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ABSTRACT

This curriculum guide consists of environmental studies modules for grades 4-8. The curriculum, which is organized around major concepts, is intended to serve as a guide for program development and as a framework for compiling and sharing ideas on methods and application on a national basis. Each module may be utilized as an integral part of the entire curriculum, in combination with several of the other units or as an independent element. The following modules for each grade level are included: (1) Values and Environmental Awareness; (2) Environmental Rights and Responsibilities of Individuals and Groups; (3) Dependence of All Things on Each Other and the Environment for Survival; (4) Energy and the Biosphere's System; (5) The City: A Complex Ecosystem Requiring Planning and Resources; (6) The Man-Made Environment and the Quality of Life; (7) Population Dynamics; (8) The Effect of the Rural Ecosystem on Urbanization; (9) Production, Consumption and Recycling-Intelligent Use of Natural Resources; and (10) Decision Making. The five areas discussed for each module are module scheme, content overview of module scheme, concepts to be developed, content organization by grade levels, and program objectives. (Author/RM)

MAN AND ENVIRONMENT

FOR

THE INTERMEDIATE GRADES

A Curriculum Guide in Environmental Studies
For Grades 4-8

Developed at a Workshop in Environmental Studies conducted in Atlanta, Georgia, July 22-26, 1973, under the sponsorship of the National Association for Environmental Education with a Grant from the Office of Environmental Education, the United States Office of Education.

National Association for Environmental Education
5940 S. W. 73 Street
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DISCRIMINATION PROHIBITED --- Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Therefore, the environmental education program has been conducted in compliance with this law.

N O T I C E

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FOREWARD

Man and Environment For the Intermediate Grades, a curriculum guide in environmental studies for grades 4-8, was developed through a grant from the Office of Environmental Education, the United States Office of Education.

The project was initiated in recognition of a need for an environmental education curriculum for grades 4-8. The curriculum has been organized around major concepts so that it can serve not only as a guide for program development, but as a framework for compiling and sharing ideas on methods and application on a national basis. Each module is complete and is not dependent on the other modules. It may be utilized as an integral part of the entire curriculum, in combination with several of the other units, or as an independent element. This is a purposeful design that will allow teachers and curriculum planners to add or delete units to express their creativity and to customize the program to fit individual circumstances.

The primary vehicle in the development process was a workshop held in Atlanta, Georgia, July 22-26, 1973. The workshop was comprised of persons with different and complementary talents and backgrounds selected to be appropriate for the creation of this curriculum. The group included school curriculum specialists, environmental content specialists, curriculum coordinators of school environmental education programs, an experienced workshop management; however, the majority of the group was made up of elementary school classroom teachers experienced in environmental education.

The first step in the process was a Delphi survey with two iterations in which all project personnel participated. The responses from the participants fell logically into the following four clusters of potential modules that served as the basis for the design of the curriculum.

ENVIRONMENT AND THE INDIVIDUAL

Personal Values and Ecological Commitments; Environmental Action: Individual, Family, Group; Your Community as an Environmental System.

Environmental Awareness - Perception

Man's Rights and Responsibilities - Today and For Future Generations; Survival in the 21st Century.

ECOLOGY

The Interdependence of Man and Environment; Ecology - The Web of Life - Ecosystems; Environmental Imperatives.

Understanding the Natural Environment; Wildlife - Plants - Forests - Oceans - Deserts

Energy - Energy Systems

URBAN ENVIRONMENT

The City as an Ecosystem. Land - Ethic and Planning

The Impact of Industry and Technology on the Environment; The Man-Made Environment and the Quality of Life.

Population Dynamics.

LIMITATION OF NATURAL RESOURCES AND POLLUTION

Waste Disposal, Sanitation, Recycling

Pollution - Water, Air, Noise, Food, Visual

Political System and World Considerations in Environmental Solutions.

Limitation of Natural Resources.

Under the direction of Dr. John Strickler, Associate Professor, School of Education of the University of Miami, the curriculum specialists worked together prior to the workshop to design a form for the curriculum and to organize an example of the application of the design to another subject area. This model served as a guide for the development of the environmental education modules.

At the workshop the participants and resource persons were assigned to four groups, one for each cluster of modules. They were instructed to reorganize, combine, separate, or rename the modules in the cluster as the group saw fit. The results of these changes were shared among the groups in order to insure that the modules that were finally developed were effectively related and comprised a complete curriculum. This work resulted in the ten modules of the final curriculum.

The management team and the curriculum specialists remained in Atlanta for an additional day and a half after the close of the workshop to complete a draft of the curriculum. This first version was reviewed by the project director and returned, with suggestions to the curriculum specialists who improved the first version. Following copy editing a preliminary edition of the guide was sent to each person involved in the project for comment. With the benefit of these suggestions the final copy was prepared as it appears in this guide.

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Atlanta, Georgia
July 22-26, 1973

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DESCRIPTION OF THE DESIGN OF THE CONCEPTUAL FRAMEWORK

AND

SUGGESTED USE OF THE CONCEPTUAL FRAMEWORK

I. Description of the Design of the Conceptual Framework

There are ten conceptual modules presented in this publication. Each module provides the framework for the further development of curricula in elementary environmental education. Although each conceptual module is complete within itself, spanning five grade levels (4-8), there is a relationship among the modules that provides the basis for an entire course of study for fourth through eighth grade levels.

All modules were developed from a specific theoretical base. It was decided that the development of the conceptual framework would proceed from the abstract to the concrete, with the understanding that when this phase of the project was over, the development of program objectives would have been completed and the basis for the selection of meaningful instructional objectives, learning activities, and resources would have been laid. This meant that the actual production and implementation of this phase would be a controlled and indepth study relating to a specific conceptual design.

There are five areas in the design that should be understood in order to gain insight into the conceptual framework of the curriculum. Each of these five areas will be discussed.

A. Module Scheme. The module scheme is a statement or generalization briefly describing an area of study. It is abstract in nature and worded in a general manner in order that the entire module may flow from the one statement. Thus, it may act as an hypothesis to be tested throughout the grade levels. In addition, it is used as an "umbrella" of content from which specific content examples are chosen for the various grade levels, providing the basis for a spiraling curricular organization.

The module scheme is seen as being basic to an understanding of the total content and concepts utilized throughout the various grade levels.

B. Content Overview of Module Scheme. The content overview of the module scheme is a brief description of the general ideas available when the scheme is utilized. It is an overview of the content and provides the curriculum writer a frame of reference when choosing specific content for the various grade levels.

C. Concepts to be Developed. The concepts to be developed are organizers of many relationships, facts, and ideas relating specifically to the module scheme and its content overview. The concepts are seen as the essence of the content and help the learner gain a better understanding of its meaning. In each module selected concepts are treated repeatedly throughout the five grade levels and provide the strands that tie the entire module together. The concepts remain the same throughout the module, enabling the learner to understand them in a progressively sophisticated manner as he develops from year to year.

D. Content Organization by Grade Levels. The content organization by grade levels provides the opportunity for selecting specific examples of content that illustrate the concepts in a variety of situations. The units of study were chosen to coincide with the developmental level of the child, providing him with the opportunity to learn from content that he is most closely associated with in everyday life. Thus, as the child progresses through school, he is more likely to generalize to new and different content, since the basic concepts remain constant and are being applied in a variety of contexts. In this way, the learner is able to comprehend the scheme in a more sophisticated manner each year, since emphasis should be on the understanding of concepts rather than on the content itself. The content acts as a vehicle for the spiral development of the chosen key concepts.

E. Program Objectives. The program objectives are grade level objectives and have been chosen from the concepts to be developed at each grade level. They are to be used as directional frames of reference for curriculum writers who want to select more specific instructional objectives, student activities, and appropriate resources.

II. Suggested Use of the Conceptual Framework

The conceptual framework should not be thought of as an instructional model. It is meant to be the beginning of the development of a total curriculum in elementary environmental education.

It is conceivable that a school system or an individual school will be able to utilize the framework, modify it to meet specific needs, and produce meaningful and controlled experiences for their youngsters.

A school system that anticipates the use of the conceptual framework should involve its personnel in the theoretical basis of this work before it proceeds in the development of the total curriculum. The conceptual framework can then act as a guide for the meaningful selection of appropriate learning activities based on a sound theoretical background.

SCOPE AND SEQUENCE CHART

LEVELS	CLUSTER A ENVIRONMENT AND THE INDIVIDUAL	CLUSTER B THE WEB OF LIFE	CLUSTER C THE CITY AS AN ECOSYSTEM	CLUSTER D SPACESHIP EARTH
Level IV	Module I & II: Interdependence in Modern Soceity	Module I & II: Communities	Module I: The City Environment Module II: Man the Inventor Module III: Man the Explorer Module IV: Mutual Influence of Rural and Urban Communities	Module I: The Have and The Have Nots Module II: We're All In This Together
Level V	Module I: The Effects on the Environment of Group and Individual Initiative Module II: The Impact on the Environment of Group and Individual Initiative	Module I: Ecological Processes Module II: Ecological Processes and Energy	Module I: The Biotic City Module II: Consumerism- Supply and Demand Module III: Limitations Placed on Man by His Environment Module IV: Population Exchange - Urban and Rural	Module I: Recycling Imitates Nature Module II: How Many Ways To Go?
Level VI	Module I: Human Values, Recent Population Patterns and The Environment Module II: Human Values and Recent Population Patterns	Module I & II: Limitations of Natural Resources	Module I: Life Support Systems For Living in a City Module II: Industrialization Through the Ages Module III: Human Settlement Patterns Through Time Module IV: An Examination of an Historic Environmental Problem: Rural and Urban	Module I; Needs and Wants Module II: Citizens Stimulate: Institutions Respond

SCOPE AND SEQUENCE CHART - CONTINUED

LEVELS	CLUSTER A	CLUSTER B	CLUSTER C	CLUSTER D
Level VII	Module I & II: Psychic and Economic Human Survival	Module I & II: Man, Technology and Environment	Module I: Living in the City Module II: Technology Influences Environment Module III: Man's Mobility Influences the Environment Module IV: Alternative Lifestyles and Environmental Issues	Module I: Who Will Pay? Module II: Can You Fight City Hall?
Level VIII	Module I & II: Expanded Technology and Its Effect on Human Existence	Module I & II: Environmental Management	Module I: City Planning Module II: Future of Man: Problems and Potentials Module III: Population Crisis - Myth or Reality Module IV: Comparative Environmental Systems	Module I: Past, Present and Future Module II: Quality and Quantity

CLUSTER A - ENVIRONMENT AND THE INDIVIDUAL

MODULE I

Module I Scheme: Values and Environmental Awareness

Personal Values held by individuals within a society have a primary effect on the quality of that society's natural and social environment.

Content Overview

Each of us has certain values that guide us as we conduct our daily activities. These values are constantly being modified by our continuous involvement in developing alternative solutions to various problems. Personal values in the aesthetic, social, political, economic and religious realms are largely responsible for the quality of our daily lives and our environment.

Man's activities have been guided primarily by economic and political considerations. Many environmental problems result from our having placed a disproportionately high premium on the profit motive as well as on the immediate consumer benefits of a technological society without taking into account the environmental costs. Personal values can help mediate this imbalance.

Concepts To Be Developed

1. Human values and the activities resulting from their expression affect both the living and non-living components of the environment.

2. The quality of human life depends on the natural environment, the man-made environment, and man's values.

3. Man's ability to influence and improve both the quality of human life and the quality of the environment depends on his ability to make his value system operative in the organization of his resources.

4. Man has a choice of life styles and each life style has a characteristic impact on the environment.

5. Environmental values held by individuals may be modified through changes in the levels of awareness of those individuals.

6. Environmental awareness is dependent upon an individual's level of involvement with his natural and social environment.

7. Personal involvement in environmental problems increases an individual's ability to develop alternative solutions to environmental problems.

Level IV

Unit Topic --- Interdependence in Modern Society

Content Overview

The quality of human life in a culture is determined largely by the relationship of the individuals of that culture to all aspects of their environment. The physical and social needs of each person are related to and dependent upon the activities and technologies of other groups and the natural environment. These relationships and dependencies have evolved from the increasing complexity and specialization of modern systems.

Breakdowns in these interdependency systems produce profound effects on the natural and man-made components of the environment. To protect, preserve, rebuild and enhance the quality of life for man and for his natural environment requires an understanding of the impact of these relationships among human activities.

Concepts To Be Developed

1. Human values
2. Quality of human life
3. Man's ability to enrich the environment
4. Life-style choices
5. Environmental values
6. Environmental awareness
7. Personal involvement

Level IV Program Objectives

1. To survey and examine students' personal values regarding home and peers and the impact of those values on their total environment.

2. To recognize a prejudicial statement or idea in the context of open classroom discussion.

3. To recognize the interaction between living and non-living components of the environments.

4. To develop an understanding that the perception of what is comfortable or desirable space around one's self is a learned reaction as opposed to a universal perception.

5. To develop descriptive lists of the different methods nations use to solve internal and external environmental problems.

6. To list the locations for various types of leisure time activities in the community.

7. To survey number and extent of previous residential moves by students in the class, and to share thoughts and feelings about those moves.

8. To locate the major cities of the U. S. on a map and to collect visual materials dealing with the environment of each.

9. To develop relationships between personal values, quantity and quality of nutrition, and levels of health care.

10. To compare level of conformity of community standards in micro- and in macro-regions.

11. To enumerate the needs of an individual which are met by his participation in the social environment of his community.

12. To enumerate those powers originating within the muscles and brain of a human being, and to show how these powers multiply when they are combined with those of another human being.

13. To analyze reasons why man has a tendency to consume more than he actually needs.

14. To study several aspects of interdependency between individuals and within families, and peer groups.

15. To develop tentative explanations for several types of environmental changes that can be observed locally.

16. To understand several ways in which a group of people interact to arrive at a decision.

17. To inventory the various activities featuring human interdependence within the community.

18. To provide experiences developing skill at inductive reasoning by keeping systematic logs of environmental phenomena (air temperature, pollution index, etc.)

19. To examine alternative solutions to local environmental problems.

20. To list organizations that deal with the environment and to communicate with these organizations to determine their sphere of concern.

LEVEL V

Unit Topic --- The Effects on the Environment of Group and Individual Initiative

Content Overview

Change in the environment is inevitable, but it can be harmful or helpful change depending upon the actions of individuals and groups.

Each individual has an obligation to maintain the benefits of the natural environment for future generations. As a member of a complex ecological system, the individual should be sensitive to the limitations of that system. Sensitivity to all forms of life is the result of being informed, involved and accountable.

Because of a human group's dependence upon the environment, it is necessary that each member of the group use wisely the environmental resources which affect the total group.

History has shown that man achieves his most productive long-range results by planning and organizing for effective action. It is the responsibility of individuals, through group action, to see that laws are created and enforced which protect the rights of man and the natural resources he needs to live.

Concepts To Be Developed

1. Human values
2. Quality of human life
3. Man's ability to enrich the environment

4. Life style choices

5. Environmental values

6. Environmental awareness

7. Personal involvement

Level V Program Objectives

1. To develop awareness that individuals, groups and nations each have a sense of optimum surrounding space.

2. To survey and examine those effects of the environment which stimulate initiative within the individual and group.

3. To analyze stereotypes and their origins and to relate these to group cohesion and group defensiveness.

4. To survey those human environmental values that are affected by either group and/or individual action.

5. To communicate with students from other countries to determine how they would solve 10 specific environmental problems.

6. To have students prepare environmental action categories and identify age groups that could participate in each.

7. To explore alternative ways of getting involved in governmental decisions about population limits, zoning requirements and mobility.

8. To compare the environmental changes that have taken place in the development of 6 cities.

9. To examine the nature of group behavior as it affects problem-solving.

10. To determine the enhancements and restraints of an environment as it affects an individual's contribution to the public life of his community.

11. To investigate and determine the effects of alternatives to conventional consumption patterns.

12. To categorize governmental regulations that affect the individual's environment.

13. To list positive and negative effects that the community's normal activities have on the environment.

14. To provide group encounter experiences which enable the student to focus on his verbal and nonverbal behavior as others perceive it and as it affects the emotional climate of the group.

15. To create and explore alternative solutions for three environmental problems.

16. To develop research skills directed at examining environmental problems as they exist both in the field and in the library.

17. To understand the implications, past and present, of group and individual attempts to effect change in natural environment.

LEVEL VI

Unit Topic --- Human Values, Recent Population Patterns, and the Environment

Content Overview

Human life began with man living in a sensitive balance with the other components of his natural environment. Life activities focused on survival until the advent of the industrial revolution. At that time life support systems reached a level which enabled certain members of society to make decisions to deal with specialized activities and to live in specialized population areas.

The ability to choose one activity over another has had varied effects on the environment. Early benefits for humans included greater life spans and more effective use of natural resources.

Another benefit has been the increased time man has been able to spend away from his job. As a result, man presently is in pursuit of a greater variety of recreational activities during his non-working time. Recent population patterns, especially large clusters of people in urban centers, benefit economic affairs but preclude man's full use of the recreational potential of the natural environment.

Concepts To Be Developed

1. Human values
2. Quality of human life
3. Man's ability to enrich the environment
4. Life-style choices

5. Environmental values

6. Environmental awareness

7. Personal involvement

Level VI Program Objectives

1. To examine how local standards of land use are determined.

2. To create an understanding of the cultural origins of prejudices in varying environmental settings within the United States.

3. To survey and examine the interrelationships between modern habitation patterns and personal values.

4. To determine how environmental decisions are made on a local, regional and national basis.

5. To develop skills that enable students to use different types of leisure time activity sites.

6. To examine attitudes, interests and feelings about life in various population clusters: rural areas, towns, cities, suburbs.

7. To examine ways people can affect the environmental conditions under which they live.

8. To help students examine how modern habitation affects the health and values of the individual family and group.

9. To survey resources available to the rural dweller, suburbanite and city dweller for improving his environment.

10. To assess the differences habitation patterns make in enabling or preventing an individual from expressing his concerns to others.

11. To investigate the immediate and long range effects of increased consumption of goods.

12. To help the individual understand the interrelationship between life style and modern habitation patterns.

13. To list cultural, economic and political factors that are present when environmental improvement or degredation occurs.

14. To acquire the skills necessary to document the effects of community activities on the environment.

15. To examine the nature of interpersonal relations in a crowded ghetto, in an affluent suburb, and in a pastoral setting.

16. To determine the responsibilities of each governmental agency on various levels: city, county, state and nation.

17. To survey ways in which man has altered his environment to accommodate his needs.

18. To discover the impact of solutions to environmental problems on the life styles of various individuals or groups.

LEVEL VII

Unit Topic --- Psychic and Economic Human Survival

Content Overview

Our technological society has largely been driven by the profit motive. In the past, individuals and industries have chosen to ignore detrimental long-term environmental effects of their activities in favor of the immediate economic gain and a higher standard of living, as measured by the acquisition of material things.

Of late, more people are choosing to consider alternatives to their life-styles. Specifically, there has been a shift to a greater concern for individual identity in the choice of life patterns. With this change it has become increasingly necessary for society to consider ecological principles, technological potential, aesthetic reality, and human and economic resources in determining the quality of future environments. In effect, this shift in emphasis represents an effort by the members of our society to consider not only their material well-being, but their spiritual or psychic well-being as well.

Concepts To Be Developed

1. Human values
2. Quality of human life
3. Man's abilities to enrich the environment

4. Life-style choices

5. Environmental values

6. Environmental awareness

7. Personal involvement

Level VII Program Objectives

1. To enumerate the psychic and economic imperatives which are factors in our appreciation of our environment.

2. To summarize historical solutions to national and international problems dealing with the environment.

3. To survey and examine the interrelationships between personal values and psychic and economic survival.

4. To create an awareness of our feelings when we are placed in discriminatory situations.

5. To use knowledgeable students to assist the instructor in teaching other students the skills required to use available leisure time activity sites.

6. To survey the effects affluence and poverty have on awareness and attitudes toward the environment.

7. To examine the historical patterns of human movement to cities, within cities and between cities.

8. To help students understand how psychic and economic survival are related to the level of their physical and emotional health.

9. To understand the emotional effects of passivity and activity in the face of adverse environmental conditions.

10. To determine the effects of psychic condition and economic position on an individual's ability to be influential in his interactions with others.

11. To understand some of the interrelationships between life style and psychic and economic survival.

12. To determine how different cultures have dealt with environmental problems similar to those in the local community.

13. To examine student daily activities and to develop suggested activities that are less consumptive.

14. Through structured classroom activities including role playing and field trips, to experience the joy of rapport with a group and the pain of isolation from a group; and to experience the joy of rapport with nature, and the pain of isolation from nature.

15. To predict the psychological and economic impact of various environmental pollutants.

16. To understand the relationship of economic problems to individual and group environmental actions.

17. To find ways to organize people for maximum impact on environmental conditions.

LEVEL VIII

Unit Topic --- Expanded Technology and Its Effect on Human Existence

Content Overview

Technology has affected humar existence since man first discovered simple tools and used them as extensions of himself. As man organized patterns of living to reduce his incidences of failure he became increasingly reliant on systematic and mechanical answers to the problems of inefficiency.

Pyramids were built 5000 years ago through the systematizing of labor, measurement, government, record keeping, conquest, and massive construction.

Modern technology has been developed by man in the belief that it provides the highest good because of the benefits of power, speed, mass production, automation, instant communication and remote control. However, it has also resulted in pollution and waste, overuse of natural resources, mass destruction and the potential for megadeath. Technology has provided these "benefits" without regard for man's value systems and the "side effects" of his material prosperity.

Concepts To Be Developed

1. Human values
2. Quality of human life
3. Man's ability to enrich the environment

4. Life-style choices

5. Environmental values

6. Environmental awareness

7. Personal involvement

Level VIII Program Objectives

1. To examine recent movements of industries and businesses from one area to another, and the effect these moves have had on people and the natural environment.

2. To determine the extent to which expanded technology influences human density.

3. To understand how expanding technology affects the personal values of the individual.

4. To institute a United Nations Day with students representing 10 different nations trying to solve an environmental problem.

5. To have students inform community groups about the various types of activities that can be conducted at leisure time activity sites.

6. To determine factors causing decay and rebirth of inner-cities.

7. To understand how expanding technology affects the physical and emotional health of individuals.

8. To examine the possibilities of effective citizen action within the framework of modern corporate and governmental systems.

9. To compare the back-to-the-land movement as an alternative to conspicuous consumption.

10. To examine how modern technology affects occupation choice, modes of communication, transportation, and changes in family structure.

11. To publicize findings regarding factors leading to positive and negative environmental changes.

12. To analyze the growth of an industrial area in the community and the subsequent effects this had on the area through review of newspaper files and interviews with residents.

13. To summarize information on expanded technology from the publications of different environmental organizations.

CLUSTER A - ENVIRONMENT AND HE INDIVIDUAL

MODULE II

Module II Scheme: Environmental Rights and Responsibilities of Individuals and Groups

A democratic society guarantees fundamental individual, family and group rights which include benefits from the social and natural environments. In turn, society requires the acceptance of individual, family, and group responsibilities including the responsibility to restore, maintain, and enhance the environment.

Content Overview

Rights and responsibilities are counterpart aspects of human life in societies. In a society which features advanced technological development the individual is faced with serious responsibilities for protecting nature and society. The responsible participation of citizens in planning and protecting the environment is necessary if they are to enjoy its benefits.

Freedom of expression gives the citizens of our society maximum opportunity to reap the benefits of nature and society, while it simultaneously places obligations on them to protect vigorously the quality of nature and society.

Concepts To Be Developed

1. The individual in our society should have the right to be secure, to have access to necessary information, to have freedom to express himself short of violating the rights of others, and to work toward what he perceives to be positive change in his environment.

2. Families in our society should have the opportunity to live in an environment which supports the quality of life each prefers: for this reason, the social environment should provide appropriate training, employment, and housing; the natural environment should provide adequate land, air, water, and resources.

3. The individual in our society should have the right to be a member of a group which can maintain its own integrity, initiate and monitor governance of its environment for the benefit of all, and work for societal awareness of environmental conditions.

4. The individual citizen has the responsibility to insure that the natural environment will continue to provide benefits for the generations that follow

5. The individual citizen has the responsibility to restore the natural environment wherever its benefits can be recovered.

6. The individual citizen has the responsibility to improve the natural environment whenever conditions permit.

7. The individual citizen has the responsibility to become aware of existing governmental regulations intended to protect the environment and to see that enforcement systems are implemented.

8. The individual citizen has the responsibility, through his government, to create new enforcement systems whenever the environment is threatened.

9. Because healthy family life is dependent on a healthy natural environment, families have a responsibility to work towards protection of the natural environment.

10. Since the influence of collections of individuals is often greater than that of a single individual, the individual citizen has the responsibility to act through groups to guard the natural and social environment.

11. The individual citizen has the responsibility to express his ideas, to listen to the ideas of others and to participate in arriving at group decisions which enhance the environment.

LEVEL IV

Unit Topic - Interdependence in Modern Society

Content Overview

Individual and group survival depends upon coordinated human interaction with the environment.

Exercise of our rights and acceptance of our responsibilities foster the most productive interactions to protect, preserve and enhance the environment.

In our increasingly complex society the individual must become skilled at communicating with others, perceiving when his strengths are needed for group goals, participating willingly where his support is needed and sharing his purposes with those of his fellows.

Concepts To Be Developed

1. Individual rights of access to the environment
2. Family opportunities for beneficial natural and social environments
3. The rights of groups in society
4. Individual responsibilities to compromise for group goals
5. Individual responsibilities to restore, maintain and enhance the natural and social environment
6. Individual responsibilities to assist in making and enforcing laws for the good of the environment
7. Family responsibilities to work towards the protection of the environment

Level IV Program Objectives

1. To examine the rights of a nine-year-old in today's society.

2. To investigate the interactions of families with natural environment.

3. To recognize and observe the existence of conflict within groups.

4. To survey components of the natural environment which are in greatest danger of being lost to succeeding generations.

5. To become aware of school and community environmental problems as they affect students.

6. To examine which school regulations protect the natural and social environment.

7. To learn how to use various information-gathering techniques.

8. To understand and appreciate interdependencies which exist within family groups in modern society.

9. To review and categorize current examples of the action of individuals who are attempting to affect the quality of their environment in a significant way, and current examples of the actions of groups attempting the same ends.

10. To share systematically and periodically student likes and dislikes concerning the school and discuss changes which would enhance the school environment.

LEVEL V

Unit Topic --- The Impact on The Environment of Group and Individual Initiative

Content Overview

Historically, productive and fulfilling human life has relied upon the ability of citizens to combine self-realization with group membership. As population has increased, and as careful management of fixed inventories of natural resources has become more important, reliance on group processes and effective group decisions has also increased. Thus, the inherent rights of individuals to express themselves and to define their destinies must be protected through improved methods of group action and group representation.

To function independently with conviction is one standard of mature human behavior. To function in concert with others is also an essential characteristic of the individual who wishes to protect and conserve the qualities of his natural and social environment. Both independent and cooperative action will be increasingly needed during the years ahead.

Concepts To Be Developed

1. Individual rights of access to the environment
2. Family opportunities for beneficial natural and social environments
3. The rights of groups in society

4. Individual responsibilities to compromise for group goals

5. Individual responsibilities to restore, maintain and enhance the natural and social environment

6. Individual responsibilities to assist in making and enforcing laws for the good of the environment

7. Family responsibilities to work towards the protection of the environment

Level V Program Objectives

1. To examine the effects on his environment of an individual's exercise of his human rights.

2. To investigate how the environment influences the way in which a family perceives and seeks to solve its environmental problems.

3. To examine peer group conflicts.

4. To understand how several selected families affect the environment and have impact in dealing with environmental problems.

5. To assist the individual and group to become more responsible for improving the local environment.

6. To understand how groups can be instrumental in formulating new regulations and enforcing present ones.

7. To identify techniques of individuals and groups which are employed to encourage others to alter their behavior concerning their environments.

8. To experience individual and group problem-solving tasks dealing with identical environmental problems so as to discover on the basis of pre-established criteria difference in (1) efficiency, (2) accuracy and (3) quality of solution.

9. To understand the historical significance of the impact of the family group upon the environment.

10. To design and then develop a pocket park, courtyard or nature center.

LEVEL VI

Unit Topic --- Human Values and Recent Population Patterns

Content Overview

From earliest times, man has enjoyed many rights by virtue of the way he has lived; but along with these rights were implied responsibilities toward the members of his own family, other family units, communities, and his surroundings.

During simpler times, man lived more harmoniously with his environment and his impact on his surroundings was minimal. This may have been because he lacked the technology to alter his environment in any radical way. His responsibilities were there more easily discharged, both toward his fellow man and toward his environment.

As populations expanded, as living clusters became more dense, and as life's amenities proliferated, the individual's rights increasingly have been subjugated to group rights. Concomitantly, his responsibilities to influence group decisions in a positive way have grown as disturbance of the natural environment has become more pronounced and longer lasting. It has therefore become increasingly difficult to house the world's population while maintaining an individual's rights, fostering his sense of responsibility, and preserving the natural environment.

Concepts To Be Developed

1. Individual rights of access to the environment

2. Family opportunities for beneficial natural and social environments
3. The rights of groups in society
4. Individual responsibilities to compromise for group goals
5. Individual responsibilities to restore, maintain and enhance the natural and social environment
6. Individual responsibilities to assist in making and enforcing laws for the good of the environment
7. Family responsibilities to work towards the protection of the environment

Level V Program Objectives

1. To survey and analyze various habitation patterns occurring in our culture insofar as they affect the exercise of our individual rights.

2. To investigate how modern habitation patterns affect interactions among families.

3. To examine how residential groups solve their conflicts while dealing with local environmental problems

4. To understand how dislocations within our system of social activity affect other systems, even those that are remote.

5. To compare and contrast the effects of habitation conditions as they affect the individual and the group.

6. To develop individual proposals regarding what changes each student would make to enhance his local community and then to blend his ideas with those of others in the class to arrive at a group proposal.

7. To encourage the development of land-use policies that rely on the effective transfer of information among sub-groups.

8. To understand the techniques used by government to enhance the quality of the environment.

9. To discover through laboratory procedure (role-playing, simulations, etc.) the effects on individual students of success and failure resulting from purposeful individual endeavor and of success and failure resulting from purposeful group endeavor.

10. To understand the changing activities of family groups in different modern settings (urban, suburban, rural) as they affect the environment.

LEVEL VII

Unit Topic --- Psychic and Economic Human Survival

Content Overview

Economic survival and psychic survival are inextricably interwoven within the need systems of human beings. If either is threatened the other is adversely affected.

Our rights and responsibilities regarding the environment include the attention each of us must pay to maintaining our natural resources for the purposes of nurturing our spirits as well as our bodies.

Modern life makes us fully aware of the richness of mankind's advances and of the richness of the gifts of nature. The need to relate to other human beings during an era when confortable isolation is easy has magnified the importance of educational experiences which sharpen an individual's aesthetic sense and facilitate his ability to reach out to others for spiritual nourishment and economic support.

Concepts To Be Developed

1. Individual rights of access to the environment
2. Family opportunities for beneficial natural and social environments
3. The rights of groups in society
4. Individual responsibilities to compromise for group goals

5. Individual responsibilities to restore, maintain and enhance the natural and social environment

6. Individual responsibilities to assist in making and enforcing laws for the good of the environment

7. Family responsibilities to work towards the protection of the environment

Level VII Program Objectives

1. To examine whether the pursuit of happiness is consonant with the quest for economic survival: is the pursuit of happiness a cause or a cure of environmental problems?

2. To compare family life in different cultures to discover the economic implications, the evolution of family size, belief systems, and cohesiveness.

3. To investigate human potential for various kinds of psychic fulfillment.

4. To assess the psychic and economic costs of environmental protection and enhancement.

5. To examine and consider how individuals and groups can work to improve living conditions that adversely affect psychic and economic survival.

6. To examine the responsibility of the citizen to create alternative solutions for protecting the environment and to consider the economic and psychic impact of each.

7. To decide upon the elements of the environment which should be preserved for a given priority system of a social unit. (The family, community, etc.)

8. To study individual and group survival from the perspective of history and from the perspective of modern life.

9. To understand the changing structure of the family.

10. To develop a class constitution that will consider the rights and desires of each of its members.

LEVEL VIII

Unit Topic --- Expanded Technology and Its Effect on Human Existence

Content Overview

Though man represents the highest form of evolution, in many ways, he is in danger of becoming subservient to the technology he has created.

It is essential that a society examine how its members have lost individual freedom because of technological advances, and for that society to evaluate individual technological advances regarding their effect on mankind.

The impact of technology on human existence has created a crisis. If we are to insist on a quality of life which continues to value our humanity and our ability to face and solve problems, we must consider certain critical value questions which deal with the preservation of the present natural environment in the years to come.

Concepts To Be Developed

1. Individual rights of access to the environment
2. Family opportunities for beneficial natural and social environments
3. The rights of groups in society
4. Individual responsibilities to compromise for group goals
5. Individual responsibilities to restore, maintain and enhance the natural and social environment

6. Individual responsibilities to assist in making and enforcing laws for the good of the environment

7. Family responsibilities to work towards the protection of the environment.

Level VIII Program Objectives

1. To examine the positive and negative impact of technology on individual rights.

2. To investigate how expanding technology affects the mobility, cohesiveness, and structure of the family.

3. To examine and consider conflicting alternative solutions to environmental problems.

4. To analyze and assess the positive and negative implications of technology on the natural environment.

5. To explore ways in which the individual and group can use technology to improve and restore the natural environment.

6. To examine and evaluate individual and group opportunities to influence environmental regulations that will control responsible technological expansion.

7. To formulate various legal procedures that can be used to enhance the quality of the environment.

8. To examine and develop a community ordinance dealing with an environmental problem.

9. To understand the changes which modern technology have wrought on the family group.

10. To survey and analyze institutional life in America today as it impinges on the freedom of individuals and groups.

CLUSTER B - THE WEB OF LIFE

MODULE I

Module I Scheme: Dependence of All things on Each Other and The Environment For Survival

Human survival depends on an understanding and appreciation of the earth's limits and the ability to exist within these limits at a level which can be sustained on a continuous basis. The biosphere, that thin layer of life on our planet, exists within the limits set by immutable natural laws. It becomes necessary for man as he expands his influence within the biosphere to be cognizant of these natural laws. Equally important is the development of a redirection of human lifestyles and technology.

Lifestyles and technologies have developed which do not always reflect concern for the earth's limited resources. Recognition of these limits now requires an urgent re-evaluation of the trends in living conditions. This re-evaluation should be based not only upon ecological concepts but should have an ethical basis as well.

Man's awakening perception that he is an integral part of a closed system upon which he is totally dependent is already causing changes in his lifestyle. Changes in ethical views will not occur unless man accepts his role of stewardship for a complex biosphere.

Concepts To Be Developed

1. The biosphere is a closed system in dynamic equilibrium.
2. The ecosystem is a biotic community of interdependent members and their physical environment.

3. Interdependence - Everything is affected by everything else.

4. Life-style - Man's everyday living practices have a discernible impact upon his immediate environment.

5. Stewardship - Man has a responsibility to himself and future generations to develop his systems in harmony with the natural environment.

LEVEL IV

Unit Topic - Communities

Content Overview

It is convenient to view the biosphere in small functioning units. One such unit is the community which is an association of one or more populations of plants and animals in a common spatial arrangement. Communities may be described as a backyard, a particular forest or a large geographic area. The interwebbing relationships among all of the members in a community estalish it as an entity.

Man, a part of many communities, is ultimately subject to the same biological constraints as other members of a community, This fact is sometimes forgotten by man in his self-made, artificially controlled communities. When man exceeds these constraints he creates imbalances which may have disastrous effects upon the community. Some chemical controls of insects, for example, have had widespread, long-lasting global effects.

Since man is the only member of a community who can knowingly change it, the responsibility for management is his. Among these responsibilities are: the exercise of a personal environmental ethic, the notification of others of their responsibilities, and the duty to influence the community environmental ethic.

Concepts To Be Developed

1. The biosphere
2. The ecosystem
3. Interdependence
4. Life-style
5. Stewardship

Level IV Program Objectives

1. To identify communities in one's surroundings.

2. To identify a set of living things within a community which depict the interrelationships within a community.

3. To describe ways in which members of a community, including man, are interrelated.

4. To describe ways in which man places a stress on the environment by imbalances of excessive land and resource use and pollution.

5. To be aware that man has consciously created great environmental change and has an obligation to conserve environments for future life.

6. To become involved in creating solutions to environmental problems.

LEVEL V

Unit Topic --- Ecological Processes

Content Overview

Our environment is made up of systems of living and non-living things. Ecology is the study of the interactions within and among these living and non-living systems. All ecological systems can be viewed as dynamic units undergoing continuous change and adaptation characterized by a pervading trend toward equilibrium.

The individual habitat, the community, the ecosystem, the biome and the biosphere all exhibit the properties of change, adaptation, and interaction. These changes and alterations generally occur in both the biotic and the physical portions of the environment, in a slow process often unnoticed by the casual observer. A change in one factor of the environment usually results in changes in others. When forces such as man or severe natural phenomena interfere with nature's slow, methodical pace, however, change may be abrupt and severe.

A city and a forest are alike in that each is an ecosystem and a part of our biosphere. Within both of these the same ecological process may be discerned. Man must, therefore, strive to understand the basic principles of ecology so that he can better maintain and enhance his total environment.

Concepts To Be Developed

1. The biosphere
2. The ecosystem

3. Interdependence

4. Life style

5. Stewardship

Level V Program Objectives

1. To view the biosphere as a system in equilibrium.

2. To identify and understand various interactions within the biosphere and some processes within the abiotic and biotic environment.

3. To understand that living things survive through adaptation to their environment.

4. To understand that in nature matter recycles but energy does not.

5. To identify, compare and contrast the ecological processes occurring within a natural environment, and a man-made environment.

LEVEL VI

Unit Topic --- Limitation of Natural Resources

Content Overview

Centuries ago when the earth seemed so large to man the thought of running out of natural resources seemed absurd. Man's demands on the natural resources have grown because of increased population, technology and level of consumption. The once "limitless" resources now appear frighteningly small. The fact that man lives in a finite, closed system is only beginning to make an impact on man's thoughts and actions.

The use of various resources is dictated by such adverse factors as economics, traditions, cultures and technology. The impact of man on natural resources may be lessened by recycling, substitution, and proper management; however, certain resources are not renewable. There is a need for man to consider the alternatives to depleting resources and become aware of the effect his decisions may have on future generations. Part of the solution to these problems is to develop an understanding of the limits of natural resources and the need to use ecological principles as guides for their conservation.

Concepts To Be Developed

1. The biosphere
2. The ecosystem
3. Interdependence

4. Life-style

5. Stewardship

Level VI Program Objectives

1. To develop an awareness that man lives in a closed system with limited natural resources.

2. To learn that man relies on raw materials to maintain a technological society.

3. To identify some resources which are renewable and some which are non-renewable.

4. To list the basic requirements for life.

5. To be aware that cultures influence the choice and consumption of materials.

6. To explore conservation practices which help to maintain and to improve the environment.

7. To understand some of the trade-offs involved in maintaining a quality environment.

LEVEL VII

Unit Topic: Man, Technology and Environment

Content Overview

Ecological technology, the application of basic research findings to ecological problems, must be humane. It must be used to enhance the environment so that it will remain in productive harmony with man's best interests. This humane technology must recognize that although man can manipulate some components of the biosphere, this manipulation must be tempered with the realization that man is dependent upon the biotic community for the basic necessities of present and future life. Ecological technology must make accurate predictions of the consequences of tampering with biotic components.

This new technology will seek alternatives to the search for the utopia of limitless power by concentrating on effective utilization of existing power sources.

Technology can also lead to a reduction of power requirements by employing new devices (i. e., transistors) and products (i.e., polyurethane insulation). Technology is currently serving man by enabling him to develop substitutes and to devise more efficient means of utilizing remaining resources. Technology must be used as a means to obtain a better life rather than as a cause of environmental deterioration.

Concepts To Be Developed

1. The biosphere

2. The ecosystem

3. Interdependence

4. Life-style

5. Stewardship

Level VII Program Objectives

1. To understand the effects of both short and long-term pollution systems.

2. To understand that natural systems are disrupted by abnormal levels of any component.

3. To perceive man as an integral part of the biosphere, subject to the same environmental constraints as all other components.

4. To identify the elements of interrelationships between man and the ecosystem in which he functions.

5. To understand that culture and life-style determine the direction of technological advances.

6. To understand that man's responsibility for stewardship of the biosphere mandates the development of a technology compatible with the maintenance of environmental quality.

LEVEL VIII

Unit Topic --- Environmental Management

Content Overview

Environmental management should consider the process of living; that is, it should strive to understand the mechanisms which operate in the biosphere. In order to sustain a productive, enjoyable life-style, man must manage his global resources prudently. Survival skills must include waste control, wise development of preservation techniques and schemes for renewal of resources. The use and misuse of natural resources is a significant determinant of the future of the biosphere and its life sustaining properties. In our ever-changing world, ecosystems are continually altered, primarily to accommodate human needs or desires. However, man has a moral obligation to present and future generations to pass on the legacy of the livable unreduced environment.

Often environmental management problems are looked on by the individual as problems to be solved by governmental agencies, big business or universities. In fact, many environmental management problems could and should be solved by individuals on the local level. Neighborhoods and communities are their own best environmental managers. The individual who intelligently manages his own flower box may also be concerned with the neighborhood, community and country.

Concepts To Be Developed

1. The biosphere
2. The ecosystem
3. Interdependence
4. Life-style
5. Stewardship

Level VIII Program Objectives

1. To become aware of the need for resource management in the biosphere.

2. To become aware of the mechanisms for reviewing environmental management of ecosystems such as forests.

3. To identify management techniques of specific natural resources such as fisheries.

4. To define life-style and environmental alternatives as they relate to environmental quality.

5. To develop a sense of responsibility to present and future generations.

CLUSTER B - WEB OF LIFE

MODULE II

Module II Scheme: Energy and The Biosphere's Systems

The sun is the primary source of energy for the earth's life support systems. Some of this solar energy is used directly in life support systems such as the water cycle. The most important portion of solar energy absorption is that which is converted through the process of photosynthesis into chemical energy by green plants. This is the ultimate source of energy for the entire biotic community. The amount of this available chemical energy and its utilization depends upon such factors as climate, geology and the distribution and types of plants.

Man's role in energy consumption is further magnified by his use of stored energy. This finite reserve is currently sustaining man's rapidly expanding demands for energy. In our technological society the quest for energy presents great challenges and involves trade-off decisions between life styles and energy usage.

Concepts To Be Developed

1. Solar energy is the basic source of energy for living organisms.
2. Energy transfer and flow are critical to life on earth.
3. The primary consumer of a finite supply of stored energy is man.
4. Energy usage on a global basis is currently out of balance.
5. Modern technology requires vast amounts of energy for transportation, production of goods and services.

LEVEL IV

Unit Topic --- Communities

Content Overview

Living organisms need energy in the form of food for life processes. Sunlight is the principal source of energy for living organisms. Green plants utilize the energy in sunlight to produce plant tissue which may be consumed by animals. The production and consumption of food by plants and animals is an energy transfer process and is referred to as a food chain. Man obtains energy from both plant and animal sources. Man is therefore dependent on the conversion and storage of sunlight energy by green plants.

Man uses vast amounts of energy from sources of stored sunlight in his modern technologies. Petroleum is an important example of such a source. Within the man-made environment the same rules of energy transformation and consumption apply as in the natural biotic community. The major difference between biotic and technological environments is that biotic environments use abundant solar energy while most technological processes draw upon finite energy supplies.

Concepts To Be Developed

1. Solar energy
2. Energy transfer
3. The primary consumer

4. Energy usage

5. Modern technology

Level IV Program Objectives

1. To recognize different forms of energy in our surroundings.

2. To recognize that all living organisms need energy for life processes.

3. To describe the flow of energy from sunlight to animals.

4. To appreciate than man, as one member of the biotic community, is dependent on green plants for energy.

5. To recognize than man uses great amounts of energy from sources other than food.

6. To contrast the energy expenditures in a city with those in a natural biotic community.

LEVEL V

Unit Topic - Ecological Processes and Energy

Content Overview

The biosphere may be viewed as an environmental system utilizing three basic energy processes; transformation, consumption and transfer. Solar energy is transformed during the process of photosynthesis from light energy to chemical energy. Chemical energy is consumed by the living components within the environment and is transferred from one organism to another along the food chain.

Past photosynthetic activity resulted in the deposition of large deposits of plant material. Through geologic processes, this material was transformed into the vast yet finite reserves of coal, oil, and gas that we depend upon today. The distribution of these fossil fuel supplies is not uniform over the earth. Societies using large quantities of stored fuels thus find it necessary to acquire them from various global sources. This process of concentrating energy use in specific geographic areas greatly increases the potential for local and regional environmental deterioration as well as for international disputes.

Concepts To Be Developed

1. Solar energy
2. Energy transfer
3. The primary consumer

4. Energy usage

5. Modern technology

Level V Program Objectives

1. To understand that photosynthesis is the primary form of energy transformation in the biosphere.

2. To understand that the food chain is the primary mechanism for energy transfer in the biotic community.

3. To understand that man's supply of stored energy is the result of past ecological and geological processes.

4. To identify the global distribution of stored energy supplies.

5. To understand how areas of high energy usage are more likely to cause environmental disturbance

LEVEL VI

Unit Topic --- Limitation of Natural Resources

Content Overview

The earth is receiving a constant input of enormous quantities of energy from the sun. The portion of this solar energy which is converted and stored by green plants is dependent upon such factors as geology, climate and the plant cover in an area. Only a very small portion of this "captured" energy is in a form or location which makes it available to man.

Concentrated deposits of energy (i. e., coal, oil, gas, lignite, etc.) are being depleted at an ever increasing rate to satisfy the huge appetites of the highly technological nations. The present conversion of fossil fuels into usable energy is inefficient and ecologically costly.

The ecologically cleanest fuels (i. e., gas and low sulfur oil) are also those in lowest reserve. The largest energy reserve, coal, requires heavy ecological costs in mining and conversion. The conflicts between energy and environmental demands will be resolved but ultimately most of these energy reserves will become depleted. Atomic energy depends on uranium which is also a finite resource. Other sources of energy of a more enduring nature, i. e., solar, geothermal, wind, and hydro will need to be utilized more extensively as traditional sources become depleted.

The finite nature of deposits which easily and economically yield energy for man's lifestyle must be recognized. The heedless consumption of petroleum for energy may be looked upon as folly by future generations.

The greatest value of petroleum may lie in the chemical derivatives it affords and not energy. As reserves grow smaller and demands grow greater, far-sighted, well-informed decisions will have to be made to govern the use of our diminishing natural energy resources.

Concepts To Be Developed

1. Solar energy
2. Energy transfer
3. The primary consumer
4. Energy usage
5. Modern technology

Level VI Program Objectives

1. To understand that the sun emits a constant supply of energy to the earth.

2. To describe how the factors of climate, ecology, vegetation and man influence the amount of energy flow in the biosphere.

3. To realize that man is the only consumer of a finite supply of stored resources.

4. To realize that the conversion of stored energy to useful energy is inefficient.

5. To recognize that the highly technological nations require large amounts of energy.

6. To understand that man's quest for more energy has an impact on the environment.

LEVEL VII

Unit Topic - Man, Technology and Environment

Content Overview

It is essential that man use the technology he has developed to examine closely the use and abuse of energy in the past and present. Only through the implementation of appropriate strategies derived from this examination can technology serve the necessary function of maintenance and enhancement of the environment.

As the major consumer of energy in the biotic community, man has the responsibility to maintain a technology which can effectively monitor and control energy use. He must recognize that high technological involvement causes high environmental stress.

Concepts To Be Developed

1. Solar energy
2. Energy transfer
3. The primary consumer
4. Energy usage
5. Modern technology

Level VII Program Objectives

1. To understand that man's systems for the direct utilization of solar energy are economically inefficient.

2. To identify the major consumers of energy (for example, automobiles, air conditioning, etc.)

3. To understand some of the steps in natural and man-made processes for converting energy into usable forms.

4. To understand that vast amounts of energy are necessary for modern technology.

5. To perceive technological knowledge as a means of equalizing the global imbalance of energy usage.

6. To become aware that high technological involvement causes high environmental stress.

LEVEL VIII

Unit Topic --- Environmental Management

Content Overview

Modern technological societies have placed heavy demands on the earth's stored energy without adequate conservation of limited supplies. Present-day shortages will require re-evaluation of our needs and demands for energy if we are to sustain our technology and life style. Alternate sources of energy and methods to reduce present consumption must be identified. Further, new sources must be evaluated in light of environmental, social-political and health costs.

Current methods of energy production, transfer and use have exacted their toll from environmental quality. In view of this, it becomes critical that we seek alternatives such as the use of direct solar energy, wind and tides. These alternatives combined with new techniques or methods can reduce consumption and waste.

Concepts To Be Developed

1. Solar energy
2. Energy transfer
3. The primary consumer
4. Energy usage
5. Modern technology

Level VIII Program Objectives

1. To recognize that through environmental management man must seek efficient use of direct solar energy.

2. To become aware that man must manage stored energy to satisfy present and future needs.

3. To understand how a society's life styles affect total energy usage patterns.

4. To explore alternative technology for power generation and methods of energy consumption and conservation which are more compatible with improved environmental quality.

5. To explore the environmental, social and health costs of energy production and usage.

CLUSTER C - THE CITY AS AN ECOSYSTEM

MODULE I

Module I Scheme

The city: A complex ecosystem requiring extensive social and environmental planning as well as expenditures of resources to achieve conditions for quality living.

Content Overview

A city is a complicated system consisting of communities of people and their physical surroundings. People live in groups within the city as a result of occupations, incomes, and cultural interests. In addition to these social factors, environmental conditions are influenced by many natural conditions such as climate and geography.

Successful community living requires planning. The necessity for people to share space and resources equitably requires that planning be democratic. Intelligent planning for either social or environmental purposes is based on objective data and the application of tested principles.

Systems, human or otherwise, tend to run-down if not constantly replenished with energy and material resources. Resources are finite and will not suffice if not recycled and conservatively expended.

In order to establish and maintain quality community living conditions, men must exercise personal responsibility in the use of resources. In some instances, this may require changes in traditional value systems, especially when the values stress unnecessary material affluence.

Concepts To Be Developed

1. Ecosystem - a biotic community of interdependent members and and its physical environment.
2. Environmental factor - any living or non-living component of the environment which influences the ecosystem.
3. Environmental ethic - a principle which guides the equitable use of resources so that all members benefit and the environment is protected.
4. Democratic planning - a planning process which provides the greatest possible consideration of the viewpoints of every segment of the society and a means for applying the environmental ethic.

LEVEL IV

Unit Topic --- The City Environment

Content Overview

The city is an elaborate system consisting of many sub-systems. These sub-systems are comprised of restricted physical environments and communities of living organisms, with the human as the dominant life-form.

Communities are identified for convenience in studying the larger ecosystem. Discrete communities will at times overlap in membership. Certainly they are not self-sufficient and depend in many ways upon other communities within the ecosystem.

Communities, inasmuch as they are dependent upon the environment (habitat) in which they are found, may be located geographically within the larger area of the ecosystem. Identifying and locating communities requires that attributes be described accurately enough to establish the extent of their boundaries.

Concepts To Be Developed

1. Ecosystem
2. Environmental factor
3. Environmental ethic
4. Democratic planning

Level IV Program Objectives

1. To understand ecosystems within the confines of the city.
2. To be aware of environmental factors operating within the city.
3. To appreciate the need for an environmental ethic.
4. To understand the value of democratic planning.

LEVEL V

Unit Topic --- The Biotic City

Content Overview

Animals and plants which exist in the city often do so because they are the least specialized. For example, a pigeon lives among people and eats whatever food they may leave. A city habitat is shared by many members of a community and each is a distinct environmental factor within the habitat. There is an interdependence among the life forms and their physical environment, and consequently any change in the physical environment results in changes in the population of these life forms.

To be a satisfactory environment for men, a habitat must be managed for their continuous benefit. Environmental factors requiring intelligent planning will include open spaces, control of biotic forms, and air and water of good quality.

Concepts To Be Developed

1. Ecosystem
2. Environmental factor
3. Environmental ethic
4. Democratic planning

Level V Program Objectives

1. To identify the segments of the biotic community.

2. To appreciate the numerous environmental factors which operate within the environmental habitat.

3. To recognize the necessary components for effective planning in a democratic community.

4. To be aware of the biotic facets of the environmental ethic as distinguished from the biotic facets of the physical environment.

LEVEL VI

Unit Topic --- Life Support Systems for Living in a City

Content Overview

Life implies waste. Where people are densely congregated, disposal of waste is an expensive operation requiring elaborate systems. Because resources are limited, some waste products need to be recycled if possible, while others must be disposed of in a manner which protects the environment.

People require materials and energy to live. The systems for bringing materials and energy to city dwellers are quite complex and involve transportation and energy distribution. As standards of living rise, demands on these support systems also rise. Part of the means of providing an environment which will continuously support people may require lower consumption levels.

It may be necessary for attitudes to change so that quality living will not be equated with the comsumption of energy and goods. Quality living should rather be a consequence of culture and communication. To this end systems of communication are increasingly important. This is an appropriate emphasis inasmuch as such systems not only enhance cultural opportunities, but they are necessary for public information and safety.

Concepts To Be Developed

1. Ecosystems
2. Environmental factor
3. Environmental ethic
4. Democratic planning

Level VI Program Objectives

1. To be aware of the role life support systems play in ecological balance.
2. To understand the environmental implications of the waste process.
3. To appreciate the interrelationships of decisions and results in determining environmental standards.
4. To state the broad boundaries man must accept in planning life support systems.

LEVEL VII

Unit Topic --- Living in the City

Content Overview

As populations have become increasingly congested within the confines of the city, supporting an enriched life style to meet man's needs has become more difficult. This enrichment has assumed many forms, and cultural and recreational enrichment has acquired high priority.

Regardless of his niche in society, man searches for the "better life". Perhaps, most immediately, the "better life" for man involves the evaluation of his present living space and the potential for improving the living environment. An analysis of this dimension must take into account the variations in structure and open-space within the living area. Of primary importance is the adjustment, where necessary, of existing housing codes, zoning regulations, and patterns of financing housing development. The living domicile, however, cannot exist in isolation. Contiguous to the neighborhood must be adequate recreational space and appropriate recreational facilities designed to meet the particular needs of the local residents. Without sufficient housing and recreational conditions, man's opportunities for relieving human tension diminish.

Concepts To Be Developed

1. Ecosystem

2. Environmental factor

3. Environmental ethic

4. Democratic planning

Level VII Program Objectives

1. To understand the alternatives man has in selecting living space within the city.

2. To identify and compare issues which threaten the quality of life in the urban area.

3. To construct an environmental principle compatible with the city's needs for ecological balance.

4. To be aware of political considerations affecting planning decisions in the urban setting.

LEVEL VIII

Unit Topic --- City Planning

Content Overview

The interdependent nature of environmental factors requires that city planning be coordinated. Virtually every action by city agencies alters the environment to some extent. For example, a housing development adjacent to a heavily travelled truck route may result in unacceptable noise pollution levels for residents.

The needs of the people living in cities determine the kinds of plans necessary for life to be of high quality. Balancing human needs and the demands placed on the environment requires public understanding and participation in the planning process.

Every citizen has a right to be involved in the planning process which affects his city. In addition, he has a parallel responsibility to consider the needs and desires of fellow citizens and the effect of such plans upon the environment. This may be accomplished by providing factual information through the communication media while public hearings can provide for the involvement of every citizen in the decision making process.

Concepts To Be Developed

1. Ecosystem
2. Environmental factor

3. Environmental et ic

4. Democratic planning

Level VIII Program Objectives

1. To identify the large-scale urban problems present in the ecosystem.

2. To isolate the environmental considerations required by the city planner.

3. To understand the environmental ramifications of choices made within city boundaries.

4. To gather the necessary information for making elementary planning decisions on urban policy questions.

5. To suggest alternative courses of governmental action which vary from existing policy.

6. To list the general human needs most fundamental to the urban resident.

7. To suggest a medium for action on individual public policy problems.

CLUSTER C - THE MAN-MADE ENVIRONMENT AND THE QUALITY OF LIFE

MODULE II

Module II Scheme

Throughout history man has sought to use the resources of the environment to his advantage; his choices determine environmental quality.

Content Overview

Throughout the ages, man's decisions have been motivated by self-interest. When these choices are made sensibly, man is able to live in harmony with his environment. However, when self-interest moves toward selfish behavior, man begins to consider himself superior to and master of the environment in which he lives.

Technology, the efficient mechanization of effort, began as a positive form of self-interest. It permitted man to accomplish more work in less time, while maintaining a consistent level of quality. In time, the pace of the post-industrial revolution promoted the abuse of technology with industry being the central arena of abuse. At the outset, industry meant more jobs, more goods, and more options for man. Eventually, the widespread perversion of the purposes of industry and technology meant fewer jobs, poorer product quality and an ever-narrowing set of alternatives for mankind. The environmental challenge is, in part, to restore balance and quality to this interaction between industry and technology.

Concepts To Be Developed

1. Relationship between technology and environment - Man must develop a clear understanding of the relationship of technology to the total environment. That understanding must be based on past, present and projected experiences.
2. Man and his value system --- Man's relationship to the environment is dependent on his values. He must understand environmental priorities as they relate to his value system.
3. Man's stewardship of his environment --- Man is directly responsible for the future development of a healthy environment and a technologically acceptable society.

LEVEL IV

Unit Topic --- Man the Inventor

Content Overview

Throughout history man has sought to make his work easier and to become more efficient.. This has led to the development of tools and implements, such as the McCormick reaper, the spinning wheel, and the steam engine, all of which have cut down on the time required to do work. Communication, production, and transportation systems have made it possible for these inventions to be used on a broad scale. But technological improvements have led to a more complex and interdependent society and economy.

The application of the inventor's ideas have resulted in large-scale industrial complexes which have influenced the environment by depleting resources and introducing pollutants into our environment.

Concepts To Be Developed

1. Relationship between technology and environment
2. Man and his value system
3. Man's stewardship of his environment

Level IV Program Objectives

1. To acquaint children with the scientific method and the process of invention.

2. To understand man's need to invent.

3. To trace and analyze the influence of an invention upon the quality of living.

4. To trace and analyze the influence of an invention upon the environment.

LEVEL V

Unit Topic --- Consumerism --- Supply and Demand

Content Overview

Our economy is based upon supply and demand. As technology and processes of production have advanced, the numbers and varieties of products available to the consumer have increased tremendously. Thus, the individual consumer is faced with seemingly countless choices. In selecting consumable items the environmentally concerned person will consider their environmental implications (depletion of resources, pollution, etc.).

Advances in the means of communication have resulted in the bombardment of the consumer with information which sometimes creates an excessive demand and a false impression of worth. The individual's role in this complex economic system is often diminished unless he assumes responsibility for influencing production and consumption patterns. Through the democratic system, the citizen may exercise his vote in effecting change. The consumer may also take an active role in organizing groups interested in appropriately changing behavior through the media and in trying to influence legal and political institutions directly.

Concepts To Be Developed

1. Relat[illegible] of technology and environment

2. Man and his value system

3. Man's stewardship of his environment.

Level V Program Objectives

1. To understand the principle of supply and demand.

2. To understand the distinction between consumers and producers.

3. To understand the role of the media and how it can influence the consumer.

4. To understand how political and legal institutions are able to control the producer and the consumer.

5. To understand the role the individual may occupy in bringing about change through democratic systems.

6. To understand that production utilizes natural resources.

LEVEL VI

Unit Topic --- Industrialization Through The Ages

Content Overview

Man's early attempts to make his work easier took the form of sharing with the immediate group. As groups became larger, villages grew into cities and larger land areas were occupied. The need to accomplish more work in a shorter length of time became more beneficial, specialization occurred and the desire and need to trade with neighboring groups arose. In this process, bartering systems developed while increased migration and immigration resulted in an expanded exchange of customs and ideas. Through science and technology, small enterprises grew into vast industries, and developments in transportation and communication expanded to the extent that people of different continents became neighbors.

As the growth of industries has proceeded, natural resources have been used in an ever-expanding manner. These resources, renewable and non-renewable, have been used with little regard for natural limitations or the needs of future generations. In the final analysis, man's decisions related to the intelligent use of natural resources determine the quality of life.

Concepts To Be Developed

1. Relationship between technology and environment
2. Man and his value system

3. Man's stewardship of his environment

Level VI Program Objectives

1. To understand natural conditions which have aided and influenced the development of civilization.

2. To understand the efforts of primitive man to control his environment.

3. To understand the influence of increased population upon the development of technology.

4. To understand the opportunity for increased specialization as technology developed.

5. To understand the impact of the rapidly growing technology on society.

6. To understand the effect of the technological growth upon the environment.

LEVEL VII

Unit Topic --- Technology Influences Environment

Content Overview

Primitive men were controlled by their environment. They moved from place to place in search of food and shelter. As they developed tools and implements, men had more time to think, to observe their environment closely, and to broaden their understanding of it.

With the Industrial Revolution came the opportunity to organize knowledge according to disciplines and to devote energies solely to the perpetuation and growth of this body of knowledge. Men were freed to study their environment and to design better and more efficient methods of production of goods and services. This freedom led to a knowledge explosion in which man's technology allowed him to control many aspects of his environment.

This technological growth has had a tremendous impact upon the natural environment. Industrialization has reduced available resources (animal, vegetable, and mineral) and has introduced harmful chemical compounds (pollutants of air and water, atomic wastes, and synthetic materials) to the environment. Since the Earth is a closed system, men must develop an individual and a collective responsibility to utilize their knowledge without destroying environmental quality.

Concepts To Be Developed

1. Relationship between technology and environment

2. Man and his value system

3. Man's stewardship of his environment.

Level VII Program Objectives

1. To understand the ways in which technology has altered our environment.

2. To understand the ways in which technology has been used to control or modify the environment.

3. To understand man's responsibility to protect his environment through technology.

4. To understand man's responsibility to protect his environment from technology.

5. To understand the effects of knowledge upon technology and man.

LEVEL VIII

Unit Topic --- Future of Man: Problems and Potentials

Content Overview

Modern man is deeply involved in the technological aspects of society. He is constantly striving to improve his life by undertaking new ventures such as space travel, use of new materials for industry and refined techniques in medicine. Man's intelligent planning for improvement seems limited only by his ability to create tools and techniques and institutions. On the other hand, there is considerable danger that natural resources are being exhausted faster than they can be replenished. This danger is now exemplified in the rapid depletion of fuel and the pollution of air and water. Because of this danger to the quality of life, men of all nations must face the problem of establishing a balance between ever expanding consumption and dwindling natural resources.

Concepts To Be Developed

1. Relationship between technology and environment
2. Man and his value system
3. Man's stewardship of his environment.

Level VIII Program Objectives

1. To understand the importance of cooperation among nations in the advancement of technology as well as in the preservation of natural resources.

2. To be aware of alternative solutions to environmental problems.

3. To gain an appreciation of technology's potential in man's future.

4. To understand the role that governments can play in protecting environmental quality.

5. To be aware of the role of the individual in altering life styles and values so that they might promote environmental quality.

CLUSTER C - POPULATION DYNAMICS

MODULE III

Module III Scheme

The dynamics of population are influenced by man's physical and social needs.

Content Overview

There are certain influences which have caused man to move from place to place. Primitive man was forced to move by his need for food, shelter, and security. As societies developed and technological improvements were made, men sought to improve the quality of their lives and to broaden their horizons. Increasing complexity of societies brought about the development of cities which pressured individuals and groups to conform to common life styles. External pressures from political, social, legal, religious, and economic institutions have contributed to population movements.

Population size is determined by social and technological change, as well as by individual choice. Advances in knowledge and in medical science and technology have increased life expectancy, thereby increasing overall population. Social organization has been a limiting influence upon population through war, spread of disease, famine, and depletion of resources. The individual must consider the implications of continued population growth upon the environment.

Concepts To Be Developed

1. Population mobility - the movement of people is affected by many variables such as personal needs for food, shelter and security, as well as social needs and influences.
2. Population size - population is influenced by value decisions of individuals in the context of social institutions.
3. Biological limitation - the closed system of the Earth will support a finite human population.

LEVEL IV

Unit Topic --- Man the Explorer

Content Overview

From the beginning man has moved from place to place seeking to satisfy his physical and social needs. As these needs were satisfied, man's insatiable curiosity led him to explore his planet, first in small excursions, and later more extensively. As man moved from place to place, he left marks upon the environment. Some of these had short term effects, while others were permanently detrimental. Man the explorer often used and depleted the natural resources he found. Because of his lack of understanding he forced those who followed him to move to new areas to satisfy their needs. Once man found a desirable place, often others followed in great numbers in order to enrich their lives. In many instances and in certain areas growth of populations caused a devastation of the environment.

Concepts To Be Developed

1. Population mobility
2. Population size
3. Biological limitations

Level IV Program Objectives

1. To understand the reasons for man's migration to new regions.

2. To understand that man modifies his environment as he moves from place to place.

3. To understand that environmental limitations have influenced population size and movement.

4. To understand that a limited area will support only a limited population.

LEVEL V

Unit Topic --- Limitations Placed on Man by His Environment

Content Overview

Man's natural environment contains finite resources while his wants and needs can be limitless. Early man was not affected by a discrepancy between his needs and an insufficiency of available resources. As he grew in numbers it was impossible in many instances for his immediate natural environment to satisfy his needs. To overcome this problem, man searched for new environments and varied ways to utilize the newly discovered resources. Over time, the population has increased to the point where there is considerable danger that the natural resources are being used faster than acceptable substitutes can be found. It is imperative that man become aware of this danger and consider new means for regulating the available resources to satisfy his needs.

Concepts To Be Developed

1. Population mobility
2. Population size
3. Biological limitations

Level V Program Objectives

1. To understand environmental limitations placed on man.

2. To realize the danger of overpopulation of a particular area.

3. To appreciate the danger of resource depletion through population size and growth.

4. To appreciate the danger of resource depletion through mobility.

LEVEL VI

Unit Topic - Human Settlement Patterns Through Time

Content Overview

Some men have chosen to settle in a place because it fills a particular need, while others have been forced to move by external pressures. Settlement patterns developed as man located in particular areas which met his specific need to establish what he thought could be a quality life. The limitations of the immediate environment caused small groups to splinter off from larger groups, increasing the sphere of influence of particular societies. As one society infringed upon the land and resources of another, clashes took place which had severe implications for population size and movement. As societies and institutions became more sophisticated, pressures were exerted upon individuals and groups causing them to move and settle elsewhere or become extinct.

Concepts To Be Developed

1. Population mobility
2. Population size
3. Biological limitations

Level VI Program Objectives

1. To understand how group needs affect settlement patterns.

2. To realize that man's movements and settlement patterns are affected by the environment.

3. To understand that man's political and social institutions place limits on population size and mobility.

4. To understand how social conflict affects population size and movement.

LEVEL VII

Unit Topic --- Man's Mobility Influences the Environment

Content Overview

Environmental changes have been continuous. Some of these changes have been a result of natural phenomena, but perhaps the most important agent of environmental change has been man.

In order to satisfy his basic needs, man found it necessary to move and establish new communities. Sometimes his desires exceeded the resources and through ignorance or lack of concern he misused and damaged the environment. Land areas were damaged where communities were built; water and air resources were contaminated by the intrusion of large numbers of people and their industrial complexes. This growth damanded more services which often resulted in detrimental effects upon the local and distant environment.

Concepts To Be Developed

1. Population mobility
2. Population size
3. Biological limitation

Level VII Program Objectives

1. To understand that cities utilize resources from vast areas around them.

2. To explain why men tend to gather in cities.

3. To understand the progression of resource exchange from the local environment to the surrounding environment.

4. To recognize that population agglomerations are susceptible to environmental catastrophe.

LEVEL VIII

Unit Topic - Population Crisis --- Myth or Reality

Content Overview

As man re-examines and re-defines his role as an integral part of his environment, he will have to decide if continued population growth and movement will bring an end to his existence as a functional component of the ecosystem, or if his technology will enable him to increase in numbers without limitations.

Concepts To Be Developed

1. Population mobility
2. Population size
3. Biological limitation

Level VIII Program Objectives

1. To understand man's integral role within the environment.
2. To understand the implications of population growth for the individual.
3. To understand the individual's role in resource depletion and contamination.
4. To appreciate the mathematical trends in population growth data.
5. To realize the extreme danger of overpopulation from a global viewpoint.

CLUSTER C - THE EFFECT OF THE RURAL ECOSYSTEM ON URBANIZATION

MODULE IV

Module IV Scheme

The rural and urban ecosystems cannot be separated; the use of environmental resources in one has a direct relationship to the other.

Content Overview

As societies have moved from a rural to an urban focus the inter-relationship of these two ecosystems has become increasingly evident. False division between these systems are fast disappearing, with individuals in the one system relying on the resources of the other.

Resources in rural areas need to be utilized with more than mere rural interests in mind. Decision-making in the country must take the concerns of the city into account. Similarly, the priorities of the city must be responsive to rural needs as well.

Cultural and regional differences must be reconciled to promote the common good while maintaining the good aspects of the existing situation. As man develops the insight to identify these areas and the will to build appropriate cooperative mechanisms, society as a whole will benefit. Man should become more aware of the environmental problems he shares across boundaries rather than those which heretofore have separated urban and rural neighbors.

Concepts To Be Developed

1. Resource employment - The distribution of resources is an essential process requiring citizen knowledge of resource availability, societal needs, and efficient methods of distribution.
2. Rural and urban interdependence - The interrelationship of the rural and urban sectors encompasses resource allocation, population movement, environment policy decision making, and attitudinal development.
3. Cooperative agreement on priorities - The understanding that resource allocation requires the sensitive cooperation of urban and rural communities in their effort to give order to their primary goals.

LEVEL IV

Unit Topic --- Mutual Influence of Rural and Urban Communities

Content Overview

Because of our dynamic population it has become increasingly difficult to distinguish between rural and urban communities. It is extremely important that we realize the mutual influences which the two types of communities have upon each other. Economically, neither community could survive without the other. To understand this influence upon man's well-being, one must acknowledge the resources that each contributes. The urban community is dependent upon the rural community for food and raw materials such as minerals and fuel; the rural community is dependent upon the urban community for the finished products from industries such as agricultural machines, chemicals, electronics, etc.

Historically the city has depended upon the rural areas for its work force and now because of improved transportation this has become even more imperative. Many people who moved to the city for economic reasons are now, because of the pressures of city life, returning to the rural environment in an attempt to return to nature.

Concepts To Be Developed

1. Resource employment

2. Rural and urban interdependence

3. Cooperative agreement on priorities

Level IV Program Objectives

1. To understand the interdependence between the rural and urban communities concerning material goods.

2. To compare the resources which are contributed by both communities.

3. To realize the need for cooperation because of the interdependence between the communities.

4. To understand the cultural influences of one community on another.

5. To become acquainted with the need to use the resources of both communities wisely.

LEVEL V

Unit Topic --- Population Exchange --- Urban and Rural

Content Overview

The United States is rapidly becoming a nation of urban dwellers. Urbanization has happened primarily within the present century as industrialization and technology have been major forces in the economic system. The population exchange from rural to urban locations has placed considerable stress on both areas because the redistribution of natural resources lagged behind that of the population. Thus, a concerted effort was necessary to obtain the raw materials and to deliver them to the consumer. This demanded interconnecting networks of transportation and communication that have literally tied the rural and urban ecosystems together. These links provided the people with opportunities to remain mobile and allowed even greater concentration of populations.

As the phenomena of urban development continued in recent times there has been a reverse trend. Vast suburban areas surrounding the cities have grown, while industrial complexes generally have remained in the urban areas. This has caused many problems as suburban workers move from their homes to work. In addition, there is the complex problem of economically disadvantaged people who have not had the means to remove themselves from highly concentrated population areas of the central city.

The net result of population exchange from rural to urban to suburban sites is that the rural and urban ecosystems are interdependent. It is imperative that there be cooperative agreement between the two as priorities concerning resources are determined.

Concepts To Be Developed

1. Resource employment
2. Rural and urban interdependence
3. Cooperative agreement on priorities

Level V Program Objectives

1. To understand the reason why there has been a concentration of people in urban areas.
2. To be aware of the ways in which the rural and urban ecosystems depend on each other.
3. To explore ways in which rural and urban communities can plan for problems in a cooperative manner.
4. To identify critical resources in both the rural and urban areas and the means for their equitable distribution.

LEVEL VI

Unit Topic --- An Examination of an Historic Environmental Problem: Rural and Urban

Content Overview

Throughout history man has been plagued with problems whose solutions have required the cooperation of his neighbors. Some well known recent examples have been one-crop agricultural practices, the spread of plant disease, strip mining, and weed control.

Weed control has been of significant importance to man since early times. Although often used as food, medicine and as a prevention of erosion, weeds are most often considered a pest and a spoiler of the landscape. In many cases the simple controls of chopping, cutting, flooding and burning have been replaced by the use of herbicides. The contamination of food, water, and the destruction of wildlife, are some of the by-products of herbicide use. The fast growing production and widespread use of herbicides have had important implications for both rural and urban political, economic, and environmental systems.

The solution to this problem of weeds, like so many other problems, requires the intelligent cooperation of urban and rural groups.

Concepts To Be Developed

1. Resource employment
2. Rural and urban interdependence
3. Cooperative agreement on priorities

Level VI Program Objectives

1. To learn to value all living things and their contributions to man.

2. To understand the effects of chemical controls on our environment.

3. To understand why the rural and urban societies must work together to solve common problems, such as weed control.

4. To generalize to other areas of environmental concern that require rural and urban cooperation for solutions.

LEVEL VII

Unit Topic --- Alternative Lifestyles and Environmental Issues

Content Overview

Concern over the exploitation of natural resources and general degradation of the environment has prompted some individuals to develop life styles in stark contrast to the life style attributed to most Americans. In many instances the alternative life style is characterized by a return to the presumed simplicities of rural life of an earlier time in our history. A typical alternative life style includes concepts such as self-sufficiency for food, shelter and education; the presumption that "natural" materials are superior to "mass-produced" materials; that personal satisfaction is more likely to accrue from generalized skills than from occupations that are specialized; and that personal values which are in harmony with the preservation of the natural environment are superior to those associated with the accumulation of wealth and comfort.

Some of the people who have selected such alternatives have banded together in groups and have developed various patterns of social regulation to facilitate living together. In many instances these codes of conduct are unwritten and simplistic --- often in sharp contrast to the elaborate bureaucratic systems which regulate life in the United States generally.

Quite often a kind of "Golden Rule" morality is the basis of these alternative social codes.

In evaluating various alternative styles of living, it is necessary to consider them in the context of such realities as population and the "carrying capacity" of the environment; the modern economic system and its demands for resources, occupational efficiency, and competitive marketing; and the "rising expectations" which people have for education, recreation, and cultural enrichment. Perhaps the proper evaluative question should be: Are there alternative lifestyles from which people may realistically choose?

Concepts To Be Developed

1. Resource employment
2. Rural and urban interdependence
3. Cooperative agreement on priorities

Level VII Program Objectives

1. To examine an alternative group lifestyle as it is described in the literature.
2. To analyze the needs of the people as they are described and the means used for satisfying those needs.
3. To study the rules which regulate the group behavior.
4. To list the environmental priorities of the group.
5. To compare the needs, means of satisfying needs, social regulations, and priorities of the counter-culture group described and their environmental implications.

LEVEL VIII

Unit Topic --- Comparative Environmental Systems

Content Overview

Increasingly, the collection of separate nations across the globe approaches one world. Telstar, satellites and earth-orbiting transportation units bring men closer together each day. While man eagerly awaits the exchange of his neighbor's surplus, he seems to choose to ignore his neighbor's problems. If man lives in a "one-nation world", he must realize the responsibilities he shares with his neighbors. Often they have the same problems; seldom is there a cooperative effort to find solutions. Often they have the same desires; seldom do they share the means of satisfying them. Often they have the same potential for effective planning; seldom is planning coordinated.

Man has the capability to solve many of the environmental problems which presently transcend local and national boundaries. Unfortunately, man's response to solving common problems has not been on a cooperative basis. Today, the implicit challenge is for man to identify the problem common to others, to organize and deliberate on these issues, and to reorder international priorities to meet the common needs. The urbanization of spaceship Earth means much for all men, regardless of whether they are located in the rural reaches of Kansas or Katmandu.

Concepts To Be Developed

1. Resource employment

2. Rural and urban interdependence

3. Cooperative agreement on priorities

Level VIII Program Objectives

1. To identify and compare problems shared by rural and urban sectors which traverse national boundaries.

2. To understand the component parts of the policy-making process.

3. To examine history to find methods of solving environmental problems.

4. To develop an appreciation of local, national, and international problems of resource allocation.

5. To be aware of the interdependence of rural and urban sectors and the need for problem-solving techniques which account for these interrelationships.

CLUSTER D - SPACESHIP EARTH - NATURAL RESOURCES MANAGEMENT

MODULE I

Module I Scheme

Production, consumption and recycling must be based upon intelligent use of natural resources

Content Overview

"The humanness of life depends above all on the quality of man's relationship to the rest of creation --- to the winds and the stars, to the flowers and the beasts, to smiling and weeping humanity."[1] We can no longer think of ourselves, or our community, or even our nation as an entity in and of itself, for the underdeveloped nations are emulating our life style, and the interdependency among nations continues to grow.

Our present way of life involves the consumption of huge amounts of manufactured material and processed products, and the disposal of like amounts of waste.

The reality that earth is a finite spaceship with the sun as its fuelship is a difficult concept to comprehend. However, all of the energy on planet Earth is derived from the sun. Solar energy is radiated as light rays with a small percentage used by some plants in the photosynthetic process. The earth's ecosystem, in order to continue functioning in its present or near present state, must therefore depend on the interaction of all plants and animals and their necessary nutrients.

[1] Rene Dubos - So Human an Animal, Chas. Scribner, New York, New York, 1968 PB

The ecological system can develop some degree of tolerance, but in the process there is a loss of stability and undesirable conditions are created. Man as a link in the ecological chain seemingly tolerates many forms of pollution slowly creeping into his daily life, but he will eventually pay for it through physical and mental discomfort.

The air we breathe, the water we drink, the sounds we hear and the world we see have all been polluted to a dangerous level. Survival of a quality environment will depend on the wise management of natural resources to meet our physical and mental needs.

Concepts To Be Developed

1. Survival: Certain natural resources are essential for man's survival.
2. Limited Resources: Because natural resources are limited, their wise management is needed to ensure the mental and physical health of people.
3. Accountability: All users must be held accountable for their impact on the environment.

LEVEL IV

Unit Topic --- The Haves and The Have Nots

Content Overview

Throughout the history of humankind, different social and cultural groups have existed at various levels of development. These differences have been caused by various factors, internal and external, natural and man-made.

As man developed the ability to influence his environment, change became more rapid and more complex. The world is comprised of many diverse social, political and economic groups, whose wide diversity of life styles has varying influences on the environment.

Concepts To Be Developed

1. Survival
2. Limited resources
3. Accountability

Level IV Program Objectives

1. To compare the present standard of living of different social and cultural groups, looking closely at the resources they use, ranging from the most limited to the most plentiful.

2. To identify the historical, geographical and cultural reasons for these group differences.

3. To identify changes that have occurred in these groups throughout one or more specific time periods.

4. To determine possible future conditions and alternative directions of change which will promote human survival and environmental quality.

LEVEL V

Unit Topic --- Recycling Imitates Nature

Content Overview

Recycling has always occurred in nature. For example, soil is renewed through the growth and decay of plants and animals in a recurring cycle.

At times humans have interfered with the operation of these natural cycles, sometimes causing or intensifying the deterioration or destruction of lakes, rivers and oceans; endangering plant and animal life; and causing the disappearance and depletion of soil through neglect and mismanagement. This mismanagement has resulted in deleterious effects on such diverse matter as buildings, plants, animals and human beings.

Human survival depends upon man's recognition of his role in the cycles of nature and his accountability to the natural and man-made environments.

Concepts To Be Developed

1. Survival
2. Limited resources
3. Accountability

Level V Program Objectives

1. To analyze the different natural recycling processes that occur in our environment.

2. To determine how the lack of or interference with natural recycling can affect our environment.

3. To determine present man-made recycling processes.

4. To identify future recycling needs and limitations imposed by the earth as a closed system.

LEVEL VI

Unit Topic --- Needs and Wants

Content Overview

Natural resources are used to satisfy the widely divergent needs and wants of mankind.

Depletion of natural resources is occurring --- in some cases much faster than they can be replenished and in other cases with no possibility of replenishment. To optimize the use of natural resources, priorities must be determined for the use of these resources to satisfy the needs and wants in varied environmental situations. Present methods of setting these priorities must be critically examined and alternative means must be devised which take into account both positive and negative aspects of the total environmental impact of future uses.

Concepts To Be Developed

1. Survival
2. Limitation of natural resources
3. Accountability

Level VI Program Objectives

1. To differentiate between survival needs and human wants and the quality of life.

2. To compare natural resources used to satisfy needs with those used to satisfy wants.

3. To compare needs for survival in the pupil's environmental setting to those required in other environmental settings.

4. To identify the natural resources required to meet survival needs in different environmental settings.

5. To examine the effects of the use of natural resources for needs and wants and to differentiate between desirable and undesirable effects on the environment.

6. To identify kinds of pollution resulting from use of manufactured products.

7. To determine who should bear the expense for control and correction of undesirable effects on the environment.

8. To examine how decisions affecting use of natural resources are made.

LEVEL VII

Unit Topic --- Who Will Pay?

Content Overview

As the environment of spaceship earth becomes increasingly degraded, people must work at solving the problems that have caused the existing undesirable conditions. The question of who will pay for the solutions is a real one. The individual alone and with groups must assume the responsibility of becoming aware of environmental problems, knowledgeable regarding these problems and motivated to work toward a solution.

Historically, man has abused his world and it has only been in the last decade that awareness of environmental conditions has been widespread.

Resources have been exploited without apparent concern or knowledge of their role in a balanced world.

The results of our social, technological and economic actions have placed the world in its present condition. If man is to continue on his present course, the fate of planet Earth may be disastrous.

Environmental degradation has monetary costs as well as mental and physical health costs.

Who will pay for improving the quality of life on Earth and ensure wise use of resources? It relates directly back to the individual and to groups and the knowledge they possess regarding their place in the ecological chain. All must bear the responsibility for solving environmental problems.

Concepts To Be Developed

1. Survival
2. Limitation of natural resources
3. Accountability

Level VII Program Objectives

1. To understand that each individual has a responsibility to increase awareness and involvement in environmental problems and solutions.

2. To understand that resources must be used wisely for various social, scientific, technological and economic reasons that may or may not be apparent.

3. To recognize the monetary as well as mental and physical health costs of environment degradation.

4. To understand man's place in and responsibility for the ecological chain.

LEVEL VIII

Unit Topic --- Past, Present and Future

Content Overview

Today's environmental problems have resulted from past actions and continue to grow in today's society. Unless these problems are identified and contained, they will continue into the future with even greater ramifications.

Although environmental problems have always plagued mankind, more recently there has been an obvious acceleration, caused partly by the Industrial Revolution, the population explosion, and world competition.

Concepts To Be Developed

1. Survival
2. Limitation of natural resources
3. Accountability

Level VIII Program Objectives

1. To develop an historical perspective of environmental problems in order to perceive current environmental issues and identify future problems.

2. To assess the degree of potential environmental impact of man as an individual and as a member of a group.

3. To be able to make reasonably accurate predictions about the future of the earth concerning such things as: the survival of man, changes in the man-made environment and limitations of natural resources.

4. To understand that present technology evolved out of man's perceived needs and desires and that man is the prime cause of change.

5. To understand past, present and future effects of different cultures on the environment.

6. To understand that change and/or progress made by one group may well affect another group within the ecological chain.

CLUSTER D - SPACESHIP EARTH - DECISION MAKING

MODULE II

Module II Scheme

Political, economic and social decisions have impact on the world's environmental problems and solutions.

Content Overview

Environmental problems are created by individual and institutional decisions. These environmental problems include such areas of concern as: water pollution, radiation hazards, food management, disposal problems, distribution of energy, and over-population.

The decisions are the result of political, economic and social considerations. Political and economic expediency often result in such actions as exploitation of natural resources. Social forces such as mobility, conflict of ideas or cultural modes may be the root cause of such problems as pollution.

Solutions to these problems are usually sought and attempted only after concern becomes widespread and political and economic leadership accepts the responsibility for selecting and implementing solutions. This may be accomplished on a local level (e.g. urban, suburban, neighborhood), at a regional level (e.g. geographic region, state, group of states or group of nations), within a special interest group (e.g. a group of similar industries, multi-lateral national groups, specially created agencies) or on a world-wide basis (e.g. international agencies).

It is clear that the number of necessary actions are increasing and the actions of all of these groups are interrelated. This constant intensification of environmental problems must force institutions to accept the responsibility for leadership in finding creative, innovative and workable means of implementing solutions for these problems.

Concepts To Be Developed

1. Institutions: A variety of institutional structures are involved in planning and managing the environment.
2. Cooperation and Communication: Mutual recognition of changing needs and value systems is an essential step toward the resolution of environmental problems.
3. Problem-Solving: Alternative solutions for environmental problems require decisions based on the interplay of economic, technological, political and social factors.

LEVEL IV

Unit Topic --- We're All In This Together

Content Overview

In the past different institutions have operated in various ways, often with little or no realization of negative effects of their activities on the environment. With a growing concern for the quality of future life, a balance must be sought among various economic, technological, political and social factors in determining alternative environmental solutions.

Cooperation at local, regional and world-wide levels, among all types of institutions, is essential to effect solutions which will optimize environmental quality.

Concepts To Be Developed

1. Institutions
2. Cooperation and communication
3. Problem-Solving

Level IV Program Objectives

1. To identify institutional structures and their effects on environmental management.
2. To identify the individual's role in these institutions.

3. To recognize the effect of different value systems and changes in these systems on the concern for an approach to environmental problems.

4. To recognize the need for solutions to environmental problems, attempting to achieve a balance among economic, scientific, technological, political, and social factors.

LEVEL V

Unit Topic --- How Many Ways To Go?

Content Overview

Various levels of economic, scientific, technological, political and social institutions, agencies and groups affect environmental quality. These levels are operating in local communities and in larger geographic areas. In order to achieve the goal of effective environmental management, cooperation among these institutions is essential. The effects of these institutional forces on the environment are evidence of the need for consideration of alternative solutions to environmental problems.

Concepts To Be Developed

1. Institutions
2. Cooperation and communication
3. Problem-Solving

Level V Program Objectives

1. To identify the effects different institutions have on environmental management.

2. To identify the variety of levels of economic, technological, political, and social institutions involved in providing alternative solutions to environmental problems.

3. To explain the need for cooperative management among various institutions for successful solutions of environmental problems.

LEVEL VI

Unit Topic --- Citizens Stimulate: Institutions Respond

Content Overview

The influence of governmental and non-governmental institutions and other groups (including industry, citizen action groups and the communications media) on the environment needs to be explored and understood. These institutions and groups have impact, local to international in scope, on both the creation of environmental problems and the methods employed to solve these problems.

Environmental problems and solutions are very often interrelated. An environmental impact in one geographic area may often cause a widening reaction. Future changes in the operation of institutions and groups are needed to attend more adequately to the implications of this interrelationship.

Concepts To Be Developed

1. Institutions
2. Cooperation and communication
3. Problem-Solving

Level VI Program Objectives

1. To identify environmental problems of a local, regional or worldwide nature.

2. To note methods used in attempting to solve environmental problems at local, regional and world-wide levels.

3. To identify the instructional and other groups involved in planning and managing operations with environmental impact at the local, regional and world-wide levels.

4. To explain the degree of success and failure of institutional groups and others in dealing with selected environmental problems at the local, regional and world-wide levels.

5. To recognize and explain the interrelatedness of environmental problems and the interrelatedness of solutions.

6. To propose speculative alternatives to present institutional structures, and propose innovative solutions to present and future environmental problems.

LEVEL VII

Unit Topic - Can You Fight City Hall?

Content Overview

In modern society it is no longer feasible for man to disassociate himself from political and social strategies that continue to affect his environment and lifestyle.

Oceans no longer isolate continents, and man has become socially, politically and technically international, causing global environmental problems. Thus man needs to be informed concerning international as well as local and regional environmental issues that will have bearing on his present as well as on his future. He also needs to understand the techniques of problem-solving and how to apply them to environmental problems.

As an individual, man can exert his personal influence on an issue to bring about change; also, collectively through a variety of ways including involvement in voluntary eco-action organizations he can bring about change at all levels of government.

Concepts To Be Developed

1. Institutions
2. Cooperation and communication
3. Problem-Solving

Level VII Program Objectives

1. To understand that man has evolved as a social animal in order to live more efficiently and effectively.

2. To understand that social order requires managerial responsibilities.

3. To understand that social order requires communication and cooperation at all levels of government: local, national and international.

4. To understand that present-day social order requires continued technical and political problem-solving.

5. To understand that solving one technical, political or social problem may create new problems more difficult to solve.

6. To understand that the modern-day social order utilizes natural resources and that these resources are finite.

LEVEL VIII

Unit Topic --- Quality and Quantity

Content Overview

Qualitative and quantitative orientations by individuals and institutions produce very different but often equally useful value systems and thought processes. However, the difference at times may be great enough to cause serious communication problems and hamper any attempt to discuss and solve environmental problems cooperatively.

It must be stressed that one way of thinking is not necessarily better or worse than the other, even though good and bad attributes can be identified and discussed for each. Qualitative approaches have a bad reputation for inefficiency, wishy-washiness, insecurity, emotionalism and permissiveness, but they exemplify such good attributes as trust, concern and self-discipline. They also enable individuals and institutions to save time and money in making and implementing environmental decisions and in planning environmental management.

On the other hand, quantitative approaches have been thought to promote materialism, distrust, planned obsolescence and exploitation. At the same time, quantitative approaches reflect necessary and good qualities such as: efficiency, fairness, logical process and law and order. Without quantitative thinking we would not be able to have a basis for communications, for the approach provides statistics and data and allows us to pin down rights and responsibilities. The quantitative approach does require

considerable time and money and this frustrates impatient people, but often the extra expenditures are necessary and useful.

In short, it is necessary for individuals and institutions to use quantitative approaches for wise and efficient planning and environmental management. However, in order to preserve our humanity and instill self-discipline into people concerning the environment, it is necessary to use the qualitative approach.

To provide for cooperation and communication among individuals and institutions on environmental matters it is necessary to recognize, understand and tolerate the differences and unique attributes of both ways of thinking.

Concepts To Be Developed

1. Institutions
2. Cooperation and communication
3. Problem-Solving

Level VIII Program Objectives

1. To understand the meaning of the words "quality" and "quantity".

2. To develop an awareness of human needs based on quality and/or quantity and to understand how these needs may be reflected in individual and institutional value systems.

3. To be able to differentiate between qualitative and quantitative solutions to environmental problems and to assess their relative usefulness.

4. To understand that communication and cooperation between groups is difficult when one group is quality oriented and the other is quantity oriented.

5. To understand the relationships between qualitative and quantitative orientations as they apply to self-discipline or regulatory type solutions to environmental problems.