that will help infer: what type of habitat the animal might live in, where in the food chain it might be, where this animal might live in the environment (names of animals not important). Each group will then report their findings to the rest of the group.

Part 2:

Have each group report. At the end of each presentation, ask any questions which might draw more information out of group. For example: if group did not infer that the coyote and fox had developed the sense of smell, sight, and hearing due to long nose, forward eye sockets, and large ears, ask the group, "Based on observable characteristics, which senses do you think have been highly developed in these two animals?" (If groups ask you questions about animal's name, etc., tell them to wait until we try to put some of the different group reports together.)

Part 3:

Put 4 or 5 skulls and the matching pelts or study specimens in the center of all four groups.

Part 3: (Continued)

Ask someone in the group to make a food chain out of those pieces of animals. (Let the group solve the task without help of instructor.) (You might also allow each student to draw a food chain using skulls, skins, etc.)

After they have finished this task, say, "Each group had only part of an animal, so based on observable characteristics you could only make certain inferences. Now we have more information by pooling each group's observations so we know more about the animals."

Let's try something else: (Put the mole, squirrel, chipmunk, weasel, coyote skull, and bobcat skin in a pile.) "A couple of you build a food chain from these parts of animals." After this has been done, "Now we have put more data together to further interpret our data about these animals."

Part 4:

Instructor comments in conclusion:

a. Another activity to emphasize observation and inference skills.
b. Group problem-solving activity.
c. Opportunity to handle parts of animals up close.
d. Set stage for animal habitat studies.
e. Basis to check out observations and inferences by using reference books on animal taxonomy.

Niche

Activity: From the description of a hypothetical animal describe the location where you would expect to find the creature:

1. Body is dark blue with green color above and light below.
2. Body covered with thick oily fur.
3. Head with large eyes which are well equipped to see colors and shapes but not movement.
4. Head with highly sensitive nose.
5. Tail long and flexible.
6. Hind legs long and thin with partially webbed toes.
7. Fore legs short with strong well-articulated paws.
8. Teeth that are chisel-like and continually grow.

Notes:

1. Characteristics such as these occur for definite reasons. For each characteristic indicate for what reason it has been formed.

2. This animal feeds exclusively on a particular species of plant. Describe the species and indicate where it grows.
3. For what niche is this animal adapted?
4. What is niche?
5. Would you expect this animal to be able to easily adapt if its food supply were suddenly removed?
6. Owls are nocturnal predators and are highly adapted to fill this ecological niche. Think of some ways in which an owl could be improved to better fulfill this ecological niche.
7. Look closely at an owl and list the morphological features that make an owl adapted to fill that niche.
8. What other animal does a better job of nocturnal hunting for the same type of prey than an owl?

*Habitats

Acticity I: Choose 15 common birds and make a table showing what habitat types you observe them in during a two-hour observation period.

Birds	Grass	Field	Brushy	Inter. Tree Suc.	Deciduous Climax Com.	Pines
1						
2						
3						
Etc.						

Notes:
1. Which birds seem most specialized? Which least specialized?
2. How will specialization affect the survival of a species?
3. In which direction (toward specialization or unspecialization) do animals evolve?
4. What is ecotone?
5. Do some species seem to be ecotone dwellers? If so, name five.

*Habitat

Activity II: Sit in the woods near the lake for twenty minutes. Record all the birds you see or hear, how many and what kind. Do the same for the area in back of the dining hall, the area below the parking lot, and the pinewoods.

Notes:

1. Draw a map of the total area covered, indicating general vegetation types. Shade in (or indicate in some other way) where each bird was found and how many were present.
2. Were there any birds found in three or all four habitats?
3. If so, was there a similar number found in each, or was there a scarcity or abundance in one particular habitat? Explain.
4. Was there one habitat that seemed barren of bird life? If so, why?
5. Was the barren habitat a native one or an introduced one?
6. What role does biogeography play in this situation? (Hint: look up crossbills and evening grosbeaks in a bird book).

*Habitat (Preference as Regulated by Temperature)

Activity III: Locate a study plot of 100' by 100' and mark off boundaries. Systematically survey the area looking for reptiles and amphibians. Identify the species you find and using a thermometer take the temperature of that area. Depending on the time of day, the temperature will vary. Indicate minimum or maximum temperature. Do both if possible. Record: species, frequency of occurrence and temperature. If species are found under logs, boards, etc., use soil thermometer. Place thermometer as close to site record as possible. Map.

Materials:

Clipboard, paper, pencil, Field Guide for Reptiles and Amphibians, string (100'), and stakes or marker flags.

Notes:

1. Did you notice any temperature preference for any particular species?
2. How did temperature variation correlate with habitat type?
3. Do you think only temperature is a factor in the distribution of reptiles and amphibians?
4. What are some other factors?

* FOOD WEBS & LIMITING FACTORS

Food Webs

*Activity I: Find a very old rotten log. Dismantle a 6" section of the log carefully and separate log parts from living fungi, algae, moss, etc., and any animals present.

a. Weigh each category.
b. Count the number of organisms in each category:
   1. Which are producers?
   2. Which are herbivores?
   3. Which are carnivores?
c. Make food pyramids for numbers and weight of organisms utilizing the rotten log.
d. Diagram a food web for the rotten log.

*Activity II: Select an area or study plot of 50' x 50'. Using your powers of observation record all life that you see or observe signs of. Record grasses, shrubs, trees, and animals as to species if possible. Using your knowledge of biology and library research make a simplified food web of your study plot.

Notes:

1. Which of the life forms you have recorded are producers?
2. Which are first level consumers? Second level consumers?
3. Why are the producers more numerous than first level consumers?
4. Why are first level consumers more numerous than second level consumers?
5. If a component is eliminated from the web, what happens to this natural community?

*Limiting Factors

Activity I: Given the following arbitrary requirements to support a fall population of 50 rabbits:

a. 100 units of winter cover
b. 100 units of spring rainfall
c. 100 units of woodchuck dens
d. 100 units of cats and foxes
e. 100 units of the best rabbit foods

What happens under the following conditions? Estimate the number of rabbits that can be supported throughout the winter; identify the limiting factor; and estimate the effect on next seasons population.

a. Winter cover reduced to 80 units.
b. Along with (a) food is reduced to 60 units.
c. Restore cover to 100 units but leave food at 60 units.
d. Restore food to 100 units, decrease woodchuck holes to 80 units.
e. Restore all requirements to 100 units and then increase predators to 120 units.
f. With (e) reduce winter cover to 80 units, then to 60 units.
g. Restore all requirements to 100 units, then decrease spring rainfall to 80 units.

Notes:

1. Describe the relationship between predation, prey population, size and cover.
2. Why is the statement "limiting factors of a population" nonsense?
3. Go to good rabbit habitat and hypothesize the limiting factors of that area.

*Limiting Factors

Activity II: Choose ten organisms and determine what limiting factors are present in the area. Use a table such as the one on the next page.

There is always one factor which has more influence than any other. Be sure to examine the organism well and identify the most dominant factor in limiting reproduction.

LIMITING FACTORS CHART

Organ-ism	Comm-unity	Niche	Food	Pred-ators	Weather	Disease	Topog-raphy Soil Condit.	Supply	Repro-ductive Cycles	Final Limiting Factor
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

*Environmental Dancing - From National Forests in Florida, YCC Camp - 1973

1. Select and study an animal (fish, bird, etc.) of your choice.
   a. Note its habitat.
   b. Mannerisms (walk, stand, feed, flight, etc.)
   c. Self-preservation (how it captures its food or prey)
   d. Any other observations you think are unusual

2. Decide upon music that captures the ways of the animal chosen.

3. Prepare a dance protraying your animal.
   a. Establish a theme to your dance.

Conclusion:
1. Write your observation down.
2. Tell why you chose to imitate or portray this particular animal.
3. Perform the dance in front of an audience.

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WATER - INTRODUCTION

Field Investigation WATER - DETERMINING WATERSHED BOUNDARIES MEASURING STREAM FLOW AND POND VOLUME from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Identify the watershed boundaries of the stream or pond the project is associated with.
2. Measure stream flow, or pond volume, determine size of community that could live off stream, and discuss ecological, social, and political concerns of using such water.

Materials:

Pencils
U.S. Geodetic Survey-Topography map of watershed of area working in.
Large area map, such as National Forest map, or Highway map with major creeks, etc.
100 ft. tape measure

Time: At least 1 1/2 hours including discussion.

Notes:

1. Use as an introduction or part of any of above projects.
2. Use as carrythrough to home communities; determining watershed and water supply of own community, amount of water consumed, sources of conservation.

DETERMINING WATERSHED BOUNDARIES

TASK A: (15 minutes) Work in small groups.

Find _____ Creek on the map. Find your location. Where does the water in this stream come from? (Trace upstream to its source)
Draw lines around the boundaries of our watershed. (We're in the _____ Creek watershed)

Note: It maybe best to first define a watershed, then determine what establishes the boundaries before drawing lines around the boundaries on the topography map.

DETERMINING WATERSHED BOUNDARIES & STREAMFLOW

Discussion: (20 minutes)

1. What is the importance of a watershed?
2. What are some of the factors that you think can affect the watershed? (Accept all comments. One person could list these on a small chalk board, or a full-sized sheet of paper on a clip board.)

   Focus in on some of the items for discussion: e.g. Why did you say fire, or logging, or grazing. What would account for...What are some things that could account for...?
3. As you traced the boundaries what political boundaries (e.g. city, county, state, federal) does our watershed cross? How could this affect the management of this watershed? The management of the watershed of your community at home?

Note: This could be extended to the home communities of the YCCer's using this same format and discussion. Divide into groups and determine the boundaries of the watershed of their home community. Determine the political boundaries and who manages their watershed. Each group could give 2 min. report to whole group and discuss results.

MEASURING STREAMFLOW (Use if investigation is being made along a stream. MEASURING VOLUME OF POND OR LAKE follows on page 51)

Questions and discussion:

1. What measurements do we need in order to determine the amount of water in this stream or pond? (Discuss how to make different measurements.)
2. Predict how many people could live off the water in this stream or pond _____.

TASK B: (45 minutes)

DETERMINATION OF STREAMFLOW

Instructions for collecting and recording streamflow measurements.

a. Measure and mark a 100 foot distance along a straight section of your stream. If you can't find a 100' section

Task B Continued on next page)

TASK B: (Continued)

of your stream. Use 25' or 50:. Throw a stick (2 or 3 inches long) in the water above the upstream marker. Record the number of seconds it takes to float downstream between the markers. Record below. Now divide the 100' distance by the total seconds it took the stick to float between the stakes.

100 ft. ÷ _____ = _____ ft. per sec.
(Distance) (Total seconds to float 100 ft.) (number of ft. stick floated each second)

b. Find the average width of your section of the stream. Measure the width of the stream at 3 places within the 100 foot area. Divide the total by 3 to get the average width of the stream.

First measurement _____feet.
Second measurement_____feet.
Third measurement_____feet.
TOTAL _____feet ÷ 3 = _____ft.
(average width)

c. Find the average depth of your section of the stream. Measure the depth of the stream in at least 3 places across the stream in a straight line. Divide the total by 3 to get the average depth of the stream.

First measurement_____feet.
Second measurement_____feet.
Third measurement_____feet.
TOTAL _____feet ÷ 3 = _____ft.
(average depth)

d. Find the cubic feet of water per second. Multiply the average width, average depth and the number of feet the stick floated each second.

____ft.	____ft.	_____	=	_____
Average Width	Average Depth	Number of Feet per Second		Cubic feet of water Flowing per second

Note: A cubic foot of water is the water in a container 1 foot wide, 1 foot high and 1 foot long, and contains 7.48 gallons.

(Task B continued on next page)

TASK B: (Continued)

In order to find out how many people could live from the water in this stream, complete the following calculations.

_____	X	7.48	=	_____
Stream flow in Cu. ft. per sec.		Gallons in 1 cu. Ft. of water		Gallons of water Per second

_____	X	60	=	_____
Gallons per sec.		Sec. in minute		Gallons of water Per minute

_____	X	1440	=	_____	÷	*200 Gals	=	_____
Gal. of Water per min.		No. min. in a day		Total gal. water per day		Amount of water one person uses per day		Total no. people who could live from water in this stream

*The average person uses about 200 gallons of water a day for home use. This does not reflect each persons share of water used for industrial, public services, and commercial.

Questions and discussion:

1. How many people in your community could live off the water in this stream or pond?
2. What would happen to this environment if we piped all the water out of the stream or pond to your community?
3. If we were going to use this water, how much water should be left to flow down stream? Why?
4. Does this stream or pond always have this amount of water in it? Why?

Summary:

1. What did we find out about water from our field investigation?
2. How (has or will) your work in the stream or pond area affect(ed) the water?

MEASURING POND OR LAKE VOLUME

Questions and discussion: (Use same as Measuring Streamflow, page 48 and the following.)

3. What visible indicators can you see which would give a clue to pond depth?
4. How could we get length and width measurement without long tapes or chains?

Note: Use Task A - Pacing of Map and Compass, page 104 to establish length of pace.

TASK B-1 (45 minutes)

DETERMINATION OF POND OR LAKE VOLUME

Instructions for collecting and recording volumes of water in ponds and lakes.

A. Find the average width and average length of the pond. Pace length and width of pond to determine averages.
   Average Width _____ Average Length _____
B. Find the average depth. Measure the depth of the pond at several points across the length and width. Or develop a plan for collecting this information based on your observations of the physical features.
   Average Depth _____
C. Formula for computing volume.
   1. _____ ft. X _____ ft. X _____ ft. = _____ Cu. Ft.
      Width Depth Length Volume Cu. Ft.

   2. _____ X 7.48 = _____
      Volume in Cu. Ft. No. Gals. water in pond

   NOTE: A cubic foot of water is the water in a container 1 foot wide, 1 foot high, and 1 foot long and contains 7.48 gallons.

****

ANOTHER FORMULA for computing the volume is with the use of acre feet.

1. _____ ft X _____ ft X _____ ft = _____
   Width Depth Length Volume Cu. Ft.
2. _____ = _____ Acre Feet
   Vol. ÷ 43,560
3. _____ X 395,900 = _____
   Acre Feet No. Gallons

****

MEASURING POND OR LAKE VOLUME

TASK B-1: (Continued)

D. In order to find out how many people could live one day from the water in the pond, complete the following calculations.

_____	÷	*200 gals.	=	_____
Gallons of water in the pond		Amount of water one person uses per day		Total No. people who could live one day from this water

*The average person uses about 200 gallons of water a day for home use. This does not reflect each person's share of water used for industrial, public services, and commercial.

Note: Questions and Discussion of Measuring Streamflow can be used with the pond volume, page 50 .

Field Investigation WATER - OBSERVING THE STREAM OR POND ENVIRONMENT, OBSERVING AQUATIC ANIMALS, IDENTIFYING AND RECORDING AQUATIC ANIMALS, AND PREDICTING WATER CHARACTERISTICS FROM AQUATIC ANIMALS FOUND IN A STREAM OR POND from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: Predict the pH, temperature, and dissolved oxygen count of the pond or stream, using the list of aquatic animals found, and the water interpretation charts provided.

Materials:

Pencils	Pondlife Books (Golden Nature Series)
Jelly Cups	Screens or Plankton Nets
Hand Lenses	Containers such as white dishpans

Time: At least one and a half hours. Use as part of any of the mentioned projects, where applicable.

OBSERVING THE STREAM ENVIRONMENT

Walk to Stream. Do Task C on next page.

TASK C: (10-15 minutes) Work by yourself or in small groups

As your approach the stream, observe and record your observations about the stream environment: (Can be done visually and verbally)

plants _____
animals _____
air _____
rocks _____
water _____

Questions and discussion:

STREAM

1. What did you notice about the stream or pond environment?
2. What plants were growing on the gravel bar?
3. Why aren't large trees growing on the gravel bar?
4. What did you notice about the rocks?
5. Where did you see the bigger rocks? the smaller?

POND

1. What plants were growing on the perimeter? in the pond?
2. Do plants seem to be invading the pond? what plants?
3. What changes can you see taking place?

OBSERVING AQUATIC ANIMALS IN A STREAM OR POND

Questions and discussion:

1. What did you notice about the water in the stream? or pond?
2. What do animals need to live in water?
3. Where would you expect to find animals in the water?
4. What guidelines need to be developed by our group as we collect animals from the stream or pond?
   (Discuss what to do with animals to keep for observation, what to do with rocks that are overturned, what to do with animals when the session is over.)

TASK D: (30-40 minutes) Work by yourself or in groups.

Using collecting equipment (screens, jelly cups, etc.) collect as many types of aquatic animals as possible. Put them in the white dishpans for observation by the group. (Keep the pan in a cool place) Contact the instructor when you're finished, to receive the next task.

OBSERVING THE STREAM OR POND ENVIRONMENT

Note to Instructor: Go from group to group to see how they're doing.

IDENTIFYING AND RECORDING AQUATIC ANIMALS IN A STREAM OR POND

TASK E: (20-30 minutes) Work by yourself or in groups.

Using the Golden Nature Guide Pond Life books and Aquatic Insects in Data Section, page ____ generally identify the specimens you found. List or sketch the animals you found on the chart below.

Description of where found	Type (name or sketch)	No.

Return animals to water as soon as finished.

Questions and discussion:

1. What animals did you find? Compile a group list, (preferably on a chart). Each person should record the group list on his lab sheet.
2. Where did you find most of the specimens?
3. What similarities are there among the specimens?
4. What differences did you find?
5. What classification system could we use to classify the aquatic animals we found?
6. What other life would you expect to find in this stream or pond?
7. Would we be likely to find the same specimens in a different aquatic environment? Why or why not?

PREDICTING WATER CHARACTERISTICS FROM OUR FINDINGS AND OBSERVATIONS IN A POND OR LAKE

Questions and discussion:

1. What were the things we said plants and animals needed in order to live in the water? (Review earlier discussion)

(The following three questions apply to the pond)

2. Based on the abundance (or lack) of aquatic life, what could you say might be happening in this pond?
3. Based on your observations about the color and the clarity of the water, what could you say about the degree of light penetration? Do you think this same degree of penetration would be found next summer, winter, etc.?
4. What effect do you think sunlight might have on the temperature of the pond? Summer? Winter?

TASK F-1: (Pond or Lake)

Based on the aquatic animals you found, and your observations concerning the color and clarity of the water, and the charts below in the Analyzing Data Section, predict the following characteristics of this pond or stream (Omit the questions that don't apply.)

I predict:

the water temperature at the edge of the pond or stream will be _____because _____.
the water temperature in the middle of the pond or stream will be _____because _____.
the air temperature will be _____because _____.
the dissolved O_2 count on the bottom of the pond will be _____. the dissolved O_2 count at the edge will be _____because _____.
light will penetrate the pond _____deep. the productivity of the pond low _____ moderate _____ high _____

Keep these predictions for your own reference.

Questions and discussion:

1. As a group, discuss the range of predictions.
2. What criteria did you use to arrive at your predictions?
3. How can we test out our predictions?

PREDICTING WATER CHARACTERISTICS

Note: Measuring and Recording Water Characteristics to test out the above predictions should be done immediately following the predictions for accuracy. But if time won't permit, the testing could be done the next day, at the same time and same location. Discuss the why's of this with the YCCer's.

Field Investigation WATER - MEASURING AND RECORDING WATER CHARACTERISTICS TO TEST OUT PREDICTIONS IN A STREAM OR POND from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Test out the previous predictions of water quality using the water testing kit.
2. Gather and possibly analyze data for the management unit's water quality monitoring program.

Materials:

Pencils
Hack Water Test Kits (1 per 3-4 YCCer's)
Water thermometers
Secchi Disk

Time: 30-45 minutes

Notes: Use as a part of any of the mentioned projects, including addition of data to water quality monitoring program for the management unit.

MEASURING AND RECORDING WATER CHARACTERISTICS IN A STREAM OR POND

Directions to group: We can test out the predictions we just made, using these kits (Hach O_2 pH Testing Kit or equivalent) (Open up kit. Mention that instructions are inside lid.) There are lots of jobs to be done in testing (clipping, squirting, swirling, dipping, counting, reading, etc.) so make sure everyone in the group has a job to do. Work in groups of 3-4 people each. Each group take a kit. (Send groups to different parts of the stream or pond.)

Note to instructor: Not necessary to demonstrate the use of the kit. Let them do it. (This task could be taped somewhere on the water test kit.)

TASK G: (Stream and Pond) (20-30 minutes) Work in groups of 4-6 people. (This task could be taped somewhere on the water test kit.)

Make sure everyone in your group gets involved in the testing
Using the water test kit, determine the water temperature, air temperature, dissolved oxygen count, and pH of the stream or pond. Record the data below: (also record predictions from Task E to compare)

Location of Water Sample (Edge or Middle of Stream or Pond)	Time Taken	Temperature				pH		Useable Oxygen (ppm)	
		Water		Air					
		My Pred	Act Test	My Pred	Act Test	My Pred	Act Test	My Pred	Act Test

TASK H: (Pond Only)

SECCHI DISK READING

DEPTH AT WHICH DISK DISAPPEARS _____

Lower disk until it can no longer be seen. Measure depth to disk from surface of the water.

PREDICTING WATER CHARACTERISTICS

Questions and discussion for stream and pond:
Have each group report the results of their tests to the entire group, on a chart. Compare results.

1. What might account for any differences in results from each group?
2. How did your test results compare to your predictions?
3. Is it necessary to have sophisticated equipment to determine temperature, oxygen, pH, etc.? (We could use our inferences made from the animals found in the stream or pond)
4. What can we say about the quality of the water in this stream or pond?
5. What else would we need to know to decide whether or not to drink this water?
6. Under what conditions might we expect to get different test results than we did today?

Field Investigation WATER - COMMUNICATING FEELINGS AWARENESS, AND VALUES ABOUT WATER from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: Describe feelings of man's effect on the aquatic environment, and actions that can be taken in everyday life (YCC Camp and community) to help improve the way water is managed.

Materials: Pencil

Time: 15-30 minutes including discussion

Notes:
1. Use as a summary for projects related to water and the previous water field investigations in this Handbook.
2. Use at spike camps or camp outs when setting up, or during camp to become aware of man's effects.
3. Use to tie activities at YCC Camp to actions in community and own life style in town or city.

COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT WATER

Questions and discussion:
1. How important is this stream or pond to us?

TASK I: (10-15 minutes) Work by yourself.

1. Describe in writing how you feel about man's effect on the aquatic environment at this site:

2. Describe at least one action you can take in your everyday life to help improve the way water is managed:

   a. In YCC Camp: _____

   b. In your home: _____

   c. In your community: _____

   d. In your consumer habits: _____

3. Describe the benefits of each action in #2.

Ask group to share their feelings and actions. Discuss:

Summary Questions:

1. What did you find out about water from field investigations?
2. What did you find out about water from our work on this project?
3. Why is water important to the ecosystem?
4. How can we summarize our discussions, investigations, and effect of our work?

DATA SECTION

pH RANGES THAT SUPPORT AQUATIC LIFE

	MOST ACID 1	2	3	4	5	6	NEUTRAL 7	8	9	10	11	12	MOST ALKALINE 13	14
Bacteria	1.0												13.0	
Plants (algae, rooted, etc.)							6.5						12.0	
Carp, suckers, catfish, come insects							6.0				9.0			
Bass, crappie							6.5				8.5			
Snails, clams, mussels							7.0				9.0			
Largest variety of animals (trout, mayfly, stonefly, caddisfly)										6.5	7.5			

DISSOLVED OXYGEN REQUIREMENTS FOR NATIVE FISH AND OTHER AQUATIC LIFE

D.O. in parts per million

Cold-Water Organisms including (salmon and trout) (below 68°)
Spawning ..... 7ppm and above
Growth and well-being ..... 6ppm and above
Warm-Water Organisms (including game fish such as bass, crappie) (above 68°)
Growth and well-being ..... 5ppm and above

TEMPERATURE RANGES (APPROXIMATE) REQUIRED FOR GROWTH OF CERTAIN ORGANISMS:

Temperature		Examples of Life
Greater than 68°. (warm water)		Much plant life, many fish diseases. Most bass, crappie, bluegill, carp, catfish, caddis fly.
Less Than 68° (Cold water)	Upper Range (55-68)	Some plant life, some fish diseases. Salmon, trout, stonefly, mayfly, caddis fly, water beetles, striders
	Lower Range (Less than 55)	Trout, caddis fly, stonefly, mayfly

TEMPERATURE LAYERING IN LAKES OR PONDS

In summer, the surface water absorbs the sun's heat and warms faster than the water below. The warmed water is lighter than the cold water, so it floats on the cool layers. By midsummer there are three distinct layers.

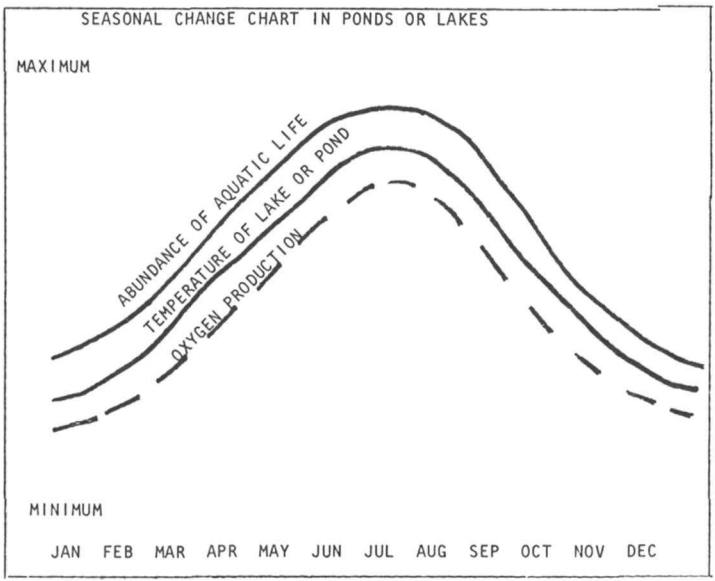
During the summer, mixing or circulation is prevented by these stratified layers of water which act as a barrier.

The upper layer of water cools in autumn until it approaches the temperature of the water in the middle and lower layers. Aided by winds, the surface water sinks causing circulation from top to bottom.

In winter, the cold surface water continues to sink and the water becomes stagnated, photosynthesis slows, and oxygen levels drop.

In the spring, aided by winds, another circulation and mixing occurs, called the "Spring Overturn."

DATA-SEASONAL CHANGE - (PONDS)



Secchi Disk Reading	Inferences
0" - 6"	Most productive waters Minimum oxygen from photosynthesis Maximum algae growth
6" - 12"	↕
12" - 24"	
Greater than 24"	Least productive waters Maximum oxygen from photosynthesis Maximum algae growth

RELATIONSHIPS OF COLOR TO WATER CONDITIONS IN POND OR STREAM		
Color of Lake	Probable Cause	Productivity
Clear	Absence of algae and micro-organisms	Low
Greenish Hue	Blue green algae	Moderate
Yellow to Yellow-Brown	Diatoms (microscopic, one-celled algae)	Moderately High
Red	Micro-crustaceans	High
Dark Brown	Peat, Humus	Most Productive

GEOLOGICAL FACTORS HAVING BEARING ON COLOR IN POND OR STREAM		
In limestone geology-Green	Abundant Calcium	Moderate
In volcanic geology-Yellow-Green Red	Abundant Sulfur Abundant Iron	Low Moderate

PRODUCTIVITY

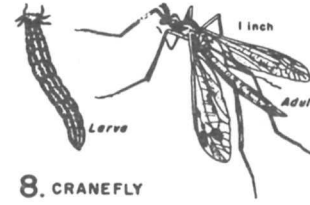
The quantity of life that may be present in any given body of water at any given time is often referred to as the "productivity". A water of low productivity is a poor water, biologically speaking, but is a clean water and desirable as a water supply or for recreational use. A productive water may be either a nuisance to man or it may be highly desirable. Foul odors and weed-choked waterways are usually branded a nuisance; however, bumper crops of bass, catfish or sunfish may be the result and are highly desirable.

LIGHT PENETRATION OF LAKES AND PONDS

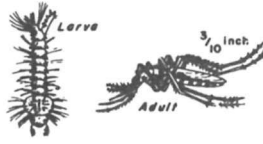
Transparency of lake and pond waters can be roughly determined by the use of a white and black plate (called a secchi disk) which is lowered on a line until it can no longer be seen. It is approximately 8 inches in diameter, painted white and black in alternating quadrants. Very little sunlight penetrates below the point at which the disk disappears.

AQUATIC INSECTS

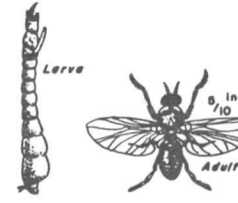
7. WHIRLIGIG BEETLE



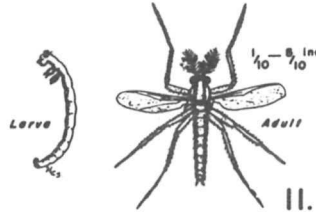
8. CRANEFLY



9. MOSQUITO

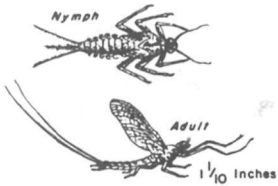


10. BLACK FLY

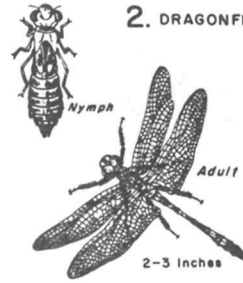


11. MIDGE

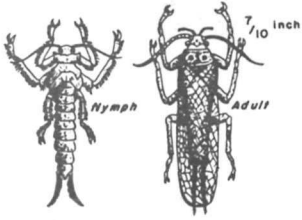
AQUATIC INSECTS



1. MAYFLY

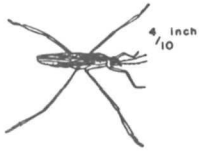


2. DRAGONFLY

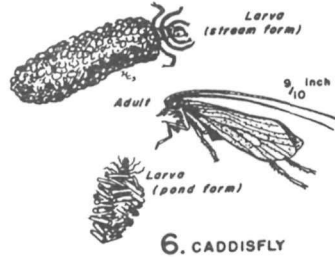


3. STONEFLY

4. WATER BOATMAN



5. WATER STRIDER



6. CADDISFLY

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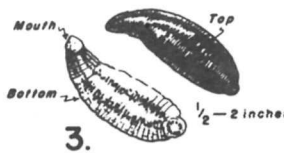
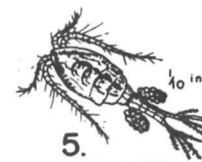
SUB-SURFACE FRESH WATER ORGANISMS

1.
PLANARIA

2.
BRYOZOAN COLONY



3.
LEECH



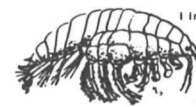
5.
CYCLOPS

DAPHNIA

4.

FAIRY SHRIMP

6.



7. FRESH WATER SHRIMP

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NOTES

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NOTES

NOTES

PLANT COMMUNITIES - INTRODUCTION

Possible Projects:

TIMBER MANAGEMENT

Timber Working and Cruising

Timber Stand Improvement

PLANT COMMUNITIES - INTRODUCTION

Possible Projects: (Continued)

RECREATION DEVELOPMENT AND MAINTENANCE

- Vegetation Control
- Campground Construction

VISITOR SERVICES

- Landscaping, Beautification and Planting
- Inventory of Historical Site

RANGE MANAGEMENT

- Plans
- Revegetation

Environmental Research

Some Ideas:

1. These investigations of plant communities can be included in projects, that are indirectly related to plants e.g., campgrounds and trails can be constructed through different vegetative types.
2. Many range investigations can be used in brush areas as well as grass.

Field Investigation RANGE - OBSERVING THE RANGE ENVIRONMENT, SOIL INVENTORY AND STUDY, PLANT INVENTORY, TRANSECT SURVEY, from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Identify and group key plants on the range site using the plant group chart.
2. Collect soil data, or use previously collected soil data on the range site.
3. Demonstrate the ability to lay out a 100 foot transect, collect and record data pertinent to conducting a transect survey.

Materials:

1. All materials for collecting soil data from Field Investigation: Land-Use Planning, page 5-9 .
2. 100 foot tape/four YCCer's
3. 2 stakes/tape

Time: 1-1 1/2 hours, not including collecting soil data. Soil data takes 2 hours.

Range is an extensive area of level, rolling, broken or mountainous land, usually not adapted to cultivation, covered with native grasses and other forage plants; it is best suited for grazing of domestic and wild animals. Range may be privately or publicly owned, fenced or unfenced, and supporting native or seeded vegetation.

OBSERVING THE RANGE ENVIRONMENT

TASK A: (10 minutes)

As you approach the study area, observe and record your observations.

Plants _____

Soil _____

Rocks _____

Air _____

Animals _____

OBSERVING RANGE ENVIRONMENT

Questions and discussion:

1. What did you notice about the plants found here?
2. What animals or evidences of animals did you see?
3. Describe the things you observed on top of the soil.

Note: If the group hasn't collected soil data for a micromonolith from a site in the immediate area do the following from the Field Investigations: Land Use Planning, page 5-9.

Task B - observing and recording things in the soil - 1/2 hour
Task C - making soil micromonolith - 1 hour
Task D - analyzing soil data - 1/2 hour

Approximate time: 2 hours

TASK B: Plant Inventory

Describe below plants found on your study area. List in the appropriate columns. Use the plant group chart page 78.

Grasses	Grasslike	Forbs	Shrubs

Questions and Discussion:

1. Which plant group had the most plants in it?
2. Where did you find the different plants growing? separ- separately? in groups? mixed?
3. What other observations can you make about the plants growing on the site?
4. We need to know more about the types of plants growing in our areas, where they are growing, how much bare ground, etc. Laying out a 100 foot line and recording the things found every foot along that line is called making a transect survey.

TASK C: (1 hour) Transect Survey

Working in groups of 4, stretch a 100 foot tape along the ground where you want to inventory the types of plants of your area. This is called a 100 foot transect. Record what you find at every foot along the tape or transect on the table below. Record presence of the item below by putting a check (✓) if present. Leave blank if not present.

TRANSECT SURVEY

Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Perennial Grass	Forb	Shrub	Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Perennial Grass	Forb	Shrub	Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Perennial Grass	Forb	Shrub	Sample Every Foot	Rock	Bare Soil	Litter	Annual Grass	Perennial Grass	Forb	Shrub
1								26								51								76							
2								27								52								77							
3								28								53								78							
4								29								54								79							
5								30								55								80							
6								31								56								81							
7								32								57								82							
8								33								58								83							
9								34								59								84							
10								35								60								85							
11								36								61								86							
12								37								62								87							
13								38								63								88							
14								39								64								89							
15								40								65								90							
16								41								66								91							
17								42								67								92							
18								43								68								93							
19								44								69								94							
20								45								70								95							
21								46								71								96							
22								47								72								97							
23								48								73								98							
24								49								74								99							
25								50								75								100							

Definitions:

- litter--plant debris on ground surface
- annual grass--lives for a single year and depends on seeds for reproduction
- perennial grass--lasts from year to year from the same root base
- forb--wildflowers and "weeds"
- shrub--persistent woody plant smaller than a tree

TRANSECT SURVEY

TASK C: (Continued)

Summarize your data below:

Item	from chart Total ( ) ÷	100 =	Percentage of Total
Animal sign			
Rock			
Bare Soil			
Litter			
Annual grass			
Perennial grass			
Forb			
Shrub			
TOTALS			

Which items had the greatest percentage _____, coverage_____, the least _____.

Do certain plants tend to be associated with certain areas, such as bare places, rocks, protective shrubs, etc? Which ones? _____

_____

What reasons can you give for this? _____

_____

Field Investigation, RANGE - INFERRING VALUE OF FOOD PLANTS FOR ANIMALS, OBSERVING AND RECORDING EVIDENCES OF ANIMALS, INVESTIGATING AN ANIMAL BURROW from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Infer food values for appropriate animals on chart and found on site, using the Plant Inventory and Plant Value Chart.
2. Describe the procedure for doing an animal evidence survey using a 42" diameter hoop.
3. Record findings of an abandoned animal burrow.

Materials:

42" hoops
knife
12" rulers or tapes
Screenbox for burrow findings
hand lenses

Time: 1 1/2 - 2 hours.

Notes: Use data from Transect Survey, page 71.

TASK D: (15 minutes)

Using Task B and C, plant chart (pages 78) and the chart below, answer the questions.

PLANT VALUE CHART

Value: X - Poor XX - Fair XXX - Good	Check plants on area	Small Mammals	Medium Mammals (example rabbit)	Hoofed Browsers (Example deer)	Songbird (Example Sparrow	Upland Game Birds (Example Quail)	Cattle	Water-Shed Value
Grasses:								
cheatgrass		X	X	XX	X	XXX	XX	X
crested wheatgrass		X	X	XX	X	X	XXX	XXX
squirreltail		X		X	X	X	XXX	XXX
Forbs:								
bull thistle		X	X		X	X	X	X
lettuce			XX		X	XXX		X
mustard		X			X	X		X
pepper grass		X			X			X
pigweed		X	X		X	X		X
russian thistle		X	X	X	X	X	X	X
Shrubs:								
rabbit brush				X				XX
sagebrush			X	XXX		XX		XX

Based on the plants found on the area and the plant value chart, this area has poor, fair, good (circle one or more) food value for the following animals--_____

_____

_____

_____

_____

OBSERVING AND RECORDING EVIDENCES OF ANIMALS

In order to have a more complete picture of animal evidence and use, have class do Task F.

ANIMAL EVIDENCES

TASK E: Animal Evidence Survey

Observe and record evidences of animals. Make a wire hoop 42" diameter. 5 hoops equals about 1/1,000 of an acre. Take 5 samples by throwing your hoop out in 5 different places and recording the evidences of animals found within each hoop area below. (Multiply total animal signs by 1,000 to get number per acre). Numbers of individual signs (such as rabbit pellets) may be convenient to work with. For small social insects such as ant, record number of anthills, active or inactive.

Type of Sign	Animal That Made it	Number of signs/hoop					5-hoop Total	Multiply by 1,000	Approx. #/acre
		1	2	3	4	5			
Example:									
Web	Spider	2	0	4	3	0	9	1,000	9,000
Tracks	Horse	4	0	0	0	0	4	1,000	4,000

1. What other types of animal evidence do you observe in your plot, but not in the hoop samples?
2. Are certain types of signs most often associated with particular kinds of plants?
3. From your evidence, are small (jackrabbit size or less) or large animals found in greater numbers of your acre? Why?

INVESTIGATING AN ANIMAL BURROW

Digging out and recording your findings of an abandoned animal burrow can give students a better idea of the living and food habitats of certain animals.

TASK F:

Locate an abandoned animal burrow such as kangaroo rat or mouse. Dig out the burrow, record information and sketch the burrow below. (See soil Task D for soil information)

1. Burrow Profile Sketch

Soil Information--color, texture, structure, depth, temperature, pH (repeat as necessary for different layers)

TASK F: (Continued)

2. Animal Stored Foods and Remains of caches

As you find evidences of stored foods or remains of caches, record the following information:

Name of Plant	% of total evidence found	Distance & Direction to plant source

3. Other evidences of animals

List and describe other evidences such as droppings, bones, hair, etc.

4. Write a description of the total burrow and what animals you think built and lived there. Consider types of construction, foods used, different parts of burrow used for different purposes, etc.

Field Investigation RANGE - PREDICTING RANGE CONDITION, COMPILING RANGE CONDITION INFORMATION, JUDGING RANGE UTILIZATION from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Determine the condition of the range.
2. Judge the amount of current year's growth that is removed by grazing.
3. Describe how you feel about man's effect on the rangeland.
4. Describe an action that you can take in your everyday life to help improve the way range is managed: in YCC activities, in community, in consumer habits.

Materials:
Pencil and Information from Task B

Time: 1 1/2 hours

PREDICTING RANGE CONDITION

If we apply the color and meaning of traffic signals to range plants, we are able to group plants in a way that makes reading the range easier. These groups will be: (1) the "green-group" plants; (2) the "yellow-group" plants; and (3) the "red-group" plants.

Plant groups:

THE GREEN GROUP--Plants in this group are the most desirable, the ones that livestock like best. When you see the green-group plants in abundance on the range, you know your grazing program is going well. The green-group plants consist of those which are plentiful in excellent condition on native range and are the first to decrease if range condition is forced down to "good", "fair", and finally to "poor" range. Range in the poorest condition has very few green-group plants on it.

THE YELLOW GROUP--These are also native plants, but they are less attractive to livestock. They escape grazing because they are short or because they are less tasty to livestock. Yellow-group plants are the ones to watch with "caution". They increase in number as grazing becomes heavy. They replace the green-group plants which have become smaller and weaker.

The range manager uses caution when he sees the number of yellow-group plants increasing on his range. He is safe if they are being replaced by green-group plants. That means the range is improving.

If heavy grazing continues, the yellow-group plants begin to weaken and die out. Their place is taken by the red-group plants.

RANGE CONDITION

THE RED GROUP--These plants really do not need any explanation. They simply mean "Danger" to the range, so far as production is concerned. These plants are usually annuals or unpalatable species which have come in from other areas and occupy the range as invaders.

Red-group plants seldom, if ever, are as effective in controlling soil erosion and conserving water resources as the native plants which are more abundant when the range is in good or excellent condition. Soil and water losses cause nature's plant and soil development process to go in reverse. The range becomes less healthy and less productive.

Based on the plants observed on your site and recorded in Task B, answer the questions in Task D.

TASK G:

TECHNICIANS' GUIDE TO RANGE CONDITION CLASSES		
GREEN-GROUP PLANTS	YELLOW-GROUP PLANTS	RED-GROUP PLANTS
DECREASERS: Plants that disappear when range is abused. Percentage figures indicate approximate amount found in climax for the site but count all found on site as climax.	INCREASERS: Plants that increase when range is abused. Percentage figures indicate approximate amount found in climax for the site, so count no more than amount shown toward climax.	INVADERS: Plants that invade when range is abused. These did not occur in climax, so none of these are counted toward climax.
60% Bluebunch wheatgrass 5 Idaho fescue T Giant wild rye	15% Sandberg bluegrass 5 Shortawn needlegrass 2 Prairie junegrass 10% max. in aggregate 1 Biscuitroot 2 Yarrow 2 Phlox 1 Buckwheat 2 Milkvetch 1 Silver luping 1 Hawksbeard 1 Arrowleaf balsamroot 1 Carrot	Cheatgrass Squirreltail Six-weeks fescue Rattlesnake brome Soft brome Kitchenweed Salsify Gumweed Tarweek
5% Bitterbrush	T Rose	Gray rabbitbrush Big sagebrush Matchweed Juniper

Condition: Excellent Good-to-Fair Poor

Task G Continued on next page.

TASK G: (Continued)

My area is in the green, yellow, red group plant condition (circle one) because of the following plants found there:

_____

_____

_____

_____

_____

What would this mean to the condition of the range? Excellent, Good, Fair, Poor?

Questions and Discussion:

1. What color group did you put your range in? Why?
2. What condition does your site appear to be?

COMPILING THE RANGE CONDITION INFORMATION

In order to put all information together do Task H.

TASK H: Range Condition Information

Location: _____

Observers: _____

Date: _____

Condition Indicators (From Task J)

Condition class based on vegetation:

Excellent _____ Good _____ Fair _____ Poor _____

(Task H Continued on next page)

RANGE CONDITION INFORMATION

Task H: (Continued)

(From Task B and C)

Plants	% Present	% in green group
Grasses and grass-like plants -- bluebunch wheat-grass		
Idaho fescue		
Sandberg blue-grass		
Cheatgrass		
Other		
Forbs		
Yarrow		
Phlox		
Balsam		
Carrot		
Other		

Shrubs and trees _____%

Total usable plants _____%
100

Slope _____% Exposure N E W S

Soil Erosion: _____ some _____ none _____

Litter: many _____ some _____ none _____

Final trend rating: Improving _____
Stable _____ Going Down _____

(Task H Continued on next page)

TASK H: (Continued)

Trend Indicators

	Rating		
	Healthy	average	sick
Vigor of key (green group) forage plants			
	Abundant	some	none
Seedlings and young key (green group) forage plants			
Seedlings and young key increasers (yellow group) and invaders (red group)			

JUDGING RANGE UTILIZATION

Utilization is the amount of the current year's growth that is removed by grazing livestock. Utilization is in no way similar to range condition. Close utilization may occur on a range in excellent condition or on a range in poor condition. Heavy utilization over a period of years causes regression and so lowers range condition. Utilization is difficult to determine with great accuracy.

Livestock do not utilize all species of range plants to the same degree. They eat more of the better tasting plants. Each grass forb, and shrub can be grazed a certain amount without harmful effects to its productiveness. Proper use of a range area can be placed into three categories.

RANGE UTILIZATION

TASK I:

For some grasses, the proper use is considered to be removal of about one-half of the growth made in the present year. While proper use must be considered in the light of the above-named factors, "taking half and leaving half" can sometimes be used as a "rule of thumb".

To determine the amount of stubble left when one-half the growth is removed, follow these steps:

1. Wrap an average-sized, mature, ungrazed plant with string to hold it together when cut.
2. Cut off plant at crown (ground level).
3. Adjust the wrapped plant across a knife blade to make it balance. Measure with ruler from bottom of plant to point of balance. This gives height, indicating 50 percent use for that particular species of grass. Desirable approximate stubble heights for some native grasses are:

Grass	Inches stubble left
Bluebunch wheatgrass	4-8
Idaho fescue	2-4
Big bluegrass	3-5

4. Repeat this for 10 average plants of the species to get an average 50 percent utilization height.
5. Select 100 plants randomly, measure their heights (whether grazed or not), and average the measurements. If the average grazed height is more than the standard shown above, the range is not fully used. If it is less, the range is overused.

Grass	Inches Stubble Left	Utilization rate heavy-moderate-light

Definition of Utilization Rate

Light Use: Only choice plants are grazed. Only a small amount of the less desirable forage plants are consumed, thereby wasting much valuable forage. Ungrazed plants and heavy litter build-up may result in serious fire hazard. Also, excessive amounts of unused plant material may contribute to poor utilization of forage by the grazing livestock because usually they will not eat last year's old stems and leaves.

Moderate Use: The most economically important forage plants have been fully grazed on the most popular parts of the management unit. Factors to be considered when determining proper use are: (1) species of grasses being grazed; (2) season of year the grass is grazed; (3) amount of growth made in the present year; and (4) amount of soil moisture this year.

Heavy Use: The range has a "clipped" or mowed appearance. Over half of the green and the yellow forage plants are grazed. This leads eventually to a decrease in forage production and range condition. Heavy use is directly harmful to palnts and soil and indirectly to animals. Grasses are grazed short. As a result, the leaf "food factories" are inefficient, roots are decreased in size and length, and plants die during the dry summer season or a severe drought. Heavy use results in unprofitable returns and reduces the value of the land for sale. The land may be ruined for many years by speeded-up water and wind erosion and by trampling. Grasses that are grazed short require three to five weeks of top growth before root growth begins.

Questions and discussion:

1. What do you think the range utilization is on your site? Why?
2. A considerable amount of stubble and plant litter will remain on a properly utilized range. Plant material which is left on the range after being properly used is not wasted. In what ways does this stubble and litter help improve range conditions?

UTILIZATION RATE

Some ideas:

increases intake and storage of water
protects soil from wind and water erosion
adds humus to the soil
assures plants necessary "food factory" for food storage
increases plant vigor
provided some protection for seedling establishment
prevents evaporation of water from the soil
helps hold snow in place

COMMUNICATING FEELINGS, AWARENESS, AND VALUES ABOUT RANGELAND

Questions and Discussion:
How important is this land to us?

TASK J: (10-15 minutes) Work by yourself.

1. Describe in writing how you feel about man's effect on the range environment at this site and how important this land is to us.

2. Describe at least one action you can take in your everyday life to help improve the way rangeland is managed:

   a. In YCC activities:

   b. In your home:

   c. In your community:

   d. In your consumer habits:

3. Describe the benefits of each action in #2

Summary Questions:

1. What do you think has happened on the land to account for the way it looks?
2. If left completely alone for the next 100 years, what might happen?
3. What would you do to manage this land for livestock? Wildlife? Both?
4. What other information do you think you would need in order to make a better plan?
5. What did you find out about rangeland from our investigations today?
6. Why is range important to the eco-system?
7. How can we summarize our discussions and investigations?
8. What methods and processes did we use in our investigations today?

Field Investigation RANGE - MAPPING THE RANGE from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: Utilize map and compass skills to draw a map or picture story of the site.

Materials: All materials from Map and Compass, etc. page 104-115.

Time: 2 hours to 1 day depending on area mapped.

Notes:

1. Any area involved in environmental analysis could be mapped.
2. Map could be used as permanent record for management unit.

MAPPING THE RANGE

It is important to draw a picture of the story you have read from your range site. Using the skills learned in the Lesson Plan for Measuring the Environment (compass, pacing, instant mapping, cardboard box plane table) construct a map of your area.

Field Investigation FOREST - OBSERVING AND INFERRING WITH CROSS SECTIONS, COLLECTING AND INTERPRETING DATA ABOUT TREE GROWTH RATE AND COMPETITION from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. List at least 3 observations about the cross sections provided, and infer possible reasons for each observation.
2. Describe ways to set up an investigation to find out more about the above observations and inferences.
3. Set up an investigation (collect and record data) to find out reasons for growth rate differences in a given stand of trees.

Materials:

Cross sections of trees or tree stumps
Increment Borer
Hand lenses
Tape measure
Chart paper or field blackboard

Time: 2 hours

OBSERVING AND INFERRING WITH CROSS SECTION (as an example of using observable evidences to infer past events 'n a forest)

Distribute cross sections and task cards. Cross sections of trees can be 4-6" in diameter or larger, and should show a variety of growth patterns and influences (fire, insects, etc.).

TASK K: (5-10 minutes)

Work with 1 or 2 other people.
Write down some things you notice about the cross sections.

CROSS SECTION

Questions and discussion:

1. What are some things you noticed about the cross sections? (Accept all comments from group. List on board or chart)
2. Focus on 2 or 3 items for discussion: Why did you say...(your cross section had evidence of fire)? (examples) What could account for...(the rings being irregular)? What are some things that could account for...?

TASK L: (10 minutes) Work with 1 or 2 other people.

Select 3 observations about the cross sections from the group list. List possible reasons for these observations. List ways you could set up an investigation to find out more about your observations and inferences.

Observation (What You Noticed)	Inferences (Possible Reasons For This)	Investigations (How We could Find Out)
1.		
2.		
3.		
4.		
5.		

Questions and discussion:

1. Ask for reports on the above chart from several groups. (as time allows)
2. Which of these investigations could be carried out in this environment?
3. Keep your lists of observations and inferences for reference at the end of this session.
4. What could tree rings from this forest tell us about past and present events in this environment?

COLLECTING AND INTERPRETING DATA ABOUT TREE GROWTH RATE AND COMPETITION

Task M (with tree cores) requires preparation by the instructor before the session.

A tree stand should be selected for study, 4-5 trees tagged (trees should be selected that show effects of environmental conditions--injury, overcrowding, lack of sunlight, etc.). The tagged trees should be bored with an increment borer, by the instructor ahead of time. (Cores should be numbered corresponding to numbers on the tree. Putting tree cores in see-through plastic straws and then taping to a cardboard will help keep them longer if liquid resin is not available. In any event, keep the cores and labeled trees to use again. This eliminates the necessity of reboring the trees.)

Note: Maybe you can find and use stumps of trees that grow under a variety of competition influences instead of tree cores.

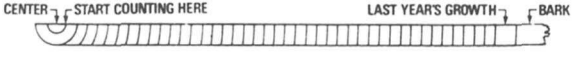
TASK M: (Part 1) (15-20 minutes) Work in groups of 4-5 people.

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

Tree #	# Dark Rings From Center to Bark (Approx. Age)	# Dark Rings in Last Inch	Remarks about the pattern of the rings

When your group has the above information, one person from the group should record this information on the blackboard or easel board. Chart to be like Task M, part 2.

DRAWING OF TYPICAL TREE CORE



(Task M continued on next page)

TASK M: (Part 2) (10-15 minutes) Work in small groups.

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

Tree #	# Dark Rings From Center to Bark (Approx. Age)	Diameter of Tree Trunk (Cir. + 3)	# Dark Rings in Last Inch	Remarks About the Ring Pattern
1				
2				
3				
4				
5				
6				

Questions and discussion:

1. What similarities do you notice in the data about the trees?
2. What differences do you notice in the data about the trees?

TASK M: (Part 3) (20-30 minutes) Work in small groups.

Set up an investigation to find out reasons for some of the differences in the data.

1. Select 2-3 trees from the list that show differences in growth rates.
2. Which trees did you select? (Indicate by number)____
   _____
3. Why did you select these trees? _____
   _____

(Task M, Part 3 continued on next page)

TASK M: (Part 3 Continued)

Go with your group to the site of the trees you selected for investigation and do (Task M, part 4),

(Part 4) (30-40 minutes) Work in small groups.

Collecting and Recording Data

Record your observations:

Interpreting Data

Record possible interpretations of the above data:

Summarizing your Investigation

Write your group's summary below, including:

what you were trying to find out

what data you collected about it

what interpretations you made

what other data would you collect about your investigation?

Questions and discussion:

1. Ask for 2-3 minute summaries from several groups. (as time allows)
2. What problems did you encounter in this task?
3. What other data could you collect about your investigation?
4. What does the information tell us about the past events of this environment?
5. How would you summarize the major factors affecting the growth of this forest?

STUDY OF A ROTTEN LOG

Field Investigation STUDY OF A ROTTEN LOG from Charline McDonald, Portland, Oregon

Objective:

1. Identify and list at least 3 evidences of change and infer the cause-and-effect relationships of those changes.
2. Construct a diagram of a cycle in a rotten log.

Materials:

Pencil
Rotten log or stump

Time: 30 minutes - 1 hour

Notes:

1. Refer to the nutrient cycle in Field Investigation, Wildlife, page 30.
2. This activity can be carried out in almost any community.

A STUDY OF A ROTTEN LOG

Would you believe...that plants can live on and in wood...that a rotten log is really alive?

All plants are born, grow to maturity, and die. They live in communities with many other plants in always changing environments. With your class, go to a rotten log (or stump) and find out all you can about it. Take care not to tear it apart so others can enjoy it, and so the living things in and on the log will still survive.

Questions and Discussion:

1. How do you think this log (stump) got here?
2. Where is the stump (or log) of the tree?
3. What kind of a tree do you think this was when living? (Look at bark and wood structure and compare to surrounding trees.)
4. How do you think the tree died? (Notice stumps of other trees in area.)
5. How old was it when it died? (Count rings on stump if possible.)

TASK N:

Record evidence of plants living on or in log: (lichen, mosses, fungi, broadleaf and conifer plants)

Name	Location (top, side, inside, under)	Seed Source	Affect on Log	Benefit to Community

What do plants need to grow? _____

How do plants get these things from the log? _____

Why do we call rotten logs "nurse logs"? _____

TASK O:

Record evidence of animal life in or on this log.

Name	Location (top, side, inside, under)	Source	Affect on Log	Benefit to Forest Community

What do animals need to live? _____

How do animals get these things from the log? _____

What will the log eventually become? _____

(Task O continued on next page)

TASK O: (Continued)

What things help to decay the log? _____
How does this log: (a) help soil hold water? _____
_____
(b) reduce soil erosion? _____
_____
(c) help new plants to grow in the plant community? _____
_____

Questions and Discussion:

1. What cycles are taking place in the rotten log or stump?
2. In the space below, construct a diagram of one of the cycles taking place in the rotten log or stump:

TASK P: (15 minutes) Work in groups.

Construct a diagram of one of the cycles taking place in the rotten log or stump.

Field Investigation ANY PLANT COMMUNITY - COMMUNICATING FEELINGS OF AWARENESS AND VALUES THROUGH SKETCHING AND WRITING from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Communicate by sketching using natural materials.
2. Communicate by writing.

Materials:

Sketch paper (manila construction paper works great)
Natural material for sketching
Pencil

Time: 30-45 minutes

Notes: Can be used in any plant community.

COMMUNICATING FEELINGS OF AWARENESS THROUGH SKETCHING

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

TASK Q: (give these directions verbally)

(Use sketching paper) Construct a sketch using charcoal from a campfire or fireplace. Other sketching materials will be given to you as you work.

Note: Subject of sketch depends on the environment.
It can be anything that is significant about the area.. rotten log, stump, or snag, an old homestead, fence, or barn, a city building, transmission tower, or freeway
While people are sketching, go around and give them:
rotten wood - brown dandelion leaves - green
dandelion flowers - yellow, other goodies in season
If you're not in the woods, IMPROVISE!

COMMUNICATING FEELINGS OF AWARENESS AND VALUES THROUGH WRITING

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

TASK R: (give these directions verbally)

Use your pencil or pen.
Find a place on your sketch (across the bottom, or down the side) to write some things.

Write 2 descriptive words about the _____.
(words that tell what it looks like)

(TASK R continued next page)

FEELINGS OF AWARENESS - WRITING

TASK R: (Continued)

Write 3 action words about the _____.
(words that describe processes or changes taking place, or things happening to it)

Write a short phrase (4-5 words) that tells how the _____ affects the rest of the environment. (a phrase to describe its value or usefulness) (or a phrase describing any thought you have about the _____.)

Write 1 word that sums up everything about the _____.
(a word that suggests a comparison, an analogy, or synonym)

Optional:
Now, if you wish, go back and give a title to what you have written.

Congratulations. You have just written a poem about the _____ or whatever you wrote about.

Note:
1. Pace the above directions to the needs of the group.
2. People shouldn't feel pressure while writing this--be casual. (It's good to mention that they may not wish to write something for every direction that is given.)
3. Review the directions now and then for people still thinking.
4. Have people read their writings if they wish.

Questions to thing about: In what ways does this description show your feelings and awareness of the environment?

Summary Questions:
1. What did we find out about the environment in our session today? (List on chart, if time)
2. Why are these things important to the way we manage the environment?
3. How can we summarize our discussion? (or investigation) (What are some big ideas that would sum up what we've just said?)
4. What methods and processes did we use in our investigation?

Field Investigation ANY PLANT COMMUNITY, INTERPRETING PAST EVENTS from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Inventory evidence of change man-made or natural in the last 25, 50 years, etc.
2. Predict the change in next 25, 50 years, etc.

Materials: Pencil

Time: 45 minutes - 1 hour

Note: This can be used in any plant community and the interpretation made each time.

INTERPRETING PAST EVENTS

TASK S: (30-40 minutes)

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

Evidence of Changes In the Environment	What Might Have Caused Them?	Effect on the Environment

Describe the way the area around you looked:

25 years ago, 50 years ago, etc.

Describe how you think the area around you might look:

25 years from now

INTREPRETING PAST EVENTS

Questions and Discussion:

1. What evidence of change did you find?
2. What might have caused this?
3. What was the effect of _____(this change) on the environment. Allow time for interchange of ideas between group members. The same changes may have been noticed, and there may be many interpretations of their causes and their effects.
4. What do you think this area looked like 25 years ago?
5. How do you think this area will look 25 years from now?

TASK T: (10 minutes)

Describe in writing how you feel about the changes in this environment.

NOTES

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NOTES

NOTES

SIMULATION GAMES - INTRODUCTION

Projects - See "some ideas" below.

Some Ideas:

1. A simulation game could be developed on an issue that might relate to YCC projects.
2. An issue that relates to the home communities or areas of the YCCer's could also be developed into a simulation game.
3. Develop a simulation game of the management unit or an area of that unit, where the YCCer's are working on projects and gathering data for environmental analysis.
4. Center place City Simulation Game, page 19 of Land Use Planning is a good example of a simulation game.

SIMULATION GAMES

Objectives:

1. Identify and describe three component parts of simulation games.
2. Construct your own simulation game based on a current environmental issue, or situation in your YCC program.
   --Name and describe at least 10 important types of data needed before making a land management decision. Describe how this information affects your life, community, and management of the environment.
   --Identify cause and effect relationships that exist in environmental management.
   --Describe alternative solutions to solving specific problems.
3. Outline a plan of action to affect a solutions or partial solution through the social and political decision-making process about the environmental or situation you used in developing your own simulation.

Materials:

Easel
Newsprint, butcher or chart paper (for each group to make visual display)
Magic Markers (4 colors each group)
Masking Tape

Time: 2 hours + depending on complexity.

SOME INFORMATION ABOUT SIMULATION GAMES (used as needed to set stage for simulation games)

Simulations are operating models of real life situations. They may be about physical or social situations.

Most simulations used involve role-playing--the roles being acted out to correspond to the functioning of some real process or system.

Most simulations used involve gaming (a game is defined as something enjoyable--however serious it might be--involving competition for specified objectives and observing rules).

Some simulation games are based on environmental issues. What are some benefits of using simulation games as an instructional technique for investigating environmental problems?

They're fun.
They get people involved.
Logistically easy way to prepare people for an environmental experience.
People analyze cause-and-effect relationships of environmental issues.
People are put in role-playing situations where they have to suggest alternative solutions to environmental concerns.

People are forced to evaluate the consequence of decisions in discussion or on paper before these decisions are carried out in reality. People interact with each other in the decision-making process.

So...simulation games not only:
develop understandings about problems in the environment and develop awareness and concern about those problems.
but they
help people develop skills they need for citizen action and involvement in environmental management.

ANALYZING CHARACTERISTICS OF SIMULATION

1. "One group of people working with simulation games have identified at least three basic characteristics of most simulation games." (Use Centerplace City page ____ as a reference.)
   --Ask: "What was the clearly defined problem in the Land Use Alternative Simulation?"
   --Ask: "What factors influenced the decision in the Land Use Alternatives Simulation?"
   --Ask: or Tell: "We assigned groups to fit each role in the Land Use Alternative Simulation, but we all helped develop that role by the items we listed on the chart."
2. The following list is more in-depth analysis of the elements of simulation:
   a. One important characteristic of a simulation is a clearly defined problem, including the choices available to the decision makers.

ANALYZING CHARACTERISTICS OF SIMULATION

(1) How would you formulate the problem or issue you were asked to decide upon?
(2) Did the developer of this simulation simplify the choices?
(3) If so, how did he do it?

b. A second major characteristic of educational simulations is the factors having an influence on the decision. (Several objective and subjective factors to be considered in making a decision need to be clearly identified. These factors indicate the data that are relevant to each of the possible choices)
   (1) What factors were selected as influences on the decision?
   (2) Which of these factors would you classify as objective?
   (3) Which of these factors would you classify as subjective?

c. A third characteristic of educational simulations is the way in which information about the problem and the variables is presented. (In many simulations, individual roles or group roles are used to perform this function. A role can be planned to incorporate a limited number of factors that influence the choice to be made.)

DEVELOPING A SIMULATION GAME

Using an issue as a situation, develop the format of a simulation game, considering the following items:

1. Identify the problem or issue to be decided upon.
2. Identify the choices available to the decision-makers.
3. Identify the factors having an influence on the decision
4. Identify individual or group roles.
5. Identify the factors (for or against) assigned to each role.
6. Establish conditions for the players (i.e., resources, voting procedures, bargaining money, etc.)
7. Develop specific goals or objectives for the players.
8. Include limits or rules for what is permissable behavior (time factor, trading, no. points, money allocations, etc.)

SIMULATION GAME - LAND-FILL, developed by Don Rawlings, Environmental Education Instructor, Fairbanks YCC - Bureau of Land Management, Alaska

Problem: During the 1972 camp the Bureau of Land Management developed a garbage land fill area at Mile 66 Steese Highway to be used by the camp and surrounding summer residents. Is this the best use for the land chosen in light of the disposal need for the camp? What are the objections (if any) for the site? What are the benefits of the site? Was the site managed in the best environmental way possible?

Objectives:

1. To identify an environmental problem directly related to the enrollees and their camp.
2. To view the solution to that problem and determine if it is the best solution given the alternatives.
3. To allow the enrollees to gather information in regard to the problem from various sources and interests, communicate this information to other members of the camp and community leaders, and determine by democratic procedures the best solution to the problem.

Background Information:

1. Possible factions for and against the solution to the problem:
   a. State of Alaska Environmental Protection AGency.
   b. Bureau of Land Management
   c. Owners of "Miracle Mile" and "Sourdough Camp"
2. Group who will make ultimate decision on the solution:
   a. Bureau of Land Management
3. Sources for data collection:
   a. Jerry Hok-State of Alaska Environmental Protection Agency, Northern Regional Office, Alaska State Building, Barnette Avenue, Fairbanks.
   b. Jim Murray-Land Use Manager, Department of the Interior, Bureau of Land Management, Fairbanks Office, Fairbanks
   c. Karl Carlson-Owner of "Sourdough Camp" and Music Mart, Noble Street, Fairbanks, Alaska
   d. Seasonal Owner-"Miracle Mile" - 66 Mile Steese Highway

SIMULATION GAME - LAND-FILL

Activity Design:

1. The camp is composed of three work groups each having an adult group leader. Each group will choose by straws what group they will represent i.e.:
   a. State Environmental Agency
   b. Private Land and Resort Owners
   c. Bureau of Land Management
2. Each group will visit the disposal site with the resource person listed in the "Sources for data collection" section of this paper. The group will obtain the resource persons views on the problem and the enrollees must adopt the position of the resource person even if his own personal convictions are the opposite. After the visitation the enrollees will invite the resource person to lunch at the camp in an informal atmosphere to obtain a glimpse of the "personal" side of the person they will be representing. An important rule to follow is that the groups will not interchange their information gathered from the resource people.
3. At an evening session a "land Use Planning Board" will be selected. One enrollee from each group will be on the "Board". The two senior enrollees (the enrollees who will be second year members to the camp) will also be on the board. Three community leaders not directly connected with the interests of the resource people interviewed will be invited for dinner and become involved as "Board Members". These people will be selected from the Borealis Kiwanis Club.
4. Each group will present the findings to the "Board". Two enrollees from each group will make the presentation. The enrollees will use butcher paper to describe the site the way their resource person views it with the possible land uses for the site. Any alternatives for the garbage disposal will also be noted. Each presentation will be limited to 10 minutes.
5. After each group makes their 10 minute presentation the "Board" will be allowed a three minute question period for each group.
6. The "Board" will retire and be allowed 15 minutes to reach their decision as to the future of the site. The Chairman of the "Board" will present their findings to the groups. An appropriate reward (a sack of garbage?) will be given to the winning group.

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MAPPING AND COMPASS - INTRODUCTION

Possible Projects:

WATER AND SOIL CONSERVATION
- Watershed Protection
- Water Quality Projects
- Fence Construction
- Irrigation Ditch Construction

TIMBER MANAGEMENT
- Tree and Seedling Planting
- Survival Checks
- Timber Stand Improvement
- Pest Control

RECREATION DEVELOPMENT AND MAINTENANCE
- Campground and Picnic Facility Construction
- Observation and Vista Sites Construction

VISITOR SERVICES
- Record of Historical Dwellings or Sites
- Archaeological Research

RANGE MANAGEMENT
- Pland
- Revegetation
- Spring Development

WILDLIFE
- Wildlife Habitat Construction or Improvement
- Population Surveys

ENGINEERING AND CONSTRUCTION
- Surveys
- Trail Construction

FIRE CONTROL
- Fire Trail Construction
- Size of Burned Areas

MAPPING AND COMPASS - INTRODUCTION

Some Ideas:

1. Mapping could be used to record projects that cover a large area.
2. Any new construction will usually have a site plan, if not the YCCer's could map it. e.g. nature trail.
3. After construction a map could be drawn of where things are: e.g. (1) a campground-tables, water line, etc. (2) nature trail-trail, stops, etc.
4. For pest control, range and timber site improvement draw a map after the work is completed. This could become a part of the management unit's records.
5. Map the area that YCCers have collected data for environmental analysis. e.g. lake
6. Use the map and compass activities to set-up an orienting course.

Field Investigation, PACING AND COMPASS from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: As a result of these activities you should be able to:

1. Compute the length of your average step, given a pre-measured 100' distance.
2. Using the length of your step, determine the dimensions of any given room, building or paceable dimension.
3. Identify three major parts of the compass.
4. Demonstrate your knowledge of the compass by accurately setting a given bearing and following that bearing for a short distance.
5. Demonstrate your knowledge of the compass by sighting on an object and setting the correct bearing and following that bearing for a short distance.
6. Complete a traverse consisting of three bearings and three distances within a 5' error.

Materials:

Map and Compass
21 stakes-numbered consecutively
100' tape
Plastic flagging
Silva compass (one per student)
Pencils with erasers
Scotch tape
Boy Scout compass game with answer sheet
Step-feet conversion sheet
Length of step sheet

Time: 1 hour.

A. PACING AND THE COMPASS

A compass is used for determining directions on the earth's surface. By using a compass and knowing the length of his step, a person can determine distances and directions of many objects.

* PACING & COMPASS

1. Pacing - A pace is the distance covered on the ground when a person takes two steps. OR, it's the distance covered when a person walking picks up his left foot until he puts it down again.

*TASK A: Determine the length of your step by using page 115. Check your accuracy by pacing to two objects indicated by the instructor.

2. The Compass

   Parts

   a. Baseplate - Clear plastic, has direction of travel arrow and two different scales.

   b. Azimuth ring (compass housing) - A dial with degrees marked on the top. Has the four cardinal directions marked, plus orienting arrow inside the bottom of housing (moves when ring moves).

   c. Magnetic needle - Pivots freely within the azimuth ring. Red end always points to magnetic north.

*TASK B: Orient the compass by rotating your body until the magnetic needle and arrow in azimuth ring (compass housing) are superimposed.

3. Declination - Declination is the difference between true north (north pole) and magnetic north (around Hudson's Bay). Maps are always made to true north.

   The difference between the two in western Washington is about 22°.

The compass can be adjusted to true north by subtracting 22° from 360° (338°) and setting this on the direction of travel arrow. DO NOT MOVE AZIMUTH RING ONCE THIS IS SET. On the base plate in line with the 360° mark, put down a small piece of scotch tape. Mark a line on the scotch tape in line with the 360°.

*TASK C: Orient yourself to magnetic north.

From now on set and read all bearings on this pencil line (etched azimuth line). Always follow direction of travel arrow.

4. Field Application

*TASK D: Orient yourself to true north.

*TASK E: Orient yourself to the four cardinal directions using true bearings.

*TASK F: Sight on given objects and orient your compass.

*TASK G: Select a partner and check skills learned.

1. Each give partner compass bearing to set.
2. Each give partner object to sight on.

Check for these things:

1. Compass held level. 2. Red needle and arrow in compass housing superimposed. 3. Set reading on pencil line. 4. Follow direction of travel arrow. 5. Sight on object to hike to. 6. Read bearing on pencil line.

*PACING, COMPASS, & INSTANT MAPPER

*TASK H: Complete the Boy Scout Compass Course.
Complete 2 out of 3 of the courses within a 5' error.

Field Investigation, INSTANT MAPPER from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: Using the constructed instant mapper and determining the proper scale to use, you can lay out and map a six-sided nature trail.

Materials:
Instant Mapper
Cardboard 8 1/2" X 11"
Clear contact paper 8 1/2" X 11"
Paper fasteners
Azimuth sheets 8" X 10 1/2"
Masking tape
Scissors
Ice pick
Acetate discs (7" diameter)
(Herculene drafting film matte finish one side, .003 thickness)

Time: 1 - 1 1/2 hours.

INSTANT MAPPER

1. Instant Mapper Construction

   a. Using cardboard as base, sandwich an azimuth sheet with clear plastic adhesive on cardboard. Seal edges with masking tape.

   b. Center acetate disc over azimuth on sheet. Pierce acetate and other cardboard with icepick or knife.

   c. Draw short radius on outside edge of acetate circle using compass baseplate as straightedge.

   d. Attach a short piece of masking tape to the outside of the acetate disc to use as a handle.

*TASK I: Construct an instant mapper.

2. Use of an Instant Mapper - The instant mapper is just like a compass with the added advantage that you can write on it, thereby showing where you are going or where you've been.

*TASK J: Using the instant mapper, plot the two given three sided traverses:

1. 346° for 102'
   129° for 78'
   215° for 63'

2. 38° for 125'
   237° for 90'
   183° for 50'

a. By using the penciled line on the azimuth ring as a direction arrow, set your first azimuth reading. Pick any spot on the acetate ring, make a small dot and number it "1".

b. Now draw a straight line away from you toward the N-marker at the top of the instant mapper and parallel with the edge of the paper. Use the graph paper as a guide for drawing the line and also for deciding a scale.

c. At the end of your distance, put a dot and number this "2".

d. Now use the pencil line on the acetate ring to set another azimuth reading. Draw a straight line as before, beginning at point 2.

   Remember, always toward the N-marker and parallel with the edge of the paper. Number the end of the second line "3".

e. Repeat until all azimuth bearings and distances have been used.

3. Field Application

*TASK K: Plot one of your own traverses from the Boy Scout compass game (hint: use one that may have been difficult for you to do.)

*TASK L: On the attached sheet with known traverses, prepare a nature trail map to include these things:

1. Observation of each station.

2. Derive questions about the observations which will involve students.

3. Include on map:

Scale	Date	North arrow
Legend	Title	Map makers names

Field Investigation, PLANE TABLE from "Investigating Your Environment Series" - U.S. Forest Service

Objectives:

1. Compare the advantages of using a plane table or an instant mapper.
2. In which cases do you feel you would use each.
3. Construct a plane table.
4. Using a constructed plane table, you can accurately map a predetermined area and include at least three reference points.
5. Using a constructed plane table, you can measure a non-paceable distance.

Materials:

Plane Table
Cardboard cartons (3 per group)
Unlined paper 8 1/2" X 11"
Wooden 12" ruler (one per group)
Map tacks (4 per group)
Masking tape
Pencil with eraser
Plastic flagging - 2 colors
Heavy twine
Stakes (2 per group)

Time: 1-1 1/2 hours

PLANE TABLE MAPPING

A plane table is a device for mapping an area without using a compass or much measuring. Only one measurement is needed--that of a base line. All objects to be mapped are then located by triangulation or the intersection of two lines.

1. Plane Table Construction

   a. Place cardboard boxes one on top of the other. Thread boxes together with stout cord.

   b. Tape paper to the top of the box.

   c. The 12" ruler will be used as a sighting guide. Drive map tacks into the ruler making sure tacks are equidistant from one edge of the ruler.

*TASK M: Construct a plane table

2. Use of a Plane Table

   a. A minimum of two people and a maximum of five should be used.

b. Pick the two objects to be included in the map that are the farthest apart. Set up your boxes near one of these objects to be included in the map.

c. Drive a red flagged stake at the base of the boxes. Then pace the longest distance that must be mapped and drive in the other stake. On the way back to the plane table, pace the distance. THIS IS THE ONLY MEASUREMENT NEEDED.

d. Orient your map in the direction of this line. Draw this line on your map -- remember to make a scale. For instance --

1" = 100'	Then on a paper 8" wide, a space 800' wide can be mapped.
1" = 40'	On a paper 8" wide, a space 320' wide can be mapped.
1" = 20'	Space 160' wide can be mapped.

e. Label the location of your box "point 1". Label the far one "point 2".

f. Lay the ruler so that one edge is along the points on the paper. Now turn the box so the tacks on the ruler sight from the point 1 to point 2. This orients the plane table correctly with the base line. The map must continue to be aligned with this base line during all future mapping.

g. Keeping one end of the ruler at point 1, rotate the far end as you sight along the tacks until you see the object to be mapped (tree, building corner, telephone pole, etc.). Draw a line along the ruler extending to the edge of the paper. Label this line what you sighted.

h. Repeat until you have sighted all the objects you want from point 1. You will, on your map, have a number of lines radiating from point 1.

i. Now move to point 2 on the ground and orient your map back to point 1. Make sure map, box and you are at point 2 looking at point 1.

j. Take sights on objects sighted at point 1. Where they intersect, you can draw the object (tree, corner of building, etc.).

*TASK N: Using the plane table method, map an area using any combination of roads, trees, etc. Include at least five objects.

3. Check - As a check of your accuracy, you may want to pace to a couple of objects and check your map scale to see if they are the same. This is not necessary for the exercise.

4. Field Application

*TASK O: Determine a given unpaceable but known distance.

When you are finished add the following to complete your map:

Scale	North arrow	Legend
Date	Title	Map makers

*DETERMINING LENGTH OF STEP

DETERMINING LENGTH OF STEP

Method I

Walk (in a normal step) the distance marked off 2 times. Record number of steps you took each time.

Number of feet in distance walked _____.
Number of steps 1st time _____.
Number os steps 2nd time _____.
Total Steps _____.

Now divide total number of steps into total distance.

Total Distance walked	(Total Steps taken)	=	Number of ft. in ea. step

Note: Round the length of your step to nearest whole foot or half foot. (Example: 2.0', 2.5', 2.0', 3.5', etc.)

Method II

# of steps in 200 ft.	Length of stride
1-73	3 feet
74-87	2 1/2 feet
88-113	2 feet
114-& over	1 1/2 feet

The length of my step is: _____

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Some Ideas:

1. This is an important investigation. It helps relate the summer activities back to the area where the YCCer's and most people spend a major part of their lives.
2. Any size community or part of a community can be used. The camp could spend a whole day planning, investigating and reporting their survey (pages 117-119)
3. Another part of a day could be spent identifying and investigating one environmental problem found in that community (pages 119-121). Then comparing the "natural" with the man-made (page 121-123).

Field Investigation URBAN - IDENTIFYING COMPONENT PARTS OF AN URBAN ENVIRONMENT, CONSTRUCTING AND DEVELOPING AN URBAN INVESTIGATION, COLLECTING AND RECORDING SURVEY INFORMATION, REPORTING SURVEY INFORMATION, IDENTIFYING AND CONSTRUCTING AN INVESTIGATION OF ONE ENVIRONMENTAL PROBLEM, COMMUNICATING FEELINGS, AWARENESS, AND VALUES, COMPARISON OF TWO DIFFERENT ENVIRONMENTS from "Investigating Your Environment Series" - U.S. Forest Service

Objectives: These investigations can help the YCCer's become aware of:

1. The inter-relationships that are continually occurring in the man-made or urban environments.
2. The inter-relationships between the "natural" and man-made environments.
3. The similarities of the inter-relationships occurring within each environment - "Natural" and man-made.

Materials:

Maps of "urban" area
Chart paper or large news print
Magic markers (several colors)

IDENTIFYING COMPONENT PARTS OF AN URBAN ENVIRONMENT

Distribute a copy of a map, of the urban area you want to investigate, to each person. (Have it large enough to make notes on when in the field). Working in small groups, list as many component parts as you can think of (Task A).

TASK A: (20 minutes) Work in groups of 5-6.

List some things that might affect the quality of the environment in this community. (Use map and past knowledge of area.) Group and label items into categories.

Questions and discussion:

1. What categories did you come up with? (List on board just as groups report (e.g. human factors, land use, transportation, community facilities, etc.). If group listed individual items in the community, you may have

to group and label into large categories (housing, commercial, utilities, transportation, land, etc.)

2. What criteria would you use in selecting an area of this community to study?
3. Have each group spend 10-15 minutes drawing boundary lines around an area they decide upon to investigate (use map passed out at first).
4. What could you do in this community to collect first-hand information about each of the categories your group decided upon?

CONSTRUCTING AND DEVELOPING AN INVESTIGATION

TASK B: (60 minutes)
Develop a plan of action to investigate your part of the urban environment. Consider such things as how to divide responsibility for collecting information, what information to collect, will you stay together or split up, most efficient ways to collect and record information, develop tools to record information.

NOTE: Information in Task B should show relationships between items from the inventory, cause and effect relationships, conflicts and complements, information should show specifics or details which help explain or clarify a relationship. Methods may include: questioning, opinion polls from residents, user counts of facilities, traffic counts, maps in greater detail, etc.

Each group give brief outline of procedure for their planned investigation of the _____community.

COLLECTING, RECORDING, AND REPORTING SURVEY INFORMATION

TASK C: (3-4 hours) Field investigation.

Each group spend 3-4 hours to do a visual survey and investigation of that portion of the community decided upon, using the methods of collecting, recording and interpreting data each group developed.

TASK D: (5 minutes, each group) After return from field investigation.

Plan a 5 minute report that tells and shows the methods you used and the information collected in Task C. The report must use the following criteria:

a. Use more than one person as spokesman.
b. Use visual displays.
c. Include a variety of information media and methods of getting it.
d. 5-minute time limit.
e. Consider--what you did, how you did it, what it meant.

Questions and discussion:

1. What are some component parts of the environment that you just investigated? (List on board) e.g. roads, homes, businesses, river, recreation.
2. In what ways are the component parts interrelated? e.g. transportation to business, buildings to public utilities, transportation to land forms, strip city development to transportation, etc.
3. How does each part of the community investigated relate to the other areas? To the total community?
4. What would happen if one whole segment of the community were eliminated? One category?
5. What examples are there in your area that: illustrate the past, typify the present, and indicate the future?
6. What are your recommendations for meeting future needs in this area?
7. If you were the city planning commission, what guidelines would you develop for consideration of future developments in this area? a. _____ b. _____ c. _____
8. Identify three factors that affect the quality of your area.

IDENTIFYING AND CONSTRUCTING AN INVESTIGATION OF ONE ENVIRONMENTAL ENVIRONMENTAL PROBLEM

Let's take an example of one interrelationship and investigate one segment of it. (Note: Pick one example such as transportation--traffic congestion and have group list items under the following three columns, one column at a time - on next page.)

IDENTIFYING & CONSTRUCTING AN INVESTIGATION

What we want to find out about the interrelationship	How to collect the information	How to record information
e.g.: (How many cars Where they go Where come from)	(survey-visual questionnaire questionnaire)	(graph description map location)

TASK E: (30 minutes) Work in original small groups.

Select one interrelationship or problem that you identified and develop an in-depth investigation to find out more about it. Consider: What you need to find out about it, actual samples of how to collect and record information, cause-effect relationship, alternative solutions to the problem, where to collect additional data, what social and political decision-making processes are available.

NOTE: If this whole lesson is done over an extended period of time, then each group should be allowed to carry out their investigation.

Questions and discussion:

1. Have each group make a report covering points in Task E.
2. Now that we know more about the _____community, do Task F.

TASK F: (15 minutes) Small groups.

List what you can say about your study area in relation to its: (Consider past, present, future)

Functions	Problems	Needs

Questions:

1. What are the basic functions of your study area? Whole community?
2. What are some of the most obvious problems?
3. What are some of the needs of the study area?
4. Identify three factors that affect the quality of the environment in your area?
5. What impact does this survey area have on the management of your community?
6. What additional information would you like to have had before making a decision?

COMMUNICATING FEELINGS, AWARENESS, AND VALUES

TASK G:

Describe what you would do to solve or improve the problem you identified in Task E --
as a member of a community action group--
as a part of the political decision-making process in your community.

Questions and discussion:

1. Discuss individual comments.
2. What type of community action can we take to identify and motivate people to collect, interpret data, arrive at alternative solutions and take intelligent action to decide on the best solution consistent with the needs of the environment and society.

Summary Questions:

1. What did we find out about the environment in our study?
2. How can we summarize our discussion and investigations?
3. What processes and methods did we use in our investigation today?

COMPARISON OF TWO DIFFERENT ENVIRONMENTS

After an in-depth study of two different environments, have small groups do Task A. (Note: An in-depth study of a Forest Environment might include the investigation of Land Use Planning,

COMPARISON OF TWO DIFFERENT ENVIRONMENTS

Measuring Some Water Quality Criteria, Investigating a Forest Environment, and Environmental Habitats. An in-depth study of an Urban Environment might include the investigations of Land Use Planning, Water Quality Criteria, and Urban Investigation.)

TASK H: (15 minutes) Work in small groups.

Analyze the data collected for each environment and do the following:

1. List four things you found out about _____ environment.
   1. 3.
   2. 4.
2. List four things you found out about _____ environment
   1. 3.
   2. 4.

Questions and Discussion:

1. List and group items on board.
2. *Which things are similar in each environment?*

TASK I: (15 minutes) Small groups.

List at least four basic functions of each environment.

_____ environment	_____ environment
1.	1.
2.	2.
3.	3.
4.	4.

TASK J: (15 minutes) Small groups.

List three factors that affect the quality of the two environments.

_____ environment	_____ environment
1.	1.
2.	2.
3.	3.

Questions and Discussion:

1. Discuss the results of Task B-C with the group and list on board next to Task A results.
2. In what way (if any) will the environments have an affect on each other?
3. Based on your own investigations, what are some general factors that apply to both environments?
4. Summarize the unique contribution of each area to the society.

TASK K: (15 minutes) Small groups.

List at least four of the most obvious problems of the two environments.

_____ environment	_____ environment
1.	1.
2.	2.
3.	3.
4.	4.

TASK L: (20 minutes)

List at least four guidelines that you could use in planning for future land uses in both environments.

_____ environment	_____ environment
1.	1.
2.	2.
3.	3.
4.	4.

TASK M:

What can we say about environments?

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Individual Projects:

Some of the YCCer's may want to forge ahead on their own. Sections of the field investigations that can be carried out easily on an individual basis are starred (*). Many other field investigations can be developed further by the YCCer's once they have experienced the processes. Some of the field investigations can be replicated by individuals in different environments and then make comparisons with their previous investigations. The following sections will be developed and expanded in the fall revision of the Handbook:

Environmental Analysis of projects or areas.
Environmental Issues will include some topics such as: energy crisis, pollution, pesticides, etc.
Natural Diasters could include: weather, fire, earthquakes, floods, etc.
Camp Living - Recreation
Composting Page 125
Eco-meal Page 127
The YCC-Sourcebook page 63-67 has some ideas which could be considered in the YCC camp living and recreation programs this summer.

To strengthen these sections, ideas, activities, and investigations used in the summer YCC activities are needed. Contributions can be sent to:

Governor H. Aker, Director
Office of Manpower Training & Youth Activities
U.S. Department of the Interior
Washington, D.C. 20240

Leon H. Anderson, Director
Division of Manpower and Youth Conservation Program
Forest Service, USDA
South Building, 12th & Independence Ave. S.W.
Washington, D.C. 20250

or

through the Regional Offices of the Forest Service

Composting - Dr. Paul Yambert, So. Illinois University, Carbondale

Outdoor Composting

Why to consider composting. Composting is an activity which is economically, ecologically, and educationally sound. It lends itself particularly well to incorporation within camp programs, resident or non-resident, since it is reasonably rapid, productive, and easy. In terms of environmental education, composting affords a teaching and learning opportunity dealing with such related concepts as reutilization, conservation of mass and energy, biodegradability, conversion of resistances into resources, and means of increasing production without commensurate increases in either pollution or consumption of fossil fuels.

Where to make compost. Composting, if properly done, does not create offensive odors or attract vermin. Consequently, it is more important to think in terms of a convenient location than a remote or hidden one. Convenience should be considered both in terms of getting garbage (and other organic matter) to the area and hauling finished compost from it.

In most camps these criteria would suggest seeking an area which is near the dining hall and also near a road or trail.

Chemistry and Physics of Composting. The rate at which the composting process takes place is influenced by numerous factors. The most important physical factors are moisture, temperature, and surface area of the materials being composted. In most instances, summer composting out of doors will insure enough warmth and enough moisture, except during the early stages, so that no special measures need to be taken to insure them. The size of the pieces of material being composted will not affect the quality of the final product (humus) but will markedly influence the rate at which the process takes place. Consequently, you may wish to slice or tear large pieces such as orange or banana peels into small pieces, thus increasing their surface area.

Composting may be done either in the presence of air (aerobically) or in the absence of air (anaerobically). The anaerobic method is slower and requires more complicated equipment to exclude the air. On the other hand, it requires no turning or grinding, and it preserves valuable gases and liquids which are, to some extent, lost by volitization and leaching in the aerobic composting process.

Camp composting considerations. Considering the length of the camp program; the number of participants; the time, equipment, and skills required; the educational values and impact; and the variations of raw materials which will be available for composting, a modified aerobic composting system is the best all-round choice for most camp situations. Because of the manner in which new organic matter is introduced into the system and the rapidity with which the chemical breakdown to humus occurs, the suggested technique is referred to as the Kwikie Kompokie.

The Kwikie Kompokie

1. Required equipment: pitchfork, shovel, sprinkling can, 30-35 feet of (snow) fencing, containers for hauling ingredients, small flag or other marker.

2. Required ingredients: well-rotted manure (horse or cow), top soil, ground limestone, well-rotted other organic material (such as sawdust and leaves).

3. Procedure prior to arrival of enrollees:

The secret to making a Kompokie is to mass together enough well-rotted ingredients to make a circular mound approximately ten feet in diameter and rising about five to six feet in the air at the center. The ingredients which comprise this mass may vary somewhat, but it is recommended that half be well-rotted manure (horse or cow) and the rest can be a mixture of almost any organic matter such as well-rotted sawdust, leaves, and weeds. To these ingredients add a goodly sprinkling of top soil and ground limestone. Mix everything together well with pitchfork or shovel and add enough water from sprinkling can so that the mound is just damp (not wet) throughout. Letting the mound sit for a week will facilitate bacterial activity. Erect the fencing around the mound and inform enrollees as to the proper procedure for use.

4. Procedure involving enrollees:

To dispose of a day's garbage, a few of the enrollees may take a shovel and dig a hole in the mound and poke the garbage in. A few twists with the shovel will mix the garbage with the interior and then the hole should be completely filled in so that no raw garbage is exposed to outside of mound. A small flag or other marker can mark this spot and then the next day the same procedure is followed except that the next hole is dug approximately 1/8 of the way around the mound in a clockwise direction. In this way it will take eight days to arrive back at the original hole and the garbage should have disintegrated by then.

5. Procedure at the end of the camp program:

At the end of the camping season, the finished compost should be utilized in some worthwhile manner, rather than being left in the mound where excessive leaching of the nutrients will occur. If there is no special area where landscaping, erosion control plantings, etc., are currently needed, a legitimate use of the humus material is to simply spread it evenly over an area of field or forest floor. You may wish to do this in a clearly delineated area so that, during the following camping seasons, a comparison between treated and untreated sites can be made.

EcoMeal-- from Denny Doak, Mount Rainier National Park YCC Camp

The enrollees should be responsible for planning, buying and preparing a meal; half of which is the most ecological that they can find and half of which is the most unecological they can dream up.

There are many ways the ecomeal-unecomeal can be used in environmental awareness. 1. The most obvious perhaps is resource consumption through the packaging processes. 2. The ecomeal is an excellent way to stress the food chain concept.

EcoMeal - An example for 40

4 packages of brown rice cooked for 25 min. Add vegetables such as onions, green pepper, carrots and cook 10 more minutes. Add vegetables such as celery, broccoli, zuccini, and sliced cabbage and cook 5 more minutes. Add delicate vegetables, e.g. sprouts, grated cheese (a few lbs.) and nuts, and salt to taste. Cook until cheese is melted.

If a salad is made, yogurt and cottage cheese can be used as a dressing. Fresh fruit can be desert. And good old water can be the drink. This meal should cost 50 to 60 cents per person.

UnecoMeal

Anything will do for the unecological meal. It is best not to plan ahead too much, but to look through the store for eyesores. Things like individually wrapped cheeses and lunch meat on white bread, small bags of potato chips, pudding in individual aluminum cans, individual cans of punch or pop, small candies.. are yuckey foods. Splurge!

This meal can be served on aluminum or paper plates, styrafome cups; plastic forks.

At the end of the meal compare food value, waste, cost, and enjoyability.

MATERIALS

The following are materials that will be mentioned for use in the preceding field investigations. The quantity suggested are for a camp of 30 YCCer's. Some addresses are mentioned only as an aid in purchase. Most other items can be purchased locally. Prices are approximate and for information.

Quantity	Equipment Item	Source	Approximate Unit Cost
30	Silva Pathfinder Compasses	Don Ratliffe 4130 Country Club Way Corvallis, Oregon	1.97 ea.
4	Soil Thermometer 0° - 220°F Item #61048-113	VWR Scientific 3745 Bayshore Blvd. Brisbane, CA	9.25 ea.
10	Soil pH Kits	Same as above	2.25 ea.
1,000	1-1/2 oz. jelly cups with lids	Wholesale Fountain Co. 936 S.E. Clay St. Portland, Oregon	10.00/M
4	Water Test Kit Model CH-10 O_2 CO_2 pH	Hach Chemical Co. P.O. Box 907 713 South Duff Ames, Iowa 50010	28.50 ea.
1	Increment Borer	Kueffel & Esser 2701 - 2nd Avenue Seattle, Wash. 98121	35.00
4	Water thermometer Item #61068-085	VWR Scientific 3745 Dayshore Blvd. Brisbane, CA	3.00 ea.
30	Hand lens 8X w/neck cords #555000	Oregon Museum of Science & Industry 4015 S.W. Canyon Road Portland, Oregon	1.40 ea.

Quantity	Equipment Item	Source	Approximate Unit Cost
10	6' Cloth Sewing Tapes (Diameter tape)	Dime Store	.10 ea.
1	Green bamboo garden stakes (measure height)	Garden Store	.50 bdle.
4	100' tape	Hardware Store	5.00 ea.
	Hatchet, Shovel		

Pencils
Cards for Micromonolith
25", 50", 100" stick - jar of colored H_2O
Magic Markers, different colors
Masking Tape
Chart Paper or Butcher Paper
Binder's Twine
Topography maps of area
Management Unit Map e.g. National Park or Forest
Highway map
City map
Pondlife Books - Golden Nature Series
Secchi Disc

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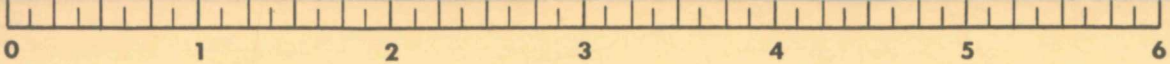
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