DOCUMENT RESUME

ED 157 835 SO 011 047

TITLE	Indian River County Environmental Education Instructional Guide. Social Studies, Seventh Grade.
INSTITUTION	Florida State Dept. of Education, Tallahassee.
PUB DATE	75
NOTE	40p.; For related documents, see SO 011 046-049; Not available in hard copy from EDRS due to poor reproducibility of original document
AVAILABLE FROM	Office of Environmental Education, Department of Education, Knott Building, Tallahassee, Florida 32304 (on loan)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Biological Sciences; *Concept Teaching; *Conservation (Environment); Ecology; Environment; *Environmental Education; Grade 7; Individual Power; Land Use; *Learning Activities; Natural Resources; Pollution; *Population Trends; Secondary Education; *Social Studies; Teaching Guides; Technology

ABSTRACT

The guide is one in a series for teachers, students, and community members to help develop and teach environmental concepts, responsibility, and problem solving. It presents concepts and activities related to environmental education for seventh grade social studies classes. Background information is based on the Indian River County environment of Florida. The introduction describes the county's forest areas, its endangered wildlife, and areas of local environmental concern. The main portion of the guide contains 21 activities based on three major concepts. These concepts emphasize the relationship between population size and demands upon natural resources, and each individual's role as an agent for change in the environment. Activities involve role play; research into local and foreign use of domestic and imported products; creation of maps showing location of the world's mineral resources; and debate over the advantages and disadvantages of technological constructions such as interstate highways, condominiums, and skyscrapers. (AV)

INDIAN RIVER COUNTY

ENVIRONMENTAL EDUCATION INSTRUCTIONAL GUIDE

Florida State Department of Education

SOCIAL STUDIES
SEVENTH GRADE

1975

INDIAN RIVER COUNTY
ENVIRONMENTAL EDUCATION PROGRAM

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ENVIRONMENTAL EDUCATION

INSTRUCTIONAL GUIDE

This publication serves as the teaching nucleus for Environmental Education activities in Middle School, The development of this program is a joint effort of teachers and staff of the Indian River County Schools.

This Guide was developed by: Mr, Patrick Trimble
Indian River Middle School

The Introduction was written by Mr. Phil Parisi

We wish to thank the Title III, E.S.E.A. Lee County Environmental Education Project as the conceptual framework for the organization of the guides comes from their work. Also, some of the activities in this guide are from their Interdisciplinary Concepts and Activities Guides.

This publication is one in a series developed by the Environmental Education Program for Indian River County Schools. This series is designed to be used by teachers, students and community members to help them to utilize community resources in developing and teaching environmental concepts, responsibility and in seeking ways to solve environmental problems. All materials are in pilot form and may be revised.

The work presented or reported herein was performed pursuant to a grant from the State Department of Education, Office of Environmental Education.

INTRODUCTION

ABOUT THE ENVIRONMENT

The environment is perhaps the most important complex of systems for man. Yet it is perhaps the most abused. It is becoming trite to say this, but none the less true--unless we change our ways, we will die.

Throughout history men have been able to change. They have done this with much pain and toil. The responsibility of this change has in the past rested on certain individual leaders. Today these leaders must reach a wide population and they must reach them at a time when habits are forming. The teachers of today are the leaders who must take up the cause of educating future populations about the delicate balance we live in.

It seems strange that many peoples of the world (American Indians, for one) need no formal or separate environmental education program for their young. Indian children grow up with the notion that the universe and the environment is one living thing. It must be respected and revered as something sacred. But somehow, modern man has lost vision of that simple concept, if indeed he ever possessed it. Environmental education is a way we can regain a respect that seems to come natural to some populations. It is a way we can be fit for survival and for prevailing on Earth.

In the year 2006, the earth will have doubled the present number of people. Within just 35 years another 3 billion people will be competing for the world's already taxed resources. This is not a problem of future generations, but an existing one that you and your students are already witnessing. As the population soars, crime rates, suicides, and psychological disorders increase at disproportional rates. More species are constantly being added to the endangered species lists, and more wilderness areas are continually being infringed upon by development. Our soil is lost at an alarming rate as it, with a heavy load of fertilizer, is being washed by rains into our precious water supplies.

INTRODUCTION

ABOUT ENVIRONMENTAL EDUCATION

There doesn't appear to be any part of this planet that is not affected by man's hand. Distributing the world's limited resources and minimizing the damage to our planet is going to be difficult. The dilemma is not going to be the problem of any one discipline area; rather, it will touch each of us, in all phases of our lives. Maintaining a quality of life will necessitate new directions in our literature, economics, psychology, food choices, engineering, and even in our daily lives.

Attaining environmental quality is everyone's responsibility, and, as such, it is going to require knowledge on the part of all our citizens. If our students are to make intelligent choices they will feel comfortable living with, they are going to need you to provide them with much of the background information they will need. Our environmental problems demand our attention in every phase of the curriculum so that our students can be prepared to solve this enigma.

Three themes or stages in educating a student to prepare him for environmental choices are: 1) awareness of the environment; 2) knowledge of the environment; and 3) action in the sense of effecting a solution.

Predicting the experiences and knowledge students will need in the future is always a difficult task. However, a few basics are readily identifiable. It seems logical to assume that a person cannot make intelligent decisions if he is not aware of the problem, or even the existence of the area that has the problem. Next, it is important that he understands or has some basic knowledge about the stressed area and the stress factors involved. Finally, once an individual is aware of a problem and has knowledge about it, he must have the tools to effect a solution for the problem.

We have targeted awarenesses at the primary and lower intermediate grades, knowledge at the upper intermediate and middle school level, and action begins in

the upper middle school running through the high school and into the adult community.

The K-9 curriculum guides compiled by various environmentalists are organized around several basic conceptual schemes that were felt to be necessary for a working knowledge of the environment. In addition, these schemes and the activities suggested for their illustration, have been applied as much as possible to the unique problems of Indian River County.

A FINAL NOTE

Education about the environment can too easily become merely an academic exercise, rather than vital interaction. Many researchers have shown that the discovery method of learning allows a more thorough and lasting attainment of the desired principles and it heightens motivation at the same time. The discovery method provides an individual experience and allows success for a wide ability range of students, because it is discovering new knowledge at each student's own particular level.

Your role in the environmental education campaign is important for the student's ability to perceive the subtleties of nature will often depend on your guidance. Most often this is not done through telling the student the names of everything he sees. We need to guide him to the relationships and beauties rather than tell him about it. The student will be eternally grateful to the teacher who helps him observe the natural wonders he encounters. He will long remember the first time he saw a beautiful bird or had someone help him closely examine a delicate wildflower. If we ask him guiding questions which lead him to make his own discoveries we are doing him the greatest service a teacher can do; we are leading the person to the knowledge about using his own brain. We are showing him how to use his capacities of reason and understanding and enjoyment.

INDIAN RIVER COUNTY RESOURCES

The Florida Division of Forestry survey of 1971 showed 44.4 thousand acres of forest land in Indian River County. This report rated the land's most valuable asset as a scenic and recreation amenity. Forestland is also a favorable modifier of the increasingly contaminated environment caused by increased population growth, urbanization, and industrialization and provides relief from crowded city living.

There are five forest types. They are listed here from largest acreage to smallest.

1. Pine flatwoods, characterized by open stand of slash pine mingled with an understory of scrub palmetto and grass.
2. Hardwood and cypress swamps--include tupelo, black gum, sweet gum, some of the oaks singly or in combination, and often associated with willow, ash, elm, water hickory and maple. The soil here is rich.
3. Sand pine scrub--found on higher, drier ridges, principally on St. Lucie sands.
4. Mixed pine hardwood--found in the transition zones along major streams and drainage between the bottomland hardwood swamps and the pine flatwoods. This is a mixture of longleaf and slash pine, associated with willow oak, live oak, sweet gum and hickory.
5. Mangrove forest--along the costal islands and tidal flats, consisting of red and black mangrove in dense thickets along partially submerged lands subject to periodic wash by high tides and brackish estuarine waters.

The importance of natural hardwood, swamps, and wetlands as a natural filter should not be overlooked. Repeated studies and experience elsewhere show that

water delivered through natural drainage tends to improve in quality through the process of self-purification as it flows through and into the forest floor--that spongy, natural filter made up of debris, leaves and partially decayed vegetative duff. Water drained out of any watershed by canal will not show the improved quality of this naturally filtered product.

Although the hardwood and cypress swamps (consisting of a little over 10,000 acres of forested land) remained largely intact in this area for many years, they have been abused by over-cutting, promiscuous burning, over-grazing, and draining, all of which detract from their usefulness as a natural filter. Since 1970 drastic reductions of the hardwood Cypress community has occurred by the drainage of large areas of marsh for citrus production.

The value of mangrove forests to the marine ecosystem is well known. According to the distinguished ecologist, Dr. E. P. Odum of the University of Georgia, this interaction of land, sea, air and sunlight provides some of the richest food-producing areas in the world--20 times as productive per unit as the open sea, seven times as productive as an alfalfa field, and twice as productive as a field of corn!! Efforts should be continued to preserve the existing mangrove along the Indian River and expand it to the barren islands capable of supporting this growth. Some preliminary efforts at seed collection and restablishment are going on here and elsewhere in the state where this problem exists.

The Pelican Island Audubon Society has listed the ten major areas of Environmental and Human Concern in Indian River County. That list follows.

Areas of Environmental and Human Concern

1. Preservation and Protection of The Indian River Estuary, Including:
    a. Red and Black Mangrove swamplands
    b. Batis (pickleweed) marsh
    c. Submerged marine grass beds
    d. Spoil Islands
    e. Marshland functions
        (1) Marine productivity
        (2) Hurricane and storm protection
        (3) Wildlife feeding and nesting habitat
        (4) Pollutant filtration
        (5) Aesthetic values

2. Water Resources
    a. Shallow well aquifer
    b. Floridan aquifer
    c. Protection of recharge areas
    d. St. Johns River headwater marshlands

3. Water Pollution Abatement
    a. Sewage treatment plants
    b. Septic tanks and drainfields
    c. Canals and ditches
    d. Lakes, ponds, borrow pits
    e. Agricultural runoff
    f. Urban runoff
    g. Public health
    h. Tertiary treatment, land-spraying
    i. Sand-mining operations

4. Solid Waste Disposal
    a. Sanitary land fills
    b. Recycling
    c. Littering

5. Dune and Beach Protection and Restoration

6. Rare and Endangered Habitats
    a. Parklands
    b. Coastal forest hammocks
    c. Sand pine community
    d. Pine-flatwood community
    e. Freshwater marsh community

7. Noise Pollution

8. Air Pollution

9. Growth and Development Impact
    a. Environmental
    b Economic
    c. Social

10. Development of Land-Use Policies and Ethics

Endangered and Threatened Wildlife in Indian River County

Endangered - Wildlife in this category are in danger of disappearing unless steps are taken to prevent this.

Birds: Wood Stork - A wetland inhabitant in marshes and water impoundments. In recent years 100-200 pairs have been nesting annually on Pelican Island.

Florida Everglade Kite - Not more than 100-150 of these freshwater marsh inhabiting birds survive in Florida. Several pairs have been found each spring in the St. Johns Water Management District reservoir west of Vero Beach, but overdrainage of this reservoir and subsequent loss of the Apple Snail--its sole food--has caused nesting failures.

Red-cockaded Woodpecker - Less than a half dozen birds occur in Indian River County, in a strip of Slash Pine forest along the upper reaches of the Sebastian River, southwest of Roseland. This species is dependent upon pines that have a fungus disease of the heartwood in which they excavate their nesting and roosting cavities.

Mammals: Florida Panther - Possibly one or two pairs of this rare carnivore, sometimes called a puma, or cougar, remain precariously in the wilder parts of Indian River County.

Manatee - Each winter several manatees are seen in the Indian River, especially in the warmer waters of the lagoon and canal near Vista Harbors and the outfall canal of the Vero Beach power plant. They are particularly vulnerable to injury by outboard motor propellers.

Reptiles: American Crocodile - This reptile is usually found only along the coastal areas of south Florida and the Keys, but a large 15-foot crocodile was found in 1974 in a pond at Vista Royale south of Vero Beach.

Atlantic Green Turtle - each year several females of this species come ashore to lay eggs on the beach.

Atlantic Saltmarsh Snake - one of the few snakes found in salt water. It is a harmless water snake and may be found inhabiting mosquito control impoundments on both sides of the Indian River.

Threatened - Wildlife not in imminent danger of extinction, but could become endangered if conditions worsen.

Birds: Brown Pelican - Indian River County probably has the largest concentration of Brown Pelicans in North America. Outside of Florida pesticides have seriously affected this species reproduction.

Magnificent Frigatebird - Occasionally seen over the Indian River and the beach and at Pelican Island. Considered threatened because its only n sting area in North America is on the Marquesas Keys near Key West.

Reddish Egret - One or two individuals are seen each year in the Indian River and at Sebastian Inlet. The last species to recover from the slaughter of the plume trade days.

Roseate Spoonbill - Several dozen or more of this species visit Indian River Cojnty during the spring and summer. Occasionally seen in larger drainage canals west of Vero Beach.

Osprey - Several breeding pairs found along the Indian River and at Blue Cypress Lake. More numerous in winter when northern birds are present.

Caracara - Only around 250 estimated to remain in Florida. One or two are sometimes seen in ranch areas in western parts of the county.

American Oystercatcher - Two, possibly three pairs nest on spoil islands in Indian River. Very intolerant of human disturbance.

Least Tern - Our smallest tern, here in summer only and often seen fishing in the surf. Dependent upon spoil islands and sand spits for nesting sites.

Florida Scrub Jay - Probably less than a dozen pairs remain in Indian River County in Sandpine-scrub oak communities near Donald MacDonald Park, Winter Beach-Gifford area along Old Dixie, and Whispering Palms area, south of Vero Beach. Dependent upon undisturbed scrub habitat.

Mammals: Florida Mouse - Found only in sandpine-scrub habitat on the Florida ridge.

Florida Beach Mouse - Although relatively common farther north, the destruction of beach dune vegetation in Indian River County has greatly reduced the numbers of this tiny, pale-brown mouse.

Round-tailed Muskrat - Found in freshwater marshes, but few remain in Indian River County because of overdrainage.

Reptiles: Gopher Tortoise - Although still frequently seen in our area, the destruction of Sandpine and Slash Pine Flatwoods habitat has greatly reduced their numbers.

Atlantic Loggerhead Turtle - Several hundred females nest each year on Indian River County beaches, but successful hatching is low because of predation by raccoons, disturbance by people and excessive beach erosion where man-made structures are too close to the beach.

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CONCEPTUAL SCHEME I

AS THE POPULATION INCREASES, ITS EFFECTS ON THE ENVIRONMENT BECOME MORE PRONOUNCED.

Concept A

The management of resources to meet the needs of larger successive generations demands long-range planning.

Activity 1

Place a large sign on the chalkboard which states, "LAWNS MAY NOT BE WATERED FROM 7:00 A.M. to 9:00 P.M." Devise other signs for placement around the room which deal with the scarcity of pure water. Take advantage of the students curiosity by asking how many of them have seen similar signs. Discuss the significance of posted notices such as these. Direct the discussions to related issues of water use, such as the sale of drinking water, local water supplies.

a. Why, in a state with numerous bodies of fresh water, do many people find it necessary to buy drinking water? (The pollution of rivers and other sources of water.)

b. What habitats and practices of man contribute to the pollution of our water resources? (Factory waste, sewage, etc.)

c. What could be the result of our failure to act quickly enough to prevent wholesale water pollution? (Demise of fishing industry, human disease, among other things.)

d. How does increasing a population affect the existing problems of water supply? How is water purified for drinking purposes? (More people create more waste.)

Activity 2

The growing of selective crops with high nutrient value has become necessary for a greater food yield to feed the growing populations in nearly all countries. Display two foods: (1) beef, and (2) rice.

a. Which provides more food value?

b. Which would you choose to eat? Why?

c. Which countries of the world have rice as a major part of their diet? (Asian countries)

d. Which food would be more economical to produce for a large population? (rice)

Scheme I - A

Activity 3

Have the students make up maps which show the locations of the world's major mineral resources.

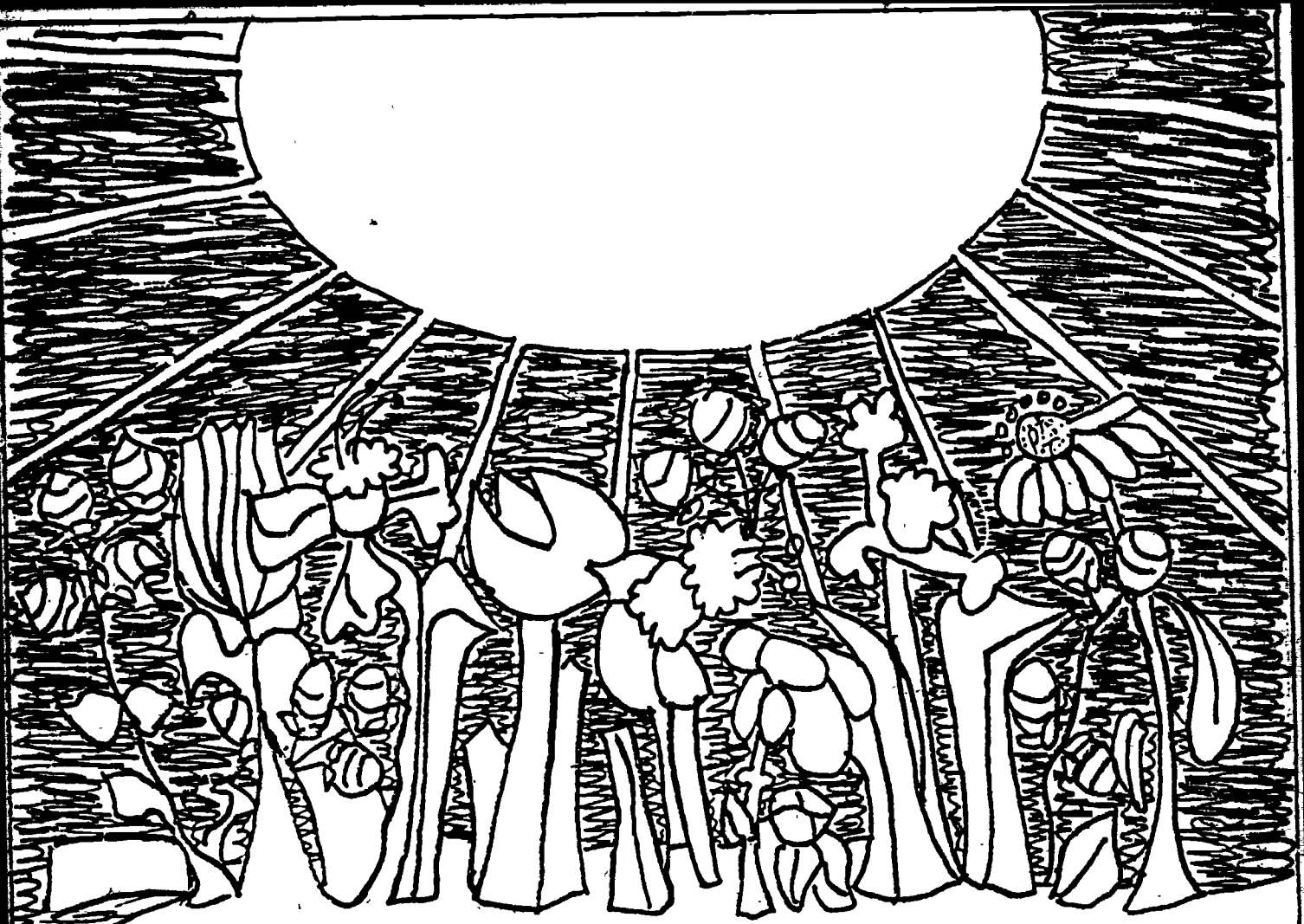
a. What is a resource? a natural resource? (Actual or potential wealth which occurs in nature) renewable resources? (A resource capable of being returned to its original state, such as soil or water.)

b. Why are mineral resources considered non-renewable? (Nature cannot replace the minerals as fast as man can use them.)

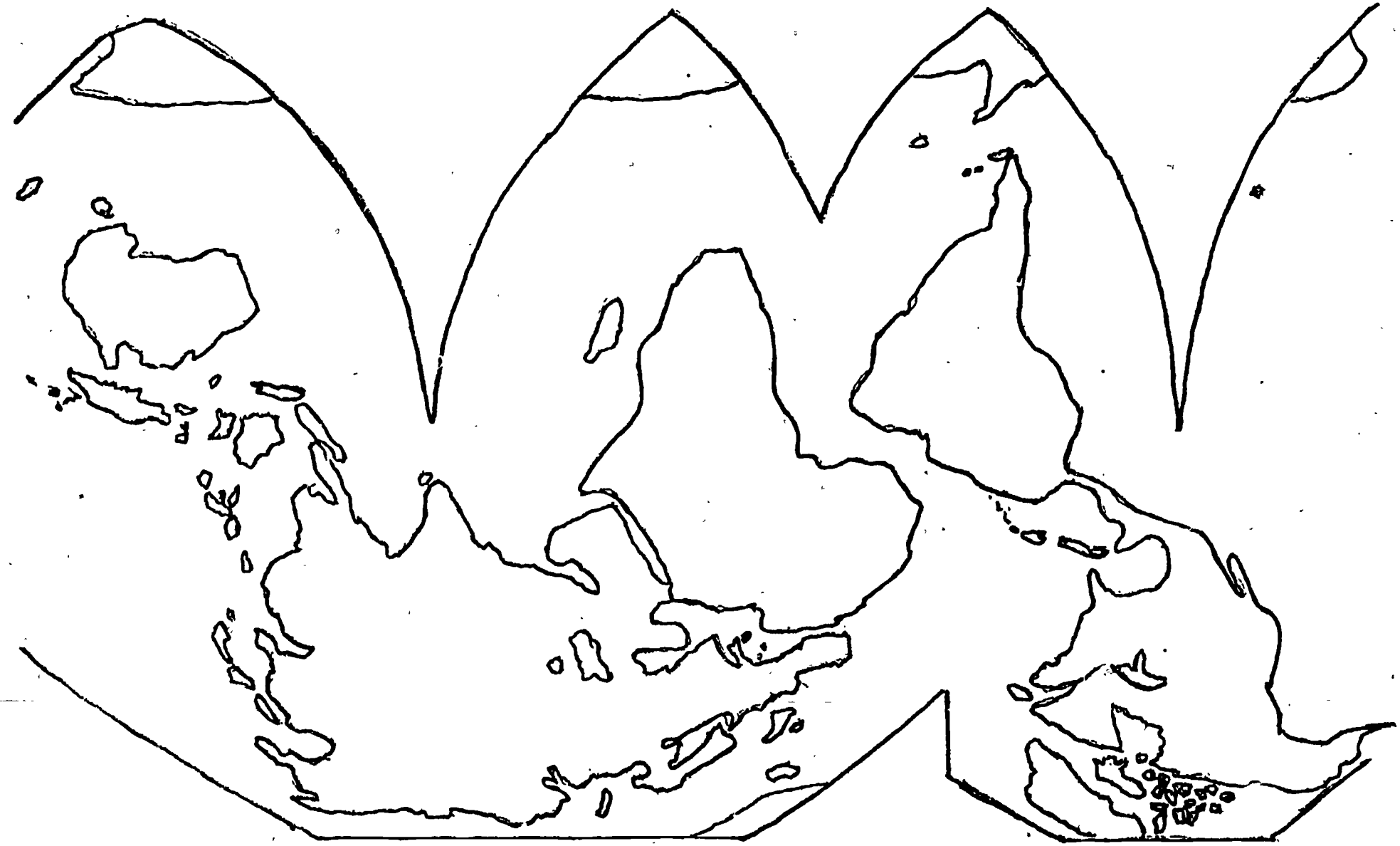
c. If water and soil are renewable, why are we concerned about them? (They can become too polluted to be renewed.)

d. For which minerals, if any, do satisfactory substitutes exist? Are these substitutes mineral resources? (coal, petroleum, natural gas can replace each other, but are mineral resources.)

e. What adaptations by man may be necessary when certain mineral resources are exhausted? (solar energy instead of using fossil fuels for energy, for example.)



fun with the environment



Scheme I - A

Activity 4

Soil is one of our greatest natural resources. Each year, in almost every country, thousands of acres of rich soil are lost to agriculture because of erosion or oxidation. Discuss the various forms of erosion with the class, mentioning at the same time, the benefits of soil conservation practices. Have the class construct a simulated example of water erosion taking place. Use a large, rectangular, metal, or metal lined pan, which is several inches deep and has a screened opening at one end. Deposit a layer of soil in the pan. Elevate the uncovered end of the pan and pour water over the soil. Measure the amount of soil lost through the screened end. Find the relationship between slope (degree of elevation) and the amount of erosion by repeating the experiment with the box held at varying angles.

a. Is the effect of wind on soil the same as the effect of water on soil? (consider the general process of erosion)

b. Show through the use of illustrations or pictures how man has overcome the effects of erosion with such methods as terracing or using trees as wind breaks.

c. What solutions can you devise for the problem of soil erosion? (terracing, windbreaks, etc.)

d. What farming practices must be changed to help solve this problem?

Resource: James, Preston E., Gertrude Whipple, Morris Weiss. Man on Earth, An Introduction to Geography, New York: The MacMillan Company, 1971.

Scheme I - B

Concept B

The population trends of other countries affect the United States.

Activity 1

Other nations, in addition to the United States, are also faced with a tremendous population increase; therefore, we cannot depend on their resources to supply our needs. In fact, our resources are needed in other countries.

Debate: Resolved -- Until the United States can feed and plan to feed its total expected population, foreign aid should be severed.

Activity 2

Have four students represent the United States, who will be suppliers of paper and pencils to the students who represent India. Every two minutes, add two more students to the population of India. The United States must still supply paper and pencils to the foreign country. Have the class discuss this action and relate it to our present day situation.

CONCEPTUAL SCHEME II

WE LIVE IN A WORLD OF FINITE RESOURCES AND ALMOST INFINITE DEMAND ON THOSE RESOURCES.

Concept A

Our mineral resources are finite and we will have to manage them wisely to maximize their distribution to an even larger population.

Activity 1

Review the meanings of finite or infinite. Explain what the term 'rationing' means. Have the students give personal instances of rationing at home or at school. Have them name five things at school that are rationed to them. Have the students find out when this country had rationed goods. Were the purposes then similar to what they are now. Make a report on rationing.

Give the students the opinion poll on the following page. Discuss each question on the poll. Make certain that you bring out the idea that rationing will only prolong the inevitable; finite resources must give out sometime. Also bring in the idea that rationing, by prolonging the amount of available resources, will give us more time to find substitutes for the resources that are running out.

Scheme II - A

TRUE or FALSE Student Opinion Poll

_____ 1. Rationing of gas will cut down waste.

_____ 2. Rationing will be inconvenient for some.

_____ 3. Rationing of goods would be an answer to our resource shortage problem even if a larger population was pending.

_____ 4. Rationing would distribute goods more evenly.

_____ 5. If gasoline is rationed, people would drive less.

_____ 6. It would be important to know who was responsible for the quota if rationing were in effect.

_____ 7. If gas is rationed, it would cost more than it would if the distribution were by supply and demand.

_____ 8. Rationing should only occur as a last resort.

_____ 9. You would not object to getting less resources if everybody else was getting less also.

_____10. Rationing could be the answer to the energy crisis.

Scheme II - B

Concept B

Even renewable resources become finite as our demands approach the limits of time and space required to recycle those resources.

Activity 1

Break the class up into four groups. In an allotted time period, have each group compile a list of as many resources as they can. Have the captain of the winning group copy their list on the blackboard. Hold a discussion of the resources listed, classifying them as renewable or non-renewable. Discuss various ways some of the resources could be recycled.

(a) Why are some of the renewable resources in danger of becoming non-renewable? (The demand is too great for the time it takes to renew the resource.)

(b) What effect does pollution have on the renewable resources? (Air and water pollution generally slow the ability of the resource to renew itself.)

(c) How does dumping old automobiles in the ocean affect the mineral renewable resources? (We lose the metal to recycling processes.)

Activity 2

Resources to be investigated. Make a report on (1) the sponge industry, (2) shrimp industry, (3) game fish, (4) commercial fish. Ask yourself these questions and include them in your report:

(a) Do we have more or less of these than we did 25 years ago?

(b) Has man wasted or saved these resources?

(c) Has the government regulated use of these resources?

(d) Find out through research in your library, or by asking someone associated with these industries, what will happen to them ten years from now.

Resources: Division of Game and Fresh Water Fish, Bryant Building, Tallahassee, Florida 32304.

Concept C

As the demand on a limited resource grows, the cost will rise and an individual's standard of living will be lowered.

Activity 1

Two basic factors influence the cost of goods in our society. One of these factors is supply and, as it rises, prices fall or, as is more often the case, as supply decreases, prices increase. The second factor is demand and a direct relationship exists between this factor and cost because as demand increases, prices increase, and as demand falls, price falls. The two factors operate simultaneously to influence costs in our economy. The following examples will help to illustrate this point:

1. If supply increases at nearly the same rate that demand increases, prices will remain the same.
2. If supply remains nearly the same, but demand increases, then costs will rise. (This is presently the case with food.)
3. If supply decreases as demand increases, then prices soar. (This is the case with most of our non-renewable resources.)

Scheme II - C

Discuss this information with your students and then ask them the following questions:

1. Our food supply is growing slowly while the demand for food is growing rapidly. What do you predict will happen to the price of food? Check with your mother to see if your prediction is accurate.
2. We have exhausted our high grade iron ore and we are now extracting lower grades in the form of taconite. How will this affect the price of cars? How will it affect the price of bicycles? How many things can you think of that will be affected by the decreasing supply of good iron ore? What are some of the things we could do to stabilize our supply of steel?
3. Our supply of petroleum is dwindling while our demand for it is soaring. What will happen to the price of gas and oil? Just before we run out of petroleum, what do you think will happen to the cost? What will happen to the cost of electricity? Why?
4. How many resources or goods can you think of that have a decreasing supply and an increasing demand?
5. How will these rises in cost affect your standard of living? Will your dollar buy as many things in the future?
6. How can we help solve our resource problems and maintain our present standard of living?

Scheme II - C, D

Activity 2

Study Britain's dependence on overseas trade, both to supply her needs and to sell her produce. Areas of investigation should include:

1. High cost of living in Great Britian.
2. Periodic rationing of materials.
3. Low productivity in a highly industrial nation.
4. Effect on diet.
5. Nationalization of hay industries.
6. Preferred position of commonwealth nations' trade with Great Britain.
7. Connection with National Health Program (reduce cost of living).
8. Comparison of cost of living in Great Britain and United States.
9. Periodic outbreaks of inflation in England due to cost of resource.

Concept D

A sound natural resource policy is dependent upon a flexible political system, pragmatically appraising and reappraising policies and programs in terms of their effect upon the public interest and in light of scientific knowledge about the natural resources.

Activity 1

Students should study the structure of the local agency of government (county, town, city, village). Make a chart of the duties the officials perform. They should be aware of the

Scheme II - L

presence of a responsible program for safeguarding our resources. Each student should write an article (the best ones, chosen by the class, could be printed in the school newspaper) answering the following:

1. Who is responsible for Environment Planning?
2. Is this his only task? How many others does he have?
3. Should the government have a Director of Environmental Planning? Why? Interested students may want to research the States and Federal function.
4. What kinds of legislation are being recommended to safeguard our resources?
5. What groups support such legislation? What groups oppose it?
6. What is the effectiveness of the legislative approach to solving our resource problems?

CONCEPTUAL SCHEME III

EACH INDIVIDUAL HAS A ROLE AS AN AGENT FOR CHANGE IN THE ENVIRONMENT AND THEREFORE HAS A RESPONSIBILITY TO THE ENVIRONMENT.

Concept A

Man's technological and economic development has changed the environment in an uncontrolled manner and now man is writing laws trying to control the direction of change.

Activity 1

If you could be one of the following people for six months, what would you do about pollution?

President of the U. S. Governor of Florida

Mayor of Vero Beach President of the Board of Realtors

(a) Write at least two paragraphs expressing your thoughts on these matters. Is there any reason why these people do not do these things? Is there any way to make them do the right thing? Who can decide what is right or wrong?

Concept B

Some of nature's basic laws must be obeyed and man's interference with these laws may be deadly.

Activity 1

Research environmental problems that result from "Strip-mining". Mining companies claim no responsibility for destruction of farmland. In their philosophy, providing coal for the public is more important than preserving land. Pick students to work on a panel.

Scheme III - B, C

Present these questions:

1. What is the reason for the use of strip-mining technique as opposed to a less destructive method? (Strip-mining is the cheapest method available.)
2. Do the end results justify the harmful side effects? Explain.
3. What do you think of the mining industry's legal rights?
4. What might be a solution to this problem?

Activity 2

Over a period of two weeks, assign students to sketch occurrences in the environment where man has interfered with nature (in the local community or anywhere). Make sure the drawings show the effect of man's interference in nature. Have the students mount the drawings on a poster and explain them to the class. Each child should have at least five sketches.

Concept C

Many of the changes man induces are irreversible in his time frame.

Activity 1

Give the students the following paragraph to read. Tell them it is the beginning of a letter to a friend who used to live next door to them. The friend moved to another city several years ago. The students are to finish the letter:

Scheme III - C

Dear Joe,

I am glad to hear you like your new school. Your friend, Sam, sounds neat.

Things sure changed around this town since the new interstate highway was built.

Scheme III - C, D

1. The teacher might suggest other factors that could change the environment of a town, such as land development, new jet airports, large manufacturing plants, or, as on our beach, a new bridge access, and water development.
2. How do these things affect the people who live in these areas? Suggest that it could affect living facilities, rise in prices, crowded roads, bring new stores, create jobs, create a shortage of public utility services, destroy recreational facilities or bring new ones, and create crowded schools.

Activity 7

Have students make a list of all man-made changes they see in their community that they feel are irreversible. Make one (1) large class list on the board for discussion.

Concept D

Human needs and values affect decisions about the use of man's natural resources.

Using the National Geographic Society's curriculum kit, "The National Parks, America's Legacy," several activities may be planned. A lead-in film, "The National Parks, America's Legacy," is suggested prior to these activities; however, the activities may be used without showing the film.

Scheme III - D

Activity 1

Use the folder entitled "How Would You Use A National Park" from "The National Parks, America's Legacy." Students will be divided into small groups and asked to look at the four sets of photographs found in the folder. They must them select which set of photographs most resembles how they would like for the park to be used. The following should be answered by the students:

1. How might your choice affect the national beauty of the park? The recreational opportunities?
2. How might your choice affect the enjoyment of other visitors to the park?
3. In what ways might your choice tend to limit the number of visitors to the park?

Group discussion of these questions should follow with possibly a poll on which set of photographs the class would most like the park to resemble.

Activity 2

Use the folder entitled "Yosemite National Park: What Should Be Done" from "The National Parks, America's Legacy." This folder is a lead-in for the role play. Discussion should dwell on reasons for overcrowding ir the park, how students would like to see the park used, the alternatives to the use of the park.

Scheme III - D

Activity 3

Use the folder and materials "Yosemites Future: Three Points of View" from "The National Parks, America's Legacy." Students will be assigned roles in three areas relating to the development of the Yosemite National Park.

1. Developers - who want more recreational and overnight facilities and no restrictions of numbers of visitors.
2. Moderates - who want development in Yosemite to go as far as it already has, but no further.
3. Conservationists - who want all development in the development in the park taken out and restrictions on the number and type of visitors.

A group of students (10 or more) will be assigned the role of commissioners. They will determine the procedures for the hearing, judge the case and present reasons for their decisions.

Each group should present its arguments to the commissioners with cross-examination from the opposing sides. At the end of the debate, the commissioners will recess to make their decision. After the decision has been made, group discussion can be held on the three points of view and possibly a vote by the entire class on which point of view they feel would be best for the park.

Resources:

The National Parks, America's Legacy, 1973, National Geographic Society, 17th and M Streets, N.W., Washington, D. C. 20036

Concept E

Projects affecting the environment need to be carefully scrutinized. Once completed, they could be irreversible.

Activity 1

Have the students discuss the affects of the following things on the environment. They should try to determine if there are any irreversible effects.

1. Condominiums
2. Interstate Highways
3. Homes
4. Factories
5. Draining and filling of swamps
6. Parking lots
7. Skyscrapers

a. Which two (2) of the above will cause more damage to the environment after they are completed and functioning for their intended purpose? (2 & 5)

b. Which two (2) seem to be of little or no concern to our immediate area? (4 & 7)

Discuss interstate highways and condominiums at length with the students. Have them list the positive or good things about condominiums. Do the same for interstate roadways. Have them list the harmful affects of both. Discuss the pluses and minuses of these two types of development. Use the following student activity sheet to help the students organize their thoughts:

Scheme III - E

Student Activity Sheet

1. Condominiums
2. Interstate highways
3. Individual homes
4. Factories
5. Draining and filling projects
6. Parking lots
7. Skyscrapers
8. Country clubs

List two (2) from the above list that will cause the most damage to the environment after they are completed and functioning for their intended purpose.

1.

2.

Which two (2) seem to be of little or no concern to our immediate area?

1.

2.

1. List good things about condominiums:

a.

b.

c.

d.

Scheme III - E

Student Activity Sheet (cont.)

2. List the undesirable things about condominiums:

a.

b.

c.

d.

3. List the good things about interstate highways:

a.

b.

c.

d.

4. List the undesirable things about interstate highways:

a.

b.

c.

d.

Scheme III - E

Student Activity Sheet (cont.)

5. How do condominiums and interstate highways irreversibly change the environment?

6. How has the new interstate highway affected the area in which you live?